

# PROJECT MANUAL

## ROOFTOP UNIT REPLACEMENT QUIDNESSETT ELEMENTARY SCHOOL

166 MARK DRIVE, NORTH KINGSTOWN, RI

North Kingstown School Department  
Bid Number 2022-09



**October 15, 2021**

### **OWNER:**

**Town of North Kingstown  
80 Boston Neck Road  
North Kingstown, Rhode Island**

### **Architect:**

**Edward Rowse Architects, Inc.  
400 Massasoit Avenue, Suite 300, Second Floor  
East Providence, Rhode Island**

**Rooftop Unit Replacement  
Quidnessett Elementary School  
166 Mark Drive, North Kingstown, RI**

**Project Team**

**OWNER:**

**Town of North Kingstown**  
100 Fairway Drive  
North Kingstown, Rhode Island 02852

**SCHOOL DISTRICT:**

**North Kingstown Public Schools**  
100 Romano Vineyard Way, Suite 120  
North Kingstown, Rhode Island 02852

**OWNER'S PROJECT MANAGER:**

**Keough Construction Management**  
312 Waterman Avenue  
East Providence, Rhode Island 02914  
Tel (401) 383-8266

**ARCHITECT:**

**Edward Rowse Architects, Inc.**  
400 Massasoit Avenue, Suite 300, 2ndFlr  
East Providence, Rhode Island 02914  
Tel (401) 331-9200

**STRUCTURAL:**

**Pare Corporation**  
8 Blackstone Valley Place  
Lincoln, Rhode Island 02865  
Tel (401) 334-4100

**ENGINEER:**

**Building Engineering Resources, Inc.**  
66 Main Street  
North Easton, Massachusetts 02356  
Tel (508) 230-0260

**COMMISSIONING AGENT:**

**Consulting Engineering Services**  
Corporate Headquarters  
811 Middle Street  
Middletown, Connecticut 06457  
Tel (860) 632-1682

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## INVITATION FOR BIDS

### QUIDNESSETT ELEMENTARY SCHOOL ROOFTOP UNIT REPLACEMENT NORTH KINGSTOWN, RHODE ISLAND

Sealed proposals for the above, will be accepted at the Office of **Steve Tremblay, North Kingstown School Department, 120 Fairway Drive, North Kingstown, RI 02852, until 11:00 A.M. on November 8, 2021**, and will then be publicly opened and read aloud.

#### **NO BIDS WILL BE ACCEPTED AFTER THE 11:00 A.M. DEADLINE**

The bid will be evaluated as to R.I.G.L. 45-55-5. (2) “Competitive Sealed Bidding”; and the award shall be made on the basis of the lowest evaluated or responsive bid price.

The CONTRACT DOCUMENTS MAY BE EXAMINED, DURING NORMAL BUSINESS HOURS, BETWEEN THE HOURS OF 9:00 AM TO NOON AND 1:00 PM TO 4:00 PM, MONDAY THROUGH FRIDAY AT THE OFFICE OF Edward Rowse Architects, 400 Massasoit Avenue, Suite 300, Second Floor, East Providence, Rhode Island on or after **October 18, 2021**.

The CONTRACT DOCUMENTS may be downloaded on or after **October 18, 2021** at no charge at [www.edwardrowsearchitects.com](http://www.edwardrowsearchitects.com) by clicking on bid opportunities or at [www.questcdn.com](http://www.questcdn.com) under Login using **QuestCDN#6839708**. Contact Quest CDN.com at 952-233-1632 or [info@questcdn.com](mailto:info@questcdn.com) for assistance in membership registration and downloading this digital project information. Contractors may also download the Contract Documents (drawings and specifications in “pdf” format for their use) by accessing the North Kingstown School department website Hyperlink at [https://www.nksd.net/apps/pages/index.jsp?uREC\\_ID=796094&type=d&pREC\\_ID=1187039](https://www.nksd.net/apps/pages/index.jsp?uREC_ID=796094&type=d&pREC_ID=1187039); City of Newport Online Bidding System Hyperlink at <http://eprocmnt.cityofnewport.com> and RI State Division of Purchases Other RI Solicitation Opportunities Hyperlink at <http://www.purchasing.ri.gov/bidding/ExternalBidSearch.aspx>. Printing of the Contract Documents shall be at the Contractor’s expense.

A certified check or Bid Bond, payable to the Owner in the amount of Five Percent (5%) of the contract bid amount, **MUST** be furnished by each General Contractor in accordance with the provisions included in the Information for Bidders.

It is the policy of the North Kingstown School Department to make every effort possible to assure the participation of small, minority (MBE), and female owned (WBE) businesses in accordance with Rhode Island General Laws.

*“In accordance with RI Gen. Law § 37-14.1-1, it is the policy of the State of Rhode Island to support the fullest possible participation of firms owned and controlled by minorities (MBEs) and women (WBEs). Pursuant to §§ 37-14.1-2 and 37-14.1-6, MBEs and WBEs shall be included in all state purchasing, including, but not limited to, the procurement of goods, services, construction projects, or contracts funded in whole or in part with state funds, or funds which, in accordance with a federal grant or otherwise, the state expends*

*or administers. MBEs and WBEs shall be awarded a minimum of ten percent (10%) of the dollar value of the entire procurement or project. MBE participation credit shall only be granted for firms duly certified as MBEs or WBEs by the State of Rhode Island, Department of Administration, Office of Diversity, Equity and Opportunity, MBE Compliance Office (MBECO). The current directory of firms certified as MBEs or WBEs may be accessed at <http://odeo.ri.gov/offices/mbeco/mbe-wbe.php> or by contacting Dorinda Keene at the MBECO at (401) 574-8670 or via email at [Dorinda.Keene@doa.ri.gov](mailto:Dorinda.Keene@doa.ri.gov) ”*

A Performance Bond of One Hundred Percent (100%) of the contract price and a Labor and Material Bond of One Hundred Percent (100%) of the contract price with a satisfactory surety company will be required of the successful Bidder.

The technical point of contact for this project is Mr. James M. Partridge, Project Architect, Edward Rowse Architects, Inc., who can be contacted at (401) 331-9200 or by email at [jpartridge@rowsearch.com](mailto:jpartridge@rowsearch.com). All questions shall be submitted in writing to Mr. Partridge no later than **5:00 PM (EST) on Monday, November 1, 2021.**

A **MANDATORY** Pre-Bid meeting will be held at the **Quidnessett Elementary School, 166 Mark Drive, North Kingstown, RI 02852 on October 27, 2021, starting at 3:30 PM.** The meeting shall also include touring the Quidnessett Elementary School facility as part of this conference.

A Certificate of Insurance showing \$1 million General Liability and \$1 million Any Auto, with the Town being named as an additional insured, Worker's Compensation, with a waiver of subrogation, and a payment and performance bond, each in the amount of 100% of the project will be required of the successful bidder.

The Town of North Kingstown, Rhode Island is exempt from payment of the Rhode Island Sales Tax under the 1956 General laws of the State of Rhode Island, 44-18-30 Paragraph I, as amended. The Town of North Kingstown is exempt from payment of Federal Excise Taxes. The bid must be exclusive of taxes and will be so construed. Exemption certificates will be provided to the successful General Contractor and their sub-trade contractors.

The payment of Davis Bacon Requirements or Prevailing Wages is required on this project. Bidder's attention is called to the provisions for equal employment opportunity.

The North Kingstown School Department, North Kingstown Rhode Island reserves the right to reject any or all proposals or parts thereof; to waive any formality in same, or accept any proposal deemed to be in the best interest of the Town.

The North Kingstown School Department will provide interpreters for the hearing impaired at any pre-bid or bid opening, provided a request is received three (3) days prior to said meeting by calling (401) 268-6410.

Mary King  
Chief Operating Officer  
North Kingstown School Department  
100 Romano Vineyard Way, Suite 120  
North Kingstown, Rhode Island 02852

**NORTH KINGSTOWN SCHOOL DEPARTMENT  
NORTH KINGSTOWN, RHODE ISLAND  
INFORMATION FOR BIDDERS**

**ARTICLE 1. RECEIPT AND OPENING OF BIDS**

Sealed bids must be submitted in SEALED ENVELOPES, addressed to the North Kingstown School Department (NKSD), 120 Fairway Drive, Town of North Kingstown, Rhode Island, Office of Steve Tremblay, 120 Fairway Drive, North Kingstown, Rhode Island 02852, and clearly marked with the name of the item bid, and the date and time of opening. Bids will be received by the North Kingstown School Department, Director of Administrative Services up to the specified time as noted on the Invitation to Bid, and publicly opened and read aloud at the specified time.

Proposals submitted for a specified item must not be combined under the same cover with any other bid item.

It is the bidder's responsibility to see that his bid is delivered within the time and at the place prescribed. Proposals received prior to the time of opening will be securely kept unopened. No responsibility will attach to any officer or person for the premature opening of a proposal not properly addressed and identified.

Any bid received after the time and date specified shall not be considered, by messenger or by mail; even if it is determined by the Town that such non-arrival before the time set for opening was due solely to delay in the mails for which the bidder is not responsible. Conditional or qualified bids will not be accepted.

**ARTICLE 2. PREPARATION OF BID**

Each bid must be submitted on the prescribed form. All blank spaces for bid prices must be filled in, in ink or typewritten, both in words and figures. Erasures or other changes must be explained or noted over the signature of the bidder. Each bid must be submitted in sealed envelopes, clearly labeled, so as to guard against opening prior to the time set therefore.

The NKSD may consider any bid not prepared and submitted in accordance with the provisions hereof and reserves the right to reject any or all proposals in whole or in part, toward any item, group of items, or total bid; to waive any technical defect or formality in same, or to accept any proposal deemed to be in the best interest of the Town.

In the event more than one item is requested and/or listed on the Proposal Form, bidders may bid on any or all items. The NKSD reserves the right to make award on an item for item basis or aggregately, whichever may be in the best interest of the NKSD.

**ARTICLE 3. TELEGRAPHIC MODIFICATION**

Telephonic, telegraphic or oral bids, amendments or withdrawals will not be accepted.

**ARTICLE 4. WITHDRAWAL OF BIDS**

Bids may be withdrawn personally or by written request at any time prior to the time specified for the opening. Bids may be modified in the same manner. Negligence on the part of the bidder in preparing the bid confers no right of withdrawal or modifications of his bid after such bid has been opened.

**ARTICLE 5. QUALIFICATIONS OF THE BIDDER**

The NKSD reserves the right to request each bidder to present evidence that he is normally engaged in purveying the type of product or equipment bid on. No bid shall be considered from bidders who are unable to show that they are normally engaged in purveying the type of product or equipment specified in the bid proposal.

To receive full consideration, the bidder must submit literature and necessary details, when applicable, on the material or service he proposes to furnish in order that the Town may have full information available when analyzing the proposals.

**ARTICLE 6. OBLIGATIONS OF THE BIDDER**

At the time of opening of bids, each bidder will be presumed to have inspected the Specifications and Contract Documents (including all addenda) which has been sent to the address given by such bidder. The failure or omission of any bidder to receive or examine any form, instrument, or document or to inspect any item specified as a Trade-in shall in no way relieve any bidder from any obligation in respect to his bid. Any exceptions or deviations from the provisions contained in this Specification must be explained in detail and attached to proposal. If such deviations do not depart from the intent of this notice and are in the best interest of the NKSD, the proposal will receive careful consideration.

**ARTICLE 7. BID SECURITY**

Each proposal must be accompanied by bid security in the form of a Certified Check or Bid bond payable to the Town of North Kingstown, Rhode Island in the amount of FIVE PERCENT (5%) of the total amount bid. Bid security of unsuccessful bidders will be returned following award of bid and/or execution of a contract. Bid security of the successful bidder will be retained by the Town until bid requirements are met or forfeited to the Town upon bidder’s failure to perform contract obligations.

Any successful bidder with drawing his bid subsequent to bid opening shall forfeit his bid deposit.

**ARTICLE 8. “OR EQUAL” BIDDING**

The NKSD intends to permit liberal scope in bidding and specifically does not intend to limit bidding to any one make or model. Whenever a material, article or piece of equipment is identified by reference to manufacturers’ or vendors’ names, trade names, catalogue numbers, etc., it is intended merely to establish a standard; and any proposed material, article, or equipment of other manufacturers and vendors which will perform adequately the duties imposed by the general design will be considered equally acceptable provided it is in the opinion of the town to be of equal substance and function.

**ARTICLE 9. PRICES**

Bidders shall state the proposed price in the manner as designated in the Bid Proposal Form. In the event that there is a discrepancy between unit prices and the extended totals, the unit prices shall govern. In the event that there is a discrepancy between the price written in words and written in figures, the prices written in words shall govern. The prices in this bid shall be irrevocable for ninety (90) days, or until the bid is awarded by the North Kingstown School Department. After award by the North Kingstown School Department, said prices shall then remain firm for the duration of the Contract.

**ARTICLE 10. TAX EXEMPTIONS**

The Town is exempt from payment of the Rhode Island Sales Tax under the 1956 General Laws of the State of Rhode Island, 44-18-30 Para. I, as amended. The Town is exempt from payment of Federal Excise Taxes. The prices bid must be exclusive of taxes and will be so construed. Exemption certificates will be completed as required by the successful bidder.

**ARTICLE 11. CONTRACT PERIOD AND TERM OF AGREEMENT**

Contract period:   TBD  . If financially advantageous to the Town of North Kingstown, these contracts may be renewed or extended, from time to time, when agreed to, in writing, by both parties.

**ARTICLE 12. LABOR REGULATIONS**

The following paragraphs regarding nondiscrimination in employment shall be included and become part of these specifications:

- a. Contractors shall comply with the provisions of the General Laws of Rhode Island and attention is called to Title 37, Chapter 13, Section 1-16, relative to the payment of wages, obligations and charges by Contractors on public works projects.
- b. Non-resident Contractors are subject to Section 44-1-6 of the Rhode Island General Laws, as amended. (OUT OF STATE CONTRACTORS.)
- c. The successful bidder will be required to comply with the Davis-Bacon Act (40USC 2 to a-7) as supplemented by Department of Labor regulations (29CFR Part 5).
- d. The successful bidder will be required to comply with the Contract Works Hours and Safety Standards Act (40 USC 327-330) as supplemented by Dept. of Labor Regulations (29CFR, Part 5).
- e. The successful bidder will be required to comply with Executive Order 11246, entitled Equal Employment Opportunity, as amended, and as supplemented in Department of Labor regulations (41 CFR Part 60).
- f. The successful bidder will be required to comply with the Copeland “Anti-Kickback” Act (18 USC 874) as supplemented in Department of Labor regulations (29 CFR, Part 3).
- g. The successful bidder will be required to comply with the Safety and Health regulations (29 CFR, Part 1926 and all subsequent amendments) as promulgated by the Department of Labor.
- h. The successful bidder will be required to comply with Title VI of the Civil Rights Act of 1964 ( P.L. 88-352).

**ARTICLE 13. INSURANCE**

The Contractor shall assume responsibility and liability for all injuries to persons or damages to property, directly or indirectly due to, or arising out of, his operations under the contract and shall be responsible for the proper care and protection of all work performed for the Town.



The Contractor shall also indemnify and save harmless the Town of North Kingstown against any and all claims of whatever kind and nature due to, or arising out of, his breach or failure to perform any of the terms, conditions, or covenants of the contract resulting from acceptance of his bid.

The Contractor shall furnish the Director of Administrative Services with certificates of insurance from companies acceptable to the Town of North Kingstown. All insurance companies listed on certificates must be licensed to do business in the State of Rhode Island. The Contractor shall provide a certificate of insurance as specified on the bid proposal form attached. Contracts of insurance (covering all operations under this contract) shall be kept in force until the contractor's work is acceptable by the Town.

The limits of the insurance must be at least in the amounts specified below:

1. Commercial General Liability-Occurrence Form \$1,000,000/\$1,000,00
2. Automobile Liability - \$1,000,000  
(With both of the above naming the Town as additional insured.)
3. Worker's Compensation (if legally allowed and available). Waiver of subrogation applies to Worker's Compensation.

The Contractor shall secure, pay for, and maintain insurance as necessary to protect himself against loss of owned or rented capital equipment and tools, with provision for waiver of subrogation against the Owner.

The Contractor shall require similar insurance in the above amounts to be taken out and maintained by each subcontractor. The contractor shall be fully responsible for the acts and omissions of his sub-contractors and of persons employed either directly or indirectly by him. Nothing contained in the contract shall create any contractual relation between any sub-contractor and the Town of North Kingstown.

#### **ARTICLE 14. PERFORMANCE BOND AND LABOR AND MATERIAL PAYMENT BOND**

The successful bidder will be required to furnish the Town with a Performance Bond and labor and Material Payment Bond\*, each in the amount of 100% of the contract price, as security for faithful performance of the Contract and executed by a surety company licensed to do business in the State of Rhode island and approved by the Town. The failure of the successful bidder to supply the required Bonds within a time specified or within such extended period a the town of North Kingstown may grant based upon reasons determined sufficient by the Town, shall constitute a default, and the town may either award the contract to the next lowest bidder or re-advertised for bids.

\*See attached samples to be used.

#### **ARTICLE 15. LAWS, ORDINANCES AND CODES**

All applicable Federal and State Laws, Ordinances and Codes of the Town of North Kingstown and regulations of all authorities having jurisdiction over this Project shall apply to this contract the same as though written herein in full. The North Kingstown Public Schools will not award the Contract to any Contractor who is, at the time, ineligible under the provisions of any applicable regulations issued by the Secretary of Labor, United State Department of Labor, or is not qualified under applicable Ordinances of the Town of North Kingstown, or the laws of the State of Rhode Island.

#### **SELECTION CRITERIA**

The bid will be evaluated as to R.I. G.L.45-55-5. (2) "Competitive Sealed Bidding" and the award shall be made on the basis of the lowest evaluated or responsive bid price.

The following factors will be considered in determining the lowest evaluated or responsive bid price:

- Bid price
- Meeting the bid/insurance requirements
- Quality of work previously performed by the company for the Town and School Department of North Kingstown, if any
- Services offered
- Early payment discount

Past performance as reflected by the evaluation of private persons and officials of other governmental entities that have retained the services of the Vendor with respect to such factors as control of costs, quality of work, and an ability to meet deadlines.

**ARTICLE 16. LIQUIDATED DAMAGES**

Failure on the part of the Contactor to complete the project within the agreed time schedule will result in a liquidated damage cost of five hundred dollars (\$500.00) **per day**, excluding Saturdays, Sundays, and holidays, to the Contractor, until completion (final acceptance), excluding warranty periods. The Town may apply liquidated damage costs to current payment requests not yet paid.

## SECTION 00 01 15 – LIST OF DRAWINGS

## GENERAL

The drawings for this project represent an integral part of the contract documents and should not be considered as a separate entity. They, along with the technical specifications, form a complete process of disseminating specific information required to perform the work of this project.

The following schedule indicates the drawings of this project, ordered for convenience only, and do not obligate the Contractor to perform the work in any specific sequence, nor construed as specific work for a specific trade, subcontractor, or supplier.

DRAWING NUMBER	TITLE	SHEET NUMBER
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S3.00	STRUCTURAL JOIST RETROFIT DETAILS	5 OF 16
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END OF SECTION 00 01 15

## SELECTION CRITERIA

The bid will be evaluate as to R.I.G.L. 45-55-5. (2) "Competitive Sealed Bidding" and the award shall be made on the basis of the lowest evaluated or responsive bidder.

The following factors will be considered in determining the lowest evaluated or responsive bidder:

Competence to perform the services as reflected by technical training and education; general experience; experience in providing the required services;

Past performance as reflected by the evaluation of private persons and officials of other governmental entities that have retained the services of the firm with respect to such factors as control of costs, quality of work, and an ability to meet deadlines;

Demonstrated experience in the type of work required;

Record of the firm in accomplishing work on other projects in the required time: (list references and projects completed or currently in progress on the Experience Sheet contained in this bid document)

Quality of work previously performed by the firm for the Town of North Kingstown, if any;

Quality of subcontractors proposed for this project (all subcontractors are to be properly licensed at time of bid opening and must be listed on the form contained in this bid document)

BID PRICE;

Meets or exceeds bid specifications;

Warranty/Guarantee;

Early payment discount.

**EXPERIENCE SHEET**

The following experience sheet shall be completed by each bidder. Any bid submitted without a fully completed experience sheet may be rejected by the Owner.

1. Have you ever failed to complete any work awarded to you? If so, please state where and why.

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2. What projects similar to this one has your organization completed within the last 5 years?

**(Separate sheets may be submitted for this information)**

Class of Work	Contract Amount	When Completed	Name, address and telephone number of Contact person
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# DRAFT AIA® Document A305™ - 2020

## Contractor's Qualification Statement

THE PARTIES SHOULD EXECUTE A SEPARATE CONFIDENTIALITY AGREEMENT IF THEY INTEND FOR ANY OF THE INFORMATION IN THIS A305-2020 TO BE HELD CONFIDENTIAL.

SUBMITTED BY:  
(Organization name and address.)  
« »

SUBMITTED TO:  
(Organization name and address.)  
«North Kingstown School Department  
100 Romano Vineyard Way, Suite 120  
North Kingstown, RI 02852 »

TYPE OF WORK TYPICALLY PERFORMED  
(Indicate the type of work your organization typically performs, such as general contracting, construction manager as constructor services, HVAC contracting, electrical contracting, plumbing contracting, or other.)  
« »

THIS CONTRACTOR'S QUALIFICATION STATEMENT INCLUDES THE FOLLOWING:  
(Check all that apply.)

- Exhibit A – General Information
- Exhibit B – Financial and Performance Information
- Exhibit C – Project-Specific Information
- Exhibit D – Past Project Experience
- Exhibit E – Past Project Experience (Continued)

CONTRACTOR CERTIFICATION  
The undersigned certifies under oath that the information provided in this Contractor's Qualification Statement is true and sufficiently complete so as not to be misleading.

\_\_\_\_\_  
Organization's Authorized Representative Signature

« »  
\_\_\_\_\_  
Date

« »  
\_\_\_\_\_  
Printed Name and Title

NOTARY  
State of: « »  
County of: « »  
Signed and sworn to before me this « » day of « » « »

\_\_\_\_\_  
Notary Signature

My commission expires: « »

ADDITIONS AND DELETIONS:  
The author of this document has added information needed for its completion. The author may also have revised the text of the original AIA standard form. An Additions and Deletions Report that notes added information as well as revisions to the standard form text is available from the author and should be reviewed.

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.



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# DRAFT AIA® Document A305™ - 2020

## Exhibit A

### General Information

This Exhibit is part of the Contractor's Qualification Statement, submitted by « » and dated the « » day of « » in the year « »  
(In words, indicate day, month and year.)

#### § A.1 ORGANIZATION

##### § A.1.1 Name and Location

§ A.1.1.1 Identify the full legal name of your organization.

« »

§ A.1.1.2 List all other names under which your organization currently does business and, for each name, identify jurisdictions in which it is registered to do business under that trade name.

« »

§ A.1.1.3 List all prior names under which your organization has operated and, for each name, indicate the date range and jurisdiction in which it was used.

« »

§ A.1.1.4 Identify the address of your organization's principal place of business and list all office locations out of which your organization conducts business. If your organization has multiple offices, you may attach an exhibit or refer to a website.

« »

##### § A.1.2 Legal Status

§ A.1.2.1 Identify the legal status under which your organization does business, such as sole proprietorship, partnership, corporation, limited liability corporation, joint venture, or other.

« »

- .1 If your organization is a corporation, identify the state in which it is incorporated, the date of incorporation, and its four highest-ranking corporate officers and their titles, as applicable.  
« »
- .2 If your organization is a partnership, identify its partners and its date of organization.  
« »
- .3 If your organization is individually owned, identify its owner and date of organization.  
« »

**ADDITIONS AND DELETIONS:**  
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- 4 If the form of your organization is other than those listed above, describe it and identify its individual leaders:

<< >>

§ A.1.2.2 Does your organization own, in whole or in part, any other construction-related businesses? If so, identify and describe those businesses and specify percentage of ownership.

<< >>

### § A.1.3 Other Information

§ A.1.3.1 How many years has your organization been in business?

<< >>

§ A.1.3.2 How many full-time employees work for your organization?

<< >>

§ A.1.3.3 List your North American Industry Classification System (NAICS) codes and titles. Specify which is your primary NAICS code.

<< >>

§ A.1.3.4 Indicate whether your organization is certified as a governmentally recognized special business class, such as a minority business enterprise, woman business enterprise, service disabled veteran owned small business, woman owned small business, small business in a HUBZone, or a small disadvantaged business in the 8(a) Business Development Program. For each, identify the certifying authority and indicate jurisdictions to which such certification applies.

<< >>

### § A.2 EXPERIENCE

§ A.2.1 Complete Exhibit D to describe up to four projects, either completed or in progress, that are representative of your organization's experience and capabilities.

§ A.2.2 State your organization's total dollar value of work currently under contract.

<< >>

§ A.2.3 Of the amount stated in Section A.2.2, state the dollar value of work that remains to be completed:

<< >>

§ A.2.4 State your organization's average annual dollar value of construction work performed during the last five years.

<< >>

### § A.3 CAPABILITIES

§ A.3.1 List the categories of work that your organization typically self-performs.

<< >>

§ A.3.2 Identify qualities, accreditations, services, skills, or personnel that you believe differentiate your organization from others.



<< >>

§ A.3.3 Does your organization provide design collaboration or pre-construction services? If so, describe those services.

<< >>

§ A.3.4 Does your organization use building information modeling (BIM)? If so, describe how your organization uses BIM and identify BIM software that your organization regularly uses.

<< >>

§ A.3.5 Does your organization use a project management information system? If so, identify that system.

<< >>

§ A.4 REFERENCES

§ A.4.1 Identify three client references:

*(Insert name, organization, and contact information)*

<< >>

§ A.4.2 Identify three architect references:

*(Insert name, organization, and contact information)*

<< >>

§ A.4.3 Identify one bank reference:

*(Insert name, organization, and contact information)*

<< >>

§ A.4.4 Identify three subcontractor or other trade references:

*(Insert name, organization, and contact information)*

<< >>

# DRAFT AIA® Document A305™ - 2020

## Exhibit B

### Financial and Performance Information

This Exhibit is part of the Contractor's Qualification Statement, submitted by « » and dated the « » day of « » in the year « »  
(In words, indicate day, month and year.)

#### § B.1 FINANCIAL

##### § B.1.1 Federal tax identification number:

« »

§ B.1.2 Attach financial statements for the last three years prepared in accordance with Generally Accepted Accounting Principles, including your organization's latest balance sheet and income statement. Also, indicate the name and contact information of the firm that prepared each financial statement.

« »

§ B.1.3 Has your organization, its parent, or a subsidiary, affiliate, or other entity having common ownership or management, been the subject of any bankruptcy proceeding within the last ten years?

« »

§ B.1.4 Identify your organization's preferred credit rating agency and identification information.

(Identify rating agency, such as Dun and Bradstreet or Equifax, and insert your organization's identification number or other method of searching your organization's credit rating with such agency.)

« »

#### § B.2 DISPUTES AND DISCIPLINARY ACTIONS

§ B.2.1 Are there any pending or outstanding judgments, arbitration proceedings, bond claims, or lawsuits against your organization, its parent, or a subsidiary, affiliate, or other entity having common ownership or management, or any of the individuals listed in Exhibit A, Section 1.2, in which the amount in dispute is more than \$75,000?  
(If the answer is yes, provide an explanation.)

« »

§ B.2.2 In the last five years has your organization, its parent, or a subsidiary, affiliate, or other entity having common ownership or management:  
(If the answer to any of the questions below is yes, provide an explanation.)

- .1 failed to complete work awarded to it?

« »

- .2 been terminated for any reason except for an owners' convenience?

**ADDITIONS AND DELETIONS:**  
The author of this document has added information needed for its completion. The author may also have revised the text of the original AIA standard form. An *Additions and Deletions Report* that notes added information as well as revisions to the standard form text is available from the author and should be reviewed.

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

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<< >>

- 3 had any judgments, settlements, or awards pertaining to a construction project in which your organization was responsible for more than \$75,000?

<< >>

- 4 filed any lawsuits or requested arbitration regarding a construction project?

<< >>

§ B.2.3 In the last five years, has your organization, its parent, or a subsidiary, affiliate, or other entity having common ownership or management; or any of the individuals listed in Exhibit A Section 1.2:  
*(If the answer to any of the questions below is yes, provide an explanation.)*

- .1 been convicted of, or indicted for, a business-related crime?

<< >>

- .2 had any business or professional license subjected to disciplinary action?

<< >>

- .3 been penalized or fined by a state or federal environmental agency?

<< >>



# DRAFT AIA® Document A305™ - 2020

## Exhibit C

### Project Specific Information

This Exhibit is part of the Contractor's Qualification Statement, submitted by « » and dated the « » day of « » in the year « »  
(In words, indicate day, month and year.)

#### PROJECT:

(Name and location or address.)

« »  
« »

#### CONTRACTOR'S PROJECT OFFICE:

(Identify the office out of which the contractor proposes to perform the work for the Project.)

« »

#### TYPE OF WORK SOUGHT

(Indicate the type of work you are seeking for this Project, such as general contracting, construction manager as constructor, design-build, HVAC subcontracting, electrical subcontracting, plumbing subcontracting, etc.)

« »

#### CONFLICT OF INTEREST

Describe any conflict of interest your organization, its parent, or a subsidiary, affiliate, or other entity having common ownership or management, or any of the individuals listed in Exhibit A Section 1.2, may have regarding this Project.

« »

#### § C.1 PERFORMANCE OF THE WORK

§ C.1.1 When was the Contractor's Project Office established?

« »

§ C.1.2 How many full-time field and office staff are respectively employed at the Contractor's Project Office?

« »

§ C.1.3 List the business license and contractor license or registration numbers for the Contractor's Project Office that pertain to the Project.

« »

§ C.1.4 Identify key personnel from your organization who will be meaningfully involved with work on this Project and indicate (1) their position on the Project team, (2) their office location, (3) their expertise and experience, and (4) projects similar to the Project on which they have worked.

**ADDITIONS AND DELETIONS:**  
The author of this document has added information needed for its completion. The author may also have revised the text of the original AIA standard form. An *Additions and Deletions Report* that notes added information as well as revisions to the standard form text is available from the author and should be reviewed.

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**ELECTRONIC COPYING** of any portion of this AIA® Document to another electronic file is prohibited and constitutes a violation of copyright laws as set forth in the footer of this document.

<< >>

§ C.1.5 Identify portions of work that you intend to self-perform on this Project.

<< >>

§ C.1.6 To the extent known, list the subcontractors you intend to use for major portions of work on the Project.

<< >>

## § C.2 EXPERIENCE RELATED TO THE PROJECT

§ C.2.1 Complete Exhibit D to describe up to four projects performed by the Contractor's Project Office, either completed or in progress, that are relevant to this Project, such as projects in a similar geographic area or of similar project type. If you have already completed Exhibit D, but want to provide further examples of projects that are relevant to this Project, you may complete Exhibit E.

§ C.2.2 State the total dollar value of work currently under contract at the Contractor's Project Office:

<< >>

§ C.2.3 Of the amount stated in Section C.2.2, state the dollar value of work that remains to be completed:

<< >>

§ C.2.4 State the average annual dollar value of construction work performed by the Contractor's Project Office during the last five years.

<< >>

§ C.2.5 List the total number of projects the Contractor's Project Office has completed in the last five years and state the dollar value of the largest contract the Contractor's Project Office has completed during that time.

<< >>

## § C.3 SAFETY PROGRAM AND RECORD

§ C.3.1 Does the Contractor's Project Office have a written safety program?

<< >>

§ C.3.2 List all safety-related citations and penalties the Contractor's Project Office has received in the last three years.

<< >>

§ C.3.3 Attach the Contractor's Project Office's OSHA 300a Summary of Work-Related Injuries and Illnesses form for the last three years.

§ C.3.4 Attach a copy of your insurance agent's verification letter for your organization's current workers' compensation experience modification rate and rates for the last three years.

## § C.4 INSURANCE

§ C.4.1 Attach current certificates of insurance for your commercial general liability policy, umbrella insurance policy, and professional liability insurance policy, if any. Identify deductibles or self-insured retentions for your commercial general liability policy.

§ C.4.2 If requested, will your organization be able to provide property insurance for the Project written on a builder's risk "all-risks" completed value or equivalent policy form and sufficient to cover the total value of the entire Project on a replacement cost basis?

<< >>

§ C.4.3 Does your commercial general liability policy contain any exclusions or restrictions of coverage that are prohibited in AIA Document A101-2017, Exhibit A, Insurance A.3.2.2.2? If so, identify.

<< >>

§ C.5 SURETY

§ C.5.1 If requested, will your organization be able to provide a performance and payment bond for this Project?

<< >>

§ C.5.2 Surety company name:

<< >>

§ C.5.3 Surety agent name and contact information:

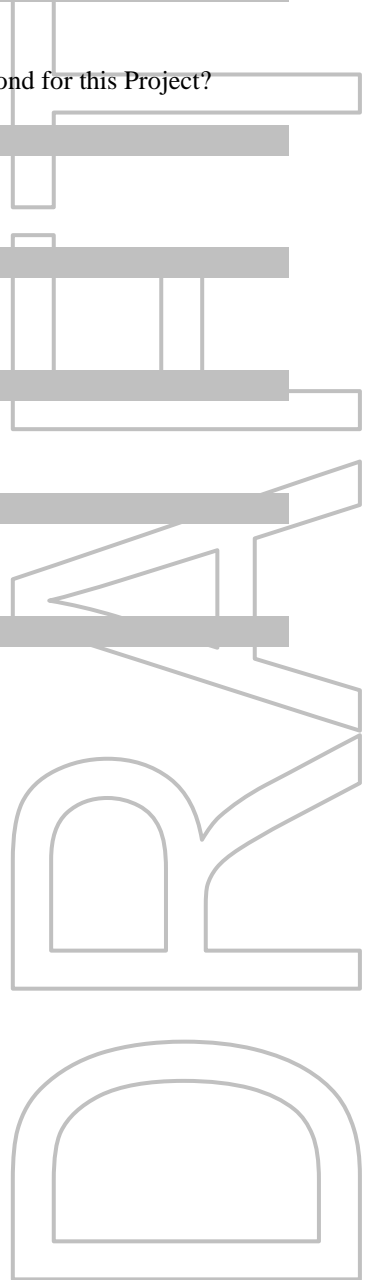
<< >>

§ C.5.4 Total bonding capacity:

<< >>

§ C.5.5 Available bonding capacity as of the date of this qualification statement:

<< >>



**DRAFT** AIA® Document A305™ - 2020  
**Exhibit D**

*Contractor's Past Project Experience*

	1	2	3	4
PROJECT NAME				
PROJECT LOCATION				
PROJECT TYPE				
OWNER				
ARCHITECT				
CONTRACTOR'S PROJECT EXECUTIVE				
KEY PERSONNEL (include titles)				
PROJECT DETAILS	Contract Amount  Completion Date  % Self-Performed Work	Contract Amount  Completion Date  % Self-Performed Work	Contract Amount  Completion Date  % Self-Performed Work	Contract Amount  Completion Date  % Self-Performed Work
PROJECT DELIVERY METHOD	<input type="checkbox"/> Design-bid-build <input type="checkbox"/> Design-build <input type="checkbox"/> CM constructor <input type="checkbox"/> CM advisor <input type="checkbox"/> Other:	<input type="checkbox"/> Design-bid-build <input type="checkbox"/> Design-build <input type="checkbox"/> CM constructor <input type="checkbox"/> CM advisor <input type="checkbox"/> Other:	<input type="checkbox"/> Design-bid-build <input type="checkbox"/> Design-build <input type="checkbox"/> CM constructor <input type="checkbox"/> CM advisor <input type="checkbox"/> Other:	<input type="checkbox"/> Design-bid-build <input checked="" type="checkbox"/> Design-build <input type="checkbox"/> CM constructor <input checked="" type="checkbox"/> CM advisor <input type="checkbox"/> Other:
SUSTAINABILITY CERTIFICATIONS				





**LAWS PERTAINING TO PUBLIC WORKS PROJECTS**  
**(General Laws of Rhode Island [1977 Reenactment])**  
**Chapter 37-12 and 37-13, as amended**

**37-13-1. "Public works" defined.** – "Public Works" as used in this chapter shall mean any public work consisting of grading, clearing, demolition, improvement, completion, repair, alteration, or construction of any public road or any bridge, or portion thereof, or any public building, or portion thereof, or any heavy construction, or any public works projects of any nature or kind whatsoever.

**37-13-4. Provisions applicable to public works contracts-Lists of subcontractors.** –All public works shall be done by contract, subject to the same provisions of law relating thereto and to the letting thereof, which are applicable to similar contracts of the awarding authority or authorized agency, hereinafter call the "proper authority", in the general location where the work is to be performed and which are not contrary to the provisions of § § 37-13-1 – 37-13-14 and § 37-13-16. Each contractor after the award of a contract for public works shall submit to the proper authority a list of his or her subcontractors of any part or all or the work. The list shall be submitted in such manner or form as the proper authority shall uniformly require from contractors in all public works.

**37-13-6. Ascertainment of prevailing rate of wages and other payments-Specifications of rate in call for bids and in contract.** –Before awarding any contract for public works to be done, the proper authority shall ascertain from the director of labor and training the general prevailing rate of the regular, holiday, and overtime wages paid and the general prevailing payments on behalf of employees only, to lawful welfare, pension, vacation, apprentice training, and educational funds (payments to the funds must constitute an ordinary business expense deduction for federal income tax purposes by contractors) in the city, town, village, or other appropriate political subdivision of the state in which the work is to be performed, for each craft, mechanic, teamster, laborer, or type of worker needed to execute the contract for the public works. The proper authority shall, also, specify in the call for bids for the contract and in the contract itself the general prevailing rate of the regular, holiday, and overtime wages paid and the payments on behalf of employees only, to the welfare, pension, vacation, apprentice training, and education funds existing in the locality for each craft, mechanic, teamster, laborer, or type of worker needed to execute the contract or work.

**37-13-7. Specifications in contract of amount and frequency of payment of wages.** – (a) Every call for bids for every contract in excess of one thousand dollars (\$1,000), to which the State of Rhode Island or any political subdivision thereof or any public agency or quasi-public agency is a party, for construction, alteration, and/or repair, including painting and decorating, of public buildings or public works of the State of Rhode Island or any political subdivision thereof, or any public agency or quasi-public agency and which requires or involves the employment of employees, shall contain a

provision stating the minimum wages to be paid various types of employees which shall be based upon the wages that will be determined by the director of labor and training to be prevailing for the corresponding types of employees employed on projects of a character similar to the contract work in the city, town, village, or other appropriate political subdivision of the State of Rhode Island in which the work is to be performed. Every contract shall contain a stipulation that the contractor or his or her subcontractor shall pay all the employees employed directly upon the site of the work, unconditionally and not less often than once a week, and without subsequent deduction or rebate on any account, the full amounts accrued at time of payment computed at wage rates no less than those stated in the call for bids, regardless of any contractual relationships which may be alleged to exist between the contractor or subcontractor and the employees, and that the scale of wages to be paid shall be posted by the contractor in a prominent and easily accessible place at the site of the work; and the further stipulation that there may be withheld from the contractor so much of the accrued payments as may be considered necessary to pay to the employees employed by the contractor, or any subcontractor on the work, the difference between the rates of wages required by the contract to be paid the employees on the work and the rates of wages received by the employees and not refunded to the contractor, subcontractors, or their agents.

(b) The terms "wages", "scale of wages", "wage rates", "minimum wages", and "prevailing wages" shall include:

- (1) The basic hourly rate of pay; and
- (2) The amount of:

(A) The rate of contribution made by a contractor or subcontractor to a trustee or to a third person pursuant to a fund, plan, or program; and

(B) The rate of costs to the contractor or subcontractor which may be reasonably anticipated in providing benefits to employees pursuant to an enforceable commitment to carry out a financially responsible plan or program which was communicated in writing to the employees affected, for medical or hospital care, pension on retirement or death, compensation for injuries or illness resulting from occupational activity, or insurance to provide any of the foregoing, for unemployment benefits, life insurance, disability and sickness insurance, or accident insurance, for vacation and holiday pay, for defraying costs of apprenticeship or other similar programs, or for other bona fide fringe benefits, but only where the contractor or subcontractor is not required by other federal, state, or local law to provide any of the benefits; provided, that the obligation of a contractor or subcontractor to make payment in accordance with the prevailing wage determinations of the director of labor and training insofar as this chapter of this title and other acts incorporating this chapter of this title by reference are concerned may be discharged by the making of payments in cash, by the making of contributions of a type referred to in subsection (b)(2), or by the assumption of an enforceable commitment to bear the costs of a plan or program of a type referred to in this subdivision, or any combination thereof, where the aggregate of any payments, contributions, and costs is not less than the rate of pay described in subsection (b)(1) plus the amount referred to in subsection (b)(2).

(C) The term "employees", as used in this section, shall include employees of contractors of subcontractors performing jobs on various types of public works including mechanics, apprentices, teamsters, chauffeurs, and laborers engaged in the transportation of gravel or fill to the site of public works, the removal and/or delivery of gravel or fill or ready-mix concrete, sand, bituminous stone, or asphalt flowable fill from the site of public works, or the transportation or removal of gravel or fill from one location to another on the site of public works, and the employment of the employees shall be subject to the provisions of subsection (a) and (b).

(D) Omitted.

**37-13-8 Investigation and determination of prevailing wages-filing of schedule.**- The Director of Labor and Training shall investigate and determine the prevailing wages and payments made to or on behalf of employees, as set forth in § 37-13-7, paid in the trade or occupation in the city, town, village, or other appropriate political subdivision of the state and keep a schedule on file in his or her office of the customary prevailing rate of wages and payment made to or on behalf of the employees which shall be open to public inspection. In making a determination, the Director of Labor may adopt and use such appropriate and applicable prevailing wage rate determinations as have been made by the Secretary of Labor of the United States of America in accordance with the Davis-Bacon Act, as amended, 40 U.S.C. § 276a.

**37-13-9 Statutory provisions included in contracts.** -A copy of §§ 37-13-5, 37-13-6, and 37-13-7 shall be inserted in all contracts for public works awarded by the State, any city, town, committee, an authorized agency, or awarding authority thereof, or any person or persons in their behalf in which state or municipal funds are used if the contract price is in excess of one thousand dollars (\$1,000).

**37-13-13 Furnishing payroll record to Director of Labor and Training.** -Each contractor awarded a contract with a contract price in excess of one thousand dollars (\$1,000) for public work, and each subcontractor who performs work on public works, shall furnish a certified copy of his or her payroll record of his or her employees employed upon the public work to the director of labor and training on a weekly basis for the preceding week. The director of labor and training may promulgate reasonable rules and regulations to enforce the provisions of this section. A contractor or subcontractor who fails to comply with the provisions of this section shall be guilty of a misdemeanor and shall pay to the director of labor and training one hundred dollars (\$100) for each calendar day of noncompliance as determined by the director of labor and training. Any of those revenues shall be deposited as general revenues.

**37-13-15 Review.**-(a) There is hereby created an appeals board which shall be comprised of three (3) members who shall be appointed by the governor; provided, however, that each member of the appeals board shall have at least five (5) years experience with prevailing wage rates as they apply to the construction industry. The members of such appeals board shall serve without compensation.

The members of the appeals board shall be appointed for terms of three (3) years except that of the three (3) members originally appointed by each of the appointing authorities: one(1) shall be appointed for a term of one (1) year, one(1) shall be appointed for a term of two(2) years and one (1) for a term of three (3) years.

(b) Any person aggrieved by any action taken by the director of labor or his or her designated hearing officer under the authority of this chapter, or by the failure or refusal of the director of labor to take any action authorized by this chapter, may obtain a review thereof for the purpose of obtaining relief from the action or lack of action by filing a petition for administrative review and relief, to the appeals board as provided herein. Such petition for administrative review shall be filed within twenty (20) days of the action taken by the director of labor and training or designated hearing officer. The petition for administrative review shall be heard within ten (10) days of the date of filing. An aggrieved person under this section shall include:

- (1) Any person who is required to pay wages to his or her employees or make payments to a fund on behalf of his or her employees, as provided in this chapter;
- (2) Any person who is required to be paid wages for his or her labor or on whose behalf payments are required to be paid to funds, as provided by this chapter;
- (3) The lawful collective bargaining representative of a person defined in subdivision (2) above;
- (4) A trade association of which a person defined in subdivision (1) above is a member;
- (5) A proper authority as defined in this chapter;
- (6) A contractor who submitted a bid for work to be or which has been awarded under the provisions of this chapter or a trade association of which he or she is a member, and
- (7) A labor organization which has one or more written collective bargaining agreements with one or more employers or a trade association which sets forth the hours, wages, and working conditions of a craft, mechanic, teamster, or type or worker needed to execute the work, as provided in this chapter to the extent that it would be affected by the action or a failure to act of the director of labor or the hearing officer.

(c) Any aggrieved person as defined herein may obtain a review of a decision of the appeals board by filing a petition in the superior court in Providence County pursuant to the provisions of the administrative procedures act, praying for review and relief. The petition shall follow the course of and be subject to the procedures for causes filed in the court.

(d) The director is hereby empowered to enforce his or her decision and/or the decision of the appeals board in the superior court for the county of Providence.

**37-13-16- Termination of work on failure to pay agreed wages.- Completion of work.** —Every contract within the scope of this chapter shall contain the further provision that in the event it is found by the director of labor that any employee employed by the

contractor or any subcontractor directly on the site of the work covered by the contract has been or is being paid a rate of wages less than the rate of wages required by the contract to be paid as aforesaid, the awarding party may, by written notice to the contractor or subcontractor, terminate his or her right as the case may be, to proceed with the work, or such part of the work as to which there has been a failure to pay the required wages, and shall prosecute the work to completion by contract or otherwise, and the contractor and his or her sureties shall be liable to the awarding party for any excess costs occasioned the awarding authority thereby.

**CONTRACTOR'S RESPONSIBILITY FOR UTILITY PROPERTY AND SERVICES.** At points where the Contractor's operations are adjacent to properties of Providence Gas damage to which might result in considerable expense, loss or inconvenience, work shall not be commenced until all arrangements necessary for the protection thereof have been made.

The Contractor shall cooperate with the gas company in their removal and rearrangement operations in order that these operations may progress in a reasonable manner, that duplication of rearrangement work may be reduced to a minimum, and that services rendered by those parties will not be unnecessarily interrupted.

In the event of contact with or damage to any gas facilities or its protective coating; interruption to gas service as a result of accidental breakage or as a result of being exposed or unsupported, the contractor shall promptly notify Providence Gas Company and shall cooperate fully with Providence Gas in the restoration of service.

Upon the receipt of said notice, Providence Gas shall immediately dispatch personnel to the subject location to effect temporary or permanent repair of the damage. Under no circumstances shall the excavator back-fill or conceal the damaged area until Providence Gas arrives at the subject location. Upon the occurrence of the escape of gas from a broken line, the person or public agency responsible for the operations causing the damage shall evacuate the immediate area while awaiting the arrival of Providence Gas personnel.

Location and depth of existing gas line as shown on the plans are estimated and should not be relied upon by the Contractor. The Contractor shall check and verify the location of all gas lines underground before proceeding to begin the work or to order materials. Excavation shall be in accordance with all statutes, ordinances, rules and regulations of any city, state or Federal Agency that may be applicable. Any damage to the existing utilities as marked by Dig Safe or as shown on the plans arising out of said excavation or by reason thereof shall be the Contractor's sole responsibility.

It is understood and agreed that the Contractor has considered in his bid all of the permanent and temporary utility appurtenances in their approximate or relocated positions as shown on the plans and that no additional compensation will be allowed for any delays, inconvenience, or damage sustained by him due to any interference from the said utility appurtenances or the operation of moving them.

The Contractor shall furnish Providence Gas Company with a "Progress Schedule" or "Critical Path Schedule" within thirty (30) days of the bid opening. The municipality will schedule the pre-construction conference after the "Progress Schedule" or "Critical Path Schedule" has been received and approved. The progress schedule shall show the proposed order of work and shall indicate the time required for the completion of the several items of work. The progress schedule may be used as the basis for establishing major construction operations and as a check on the progress of the work. The schedule shall be updated as required and be kept current during the life of the project.

**CONSTRUCTION METHODS.** Backfilling around a gas main shall consist of suitable materials (gravel or padding sand) placed in layers of not more than 8 inches after compaction. Compaction shall be achieved by mechanical tampers, vibrators or rammers. Backfill under gas facilities shall be compacted to not less than 95% of maximum density. Unless otherwise directed, the backfill shall be brought to the surface of the surrounding ground and neatly graded.

**TRAINING.** Prior to start of construction it is highly recommended that the contractor's field personnel receive training on subjects relating to natural gas pipelines. This training will be provided by Providence Gas at no charge to the contractor. Please contact the Providence Gas Co. C&M trainer at 272-5040 ext. 575 to make arrangements.

(401) 222-6269

(401) 222-3053 – Al Pugliese

31

STATE TAX OFFICIALS

44-1-6

NOTES TO DECISIONS

**1. In General.**

The tax administrator was not authorized to promulgate and enforce a rule clearly con-

trary to the intent of the legislature. *Petrarca v. Tax Adm'r*, 113 R.I. 449, 322 A.2d 621 (1974).

**Collateral References.** Imprisonment for debt: constitutional provision against impris-

onment for debt as applicable to nonpayment of tax. 48 A.L.R.3d 1324.

**44-1-5. [Repealed.]**

**Repealed Sections.** This former section § 44-1-5) was repealed by P.L. 1965, ch. 68, (P.L. 1912, ch. 769, § 5; G.L. 1923, ch. 38, § 2. § 5; G.L. 1938, ch. 28, § 5; G.L. 1956,

**44-1-6. Additional collection powers — Nonresident contractors.** — (a) Any person doing business with a nonresident contractor shall withhold payment of an amount of three percent (3%) of the contract price until thirty (30) days after the contractor has completed the contract and has requested the tax administrator, in writing, to audit the records for the particular project, a receipted copy of the request to be furnished to the person holding the funds. The tax administrator shall, within thirty (30) days after receipt of the request, furnish to the nonresident contractor and to the person holding the funds either a certificate of no tax due or a certificate of sales and use tax or income tax withheld, or both, due from the nonresident contractor.

(b) Upon receipt of a certificate of no tax due, the person holding the payment may pay the nonresident contractor. Upon receipt of a certificate of taxes due, the person may pay to the contractor out of the amount withheld the excess over the amount of taxes set forth in the certificate together with the interest and penalties then assessed. If the tax administrator furnished neither certificate to both parties within thirty (30) days after receipt of a written request for the making of the audit, the person holding the payment may forthwith pay the payment withheld to the nonresident contractor under the terms of the contract free from any claims of the tax administrator against either the person holding the payment or the nonresident contractor for payment of sales or use taxes or income taxes withheld, or both.

(c) In the event the tax administrator shall serve upon the contractor and the person holding the payment a certificate showing the taxes due within a thirty (30) day period, the person holding the payment shall deposit with the tax administrator the amount set forth in the certificate which is not in excess of three percent (3%) of the contract price, taking a receipt for the amount, and shall thereupon be free from any claim of the nonresident contractor for that amount or of the tax administrator for sales and use taxes or income taxes withheld, or both, arising out of the materials, equipment, and



services used in performance of the contract of the nonresident contractor on that project.

(d) As used in this section, a nonresident contractor is one who does not maintain a regular place of business in this state. "A regular place of business" means and includes any bona fide office (other than a statutory office), factory, warehouse, or other space in this state at which the taxpayer is doing business in its own name in a regular and systematic manner, and which is continuously maintained, occupied, and used by the taxpayer in carrying on its business through its regular employees regularly in attendance. A temporary office at the site of construction shall not constitute a regular place of business.

**History of Section.**

P.L. 1974, ch. 229, § 2.

**44-1-7. Interest on delinquent payments.** — (a) Whenever the full amount of any state tax or any portion or deficiency thereof, as finally determined by the tax administrator, has not been paid on the date when it is due and payable, whether the time has been extended or not, there shall be added as part of the tax or portion or deficiency thereof interest at the rate as determined in accordance with subsection (b) of this section, notwithstanding any general or specific statute to the contrary.

(b) Each January 1 the tax administrator shall compute the rate of interest to be in effect for that calendar year by adding two percent (2%) to the prime rate which was in effect on October 1 of the preceding year. The resultant sum shall be the interest rate referred to in subsection (a) of this section and in § 44-1-7.1. "Prime rate" as used in this subsection means the predominant prime rate quoted by commercial banks to large businesses as determined by the board of governors of the federal reserve system. In no event shall the rate of interest exceed twenty-one percent (21%) per annum nor be less than twelve percent (12%) per annum.

**History of Section.**

P.L. 1974, ch. 151, art. 1, § 1; P.L. 1981, ch. 299, § 1; P.L. 1982, ch. 9, art. 4, § 1; P.L. 1984, ch. 289, § 1; P.L. 1993, ch. 188, art. 67, § 1.

**Reenactments.** The 1995 Reenactment (P.L. 1995, ch. 323, § 1) substituted "means" for "shall mean" in the third sentence in subsection (b).

**44-1-7.1. Interest on overpayments.** — (a) Notwithstanding any general or specific statute to the contrary, overpayments of state taxes shall bear interest at the rate as provided in § 44-1-7 from the date the tax was paid, or from the date including any extensions thereof the tax became due, whichever of the dates occurs the later.

(b) If any overpayment of state tax is refunded within 90 days after the last date prescribed (or permitted by extension of time) for filing the return of the tax, or within 90 days after the return is in

RELEASE OF LIENS

Whereas, the undersigned, have furnished labor or materials or both for the execution of work described in a contract named "

\_\_\_\_\_, Dated \_\_\_\_\_, owned by the Town of North Kingstown, hereinafter called "Owner". Now therefore, the undersigned, for and in consideration of the property and of other valuable consideration to each of them paid, the receipt whereof is hereby acknowledged, do hereby release and discharge any and all manner of liens, claims and demands whatsoever which the undersigned on any of them now have or might or could have on or against said property of the Owner thereof for work done or materials furnished as aforesaid, or in any other manner, from the commencement of work on said property to the date hereof,

The Contractor also certifies that all of his sub-contractors and suppliers which have furnished any labor or materials for an amount of \$500 or more, for said job, have signed this Release of Liens.

The Contractor assumes full responsibility to hold the Town of North Kingstown safe and harmless from any lien for materials and/or labor which might occur from aforesaid work.

IN WITNESS WHEREOF, the undersigned have caused this Release of Liens to be duly executed on the respective dates indicated.

\_\_\_\_\_  
Contractor by \_\_\_\_\_ Date \_\_\_\_\_  
Authorized Signature

Trade (Supplier)/ Company Name/ Authorized Signature/ Date  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Contractor may sign if materials and/or Sub-contractors charges are \$500 or less.

# CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY)

PRODUCER  <div style="text-align: center; font-size: 2em;">X</div>	THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW.	
INSURED  <div style="text-align: center; font-size: 2em;">X</div>	INSURERS AFFORDING COVERAGE INSURER A: <input checked="" type="checkbox"/> X INSURER B: INSURER C: INSURER D: INSURER E:	NAIC #

**COVERAGES**

THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. AGGREGATE LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR ADD'L LTR INSRD	TYPE OF INSURANCE	POLICY NUMBER	POLICY EFFECTIVE DATE (MM/DD/YY)	POLICY EXPIRATION DATE (MM/DD/YY)	LIMITS								
	GENERAL LIABILITY <input checked="" type="checkbox"/> COMMERCIAL GENERAL LIABILITY <input type="checkbox"/> CLAIMS MADE <input type="checkbox"/> OCCUR <input checked="" type="checkbox"/> GEN'L AGGREGATE LIMIT APPLIES PER: <input type="checkbox"/> POLICY <input type="checkbox"/> PRO-JECT <input type="checkbox"/> LOC	X	X	X	EACH OCCURRENCE \$ 1,000,000 DAMAGE TO RENTED PREMISES (Ea occurrence) \$ MED EXP (Any one person) \$ PERSONAL & ADV INJURY \$ 1,000,000 GENERAL AGGREGATE \$ 1,000,000 PRODUCTS - COMP/OP AGG \$ 1,000,000								
	AUTOMOBILE LIABILITY <input checked="" type="checkbox"/> ANY AUTO <input type="checkbox"/> ALL OWNED AUTOS <input type="checkbox"/> SCHEDULED AUTOS <input type="checkbox"/> HIRED AUTOS <input type="checkbox"/> NON-OWNED AUTOS	X	X	X	COMBINED SINGLE LIMIT (Ea accident) \$ 1,000,000 BODILY INJURY (Per person) \$ BODILY INJURY (Per accident) \$ PROPERTY DAMAGE (Per accident) \$								
	GARAGE LIABILITY <input type="checkbox"/> ANY AUTO				AUTO ONLY - EA ACCIDENT \$ OTHER THAN AUTO ONLY: EA ACC \$ AGG \$								
	EXCESS/UMBRELLA LIABILITY <input type="checkbox"/> OCCUR <input type="checkbox"/> CLAIMS MADE <input type="checkbox"/> DEDUCTIBLE RETENTION \$				EACH OCCURRENCE \$ AGGREGATE \$ \$ \$								
	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? If yes, describe under SPECIAL PROVISIONS below.	X X	X X	X X	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%;">WC STATUTORY LIMITS</td> <td style="width: 50%;">OTHER</td> </tr> <tr> <td>E.L. EACH ACCIDENT</td> <td>\$ 100,000</td> </tr> <tr> <td>E.L. DISEASE - EA EMPLOYEE</td> <td>\$ 100,000</td> </tr> <tr> <td>E.L. DISEASE - POLICY LIMIT</td> <td>\$ 500,000</td> </tr> </table>	WC STATUTORY LIMITS	OTHER	E.L. EACH ACCIDENT	\$ 100,000	E.L. DISEASE - EA EMPLOYEE	\$ 100,000	E.L. DISEASE - POLICY LIMIT	\$ 500,000
WC STATUTORY LIMITS	OTHER												
E.L. EACH ACCIDENT	\$ 100,000												
E.L. DISEASE - EA EMPLOYEE	\$ 100,000												
E.L. DISEASE - POLICY LIMIT	\$ 500,000												
	OTHER												

SAMPLE ONLY

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES / EXCLUSIONS ADDED BY ENDORSEMENT / SPECIAL PROVISIONS

Town of North Kingstown is an Additional Named Insured

Waiver of Subrogation applies to Worker's Compensation

<b>CERTIFICATE HOLDER</b>  Town of North Kingstown 100 Fairway Drive North Kingstown RI 02852-5762	<b>CANCELLATION</b>  SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, THE ISSUING INSURER WILL ENDEAVOR TO MAIL _____ DAYS WRITTEN NOTICE TO THE CERTIFICATE HOLDER NAMED TO THE LEFT, BUT FAILURE TO DO SO SHALL IMPOSE NO OBLIGATION OR LIABILITY OF ANY KIND UPON THE INSURER, ITS AGENTS OR REPRESENTATIVES. AUTHORIZED REPRESENTATIVE
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00103

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**SECTION 00 30 00 – MBE & WBE REQUIREMENTS****1.0 MBE & WBE UTILIZATION GOAL**

- A. The Contractor agrees to attempt to expend at least 10 percent of the dollar value of the contract, if awarded, to Minority Business Enterprises or Women Business Enterprises.
- B. The MBE/WBE must be certified by one of the following agencies:

Minority Business Enterprise Compliance Office  
R.I. Department of Administration  
One Capitol Hill  
Providence, RI 02908  
Contact: Ms. Dorinda Keene, Assistant Administrator – MBE Compliance (401)574-8670

**1.2 RECORDS**

- A. The Contractor shall keep such records as are necessary to determine compliance with its MBE/WBE goal obligations. The records kept by the Contractor will be designed to indicate, as a minimum, the information in the following paragraphs.
  - 1. The number of MBE/WBE and non-minority contractors, subcontractors and suppliers and the type of work or materials or services being performed on or incorporated in this project.
  - 2. The progress and efforts being made in seeking out MBE/WBE contractor organizations and individual MBE/WBE contractors for work on this project.
  - 3. Documentation of all correspondence, contact, telephone calls, etc. to obtain the services of MBE/WBE's on this project.
- B. All such records must be maintained for a period of three years following acceptance of final payment and will be available for inspection by the Awarding Authority.

**1.3 REPORTS**

- A. The Contractor, prior to issuance of a contract, agrees to furnish a Minority Business Utilization Report to the Awarding Authority within 10 days of being notified by the Awarding Authority of being the lowest qualified Bidder. Failure to show an adequate intention to utilize MBE/WBEs may constitute reason, at sole discretion of the Awarding Authority, to reject bid.
- B. The Contractor agrees to furnish a Minority Business Utilization Report with each requisition for payment showing the actual MBE/WBE utilization.
- C. All such reports must be maintained for a period of three years following acceptance of final payment and will be available for inspection by the Awarding Authority.



**This project must follow the requirements of the Rhode Island Department of Education School Construction regulations, in particular as follows:**

**1.04-2 Minority Business Enterprise (MBE)**

Minority (MBE) and Women (WBE) Business Enterprises shall mean a small business concern, owned and controlled by one or more minorities or women certified by the Rhode Island Department of Administration to meet the definition established by Chapter 37-14.1 of the General Laws of Rhode Island. Disadvantaged Business Enterprises (DBE) shall mean socially and economically disadvantaged firms which are owned and controlled by individuals who are citizens of the United States, or legal permanent residents whose social disadvantage must stem from an individual's color, national origin, gender, physical handicap, long term residence in an environment isolated from the mainstream of American society, or other similar cause beyond the control of the individual, and whose economic disadvantage must stem from an inability to compete in the free enterprise system due to diminished capital and credit opportunities, as compared to others in the same or similar line of business and/or competitive market area who are not socially disadvantaged. See <http://www.mbe.ri.gov/> for registration and regulation details and lists of compliant vendors.

Districts are required to demonstrate that ten percent (10%) of the dollar value of the work performed against contracts for construction exceeding \$500,000 shall be performed by MBE, WBE, or DBE where it has been determined that subcontract opportunities exist, and where certified Minority Business Enterprises are available. This section of RIDE 1.00 applies to approved projects to the extent that the state law is determined to be applicable and any future determination that Section 1.04-2 is no longer held to be valid does not affect the enforcement in part or in whole of these regulations. The signature page below is to be affirmed by each vendor wishing to be considered. Vendors are reminded that further documentation may be required to prove attempt and subsequent compliance with this regulation, a failure to prove compliance may be grounds for bid disqualification.

**MINORITY AND WOMEN'S BUSINESS ENTERPRISE (MBE/WBE)  
SIGNATURE PAGE**

**RIDE School Construction regulations compliance**

The Bidder hereby certifies that the Bidder has taken steps to confirm compliance with RIDE guidance per section 1.04-2 in soliciting bids and quotes from subcontractors for supplies, construction, equipment, and professional services and is in compliance with 40 CFR 35.3575 (d) *Minority and Women's Business Enterprise (MBE/WBE) Procurement*. The Bidder further certifies that the Bidder is in compliance with the Civil Rights Act of 1964, Executive Order No. 11245, and all other applicable Federal and State laws and regulations relating to equal opportunity employment.

BIDDER:

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

\_\_\_\_\_  
(Date)

Bidder's Name: \_\_\_\_\_

Address: \_\_\_\_\_

\_\_\_\_\_  
  
(The above certification of the Bidder shall be filled out completely, signed, and submitted by each Bidder and shall be a part of the Contract Documents. Bidders that do not meet requirements may be subject to disqualification.)

**Office of Diversity, Equity and Opportunity (ODEO)  
 MBE Compliance Office  
 1 Capitol Hill, 3<sup>rd</sup> Floor  
 Providence, RI 02908**

**(401) 574-8670**  
<http://odeo.ri.gov/>

Pursuant to RIGL 37-14.1 as well as the regulations promulgated thereto, the MBE Compliance Office requires that you complete the following table. Please note that these figures will be verified with the MBEs identified. If there are outstanding issues, such as retainage or a dispute, please indicate and attach supporting documentation for same. Also note that copies of invoice and cancelled checks for payment to all MBE subcontractors and suppliers are required.

**Contractor/Vendor Name:** \_\_\_\_\_ **Current Prime Contract Amount:** \$ \_\_\_\_\_ **% Complete:** \_\_\_\_\_  
**Project Name & Location:** \_\_\_\_\_

MBE/WBE Subcontractor	Original Contract Amount	Change Orders	Revised Contract Value	% Completed To Date	Amount Paid To Date	Amount Due	Retainage %	Retainage Amount	Explanation

I declare, under penalty of perjury, that the information provided in this verification form and supporting documents is true and correct.

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

\_\_\_\_\_  
 Printed Name  
 Notary Certificate:

Sworn before me this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_\_.

\_\_\_\_\_  
 Notary Signature \_\_\_\_\_ Commission Expires



**State of Rhode Island and Providence Plantations  
Office of Diversity, Equity and Opportunity (ODEO)  
Minority Business Enterprise Compliance Office  
Minority Business Enterprise Utilization Plan**

Company Name: \_\_\_\_\_

Representative's Name who administers MBE Program: \_\_\_\_\_

Street Address: \_\_\_\_\_

City, State, Zip: \_\_\_\_\_ Telephone: \_\_\_\_\_

Email: \_\_\_\_\_ Project Location: \_\_\_\_\_

Bid or Project #: \_\_\_\_\_ Date Bid Opened: \_\_\_\_\_

Description of Work: \_\_\_\_\_

Contract Value: \_\_\_\_\_ MBE % Assigned: \_\_\_\_\_

Total # of All Subcontractors/Suppliers used: \_\_\_\_\_ # of MBE Subcontractors/Suppliers used: \_\_\_\_\_

**List All Subcontractors/Suppliers/Consultants/Independent Contractors – Total Dollar Amounts – Scope of Work:**

<b>Subcontractor / Supplier</b>	<b>Dollar Award</b>	<b>Scope/Description of Work</b>	<b>RI Certified M/WBE Yes/No</b>

Please note that all MBE/WBE firms must be certified by the RI MBE Compliance Office, and that MBE/WBE firms must self-perform 100% of the work with their own forces or subcontract to another RI certified MBE/WBE in order to receive participation credit. Vendors may count 60% of expenditures for materials and supplies obtained from an MBE certified as a regular dealer/supplier, and 100% of such expenditures obtained from an MBE/WBE certified as a manufacturer. For firms certified as a broker, you may receive MBE participation credit only for the fees and commissions charged for the procurement of the good and materials, but not the cost of the materials themselves.

The above referenced contract will not be released until this plan has been approved by the Director of the Department of Administration or its designee.

For assistance and advice in identifying MBE/WBE firms, please call the Minority Business Enterprise Compliance Office at (401) 574-8670. The directory of all certified MBE firms is also located at <http://odeo.ri.gov/>.

Signature of Authorized Agent of Business: \_\_\_\_\_ Date: \_\_\_\_\_

**Send Completed Form to:**  
**Dorinda Keene, Assistant Administrator - MBE**  
**Office of Diversity, Equity and Opportunity (ODEO)**  
**Minority Business Enterprise Compliance Office**  
**One Capitol Hill, 3rd Floor**  
**Providence, RI 02908**  
**Phone: (401) 574-8670**  
[Dorinda.Keene@doa.ri.gov](mailto:Dorinda.Keene@doa.ri.gov)





## 2. DOCUMENTS TO BE INCLUDED WITH BID SUBMISSION:

BIDDER shall fill out and submit the following documents with their bid submission:

- a) Contractors Experience Sheet; Refer to Specification Section 000400.
- b) Contractors Qualification Statement; Refer to Specification Section 000410.
- c) Proposed Subcontractors Forms; Refer to Specification Section 000500.
- d) Minority Business Enterprise Certification; Refer to Specification Section 003113.

## 3. ADDENDA

The following Addenda have been received. The modifications to the Bid Documents noted below have been considered and all costs are included in the Bid Sum.

Addendum No. 1, dated _____	Addendum No. 2, dated _____
Addendum No. 3, dated _____	Addendum No. 4, dated _____

## 4. ACCEPTANCE

The bidder understands that the Owner reserves the right to reject any or all bids and to waive any formalities in the bidding.

The bidder agrees that this bid shall be good, and MAY NOT be withdrawn for a period of ninety (90) calendar days after the scheduled closing time for receiving bids.

Upon receipt of written notice of the acceptance of his bid, the Bidder will execute the formal contract attached within 10 days and deliver a performance bond, a labor and material payment bond, and a certificate of insurance, as required by the general conditions.

The bid surety attached for the sum of 5% of the bid, is to become the property of the Owner in the event the contract and bonds are not executed within the time above set forth, as liquidated damages for the delay and additional expense to the Owner caused thereby.

By submission of this BID, each BIDDER certifies, and in the case of a joint BID, each party thereto certifies as to his own organization, that his BID has been arrived at independently, without consultation, communication, or agreement as to any matter relating to this BID, with any other BIDDER or with any competitor.

## 5. SCHEDULE (Contract Time)

If this Bid is accepted, unless indicated otherwise on the bid form, Bidder will achieve a **Substantial Completion date of August 26, 2022**, at which date the Owner's operations can commence.

**\*\*\*\*TIME IS OF THE ESSENCE\*\*\*\***

## 6. JOINT VENTURES

Firms that are bidding this Project as part of a Joint Venture Partnership shall meet the following criteria in order to be eligible to participate in the Project.

- a) At least one (1) of the firms participating in the Joint Venture Partnership shall have been incorporated or otherwise legally established as a construction business in the State of Rhode Island and Providence Plantations for not less than ten (10) years.

- b) Each entity shall have participated and completed a minimum of two (2) previous Joint Venture Partnerships together of the same magnitude as this Project in the last ten (10) years.

Joint Venture Partnerships that have submitted a Bid for this Project shall meet all the eligibility requirements detailed above and shall submit all documentation that may be requested by the Owner in regard to the Joint Venture Partnership within five (5) days of notice of consideration of acceptance of Bid. Joint Venture Partnerships that do not submit the appropriate requested information shall not be eligible for Bid Award.

7. BIDDER ACKNOWLEDGEMENTS

In accordance with Article 13, Insurance, included in the Information for Bidders, the BIDDER shall provide a certificate of insurance covering all operations under this contract. The certificate of insurance meeting all conditions set forth therein shall be submitted prior to execution of the formal contract.

<p><b>REQUIREMENT FOR LICENSE NUMBER:</b></p> <p>In compliance with the requirements of Rhode Island General Law, Section 5-65-23, my Rhode Island license number for the work to be performed by this firm as prime contractor is:</p> <p>LICENSE TYPE: _____ LICENSE NUMBER: _____</p>
--

8. SALES TAX

The Town of North Kingstown, Rhode Island is exempt from payment of the Rhode Island Sales Tax under the 1956 General laws of the State of Rhode Island, 44-18-30 Paragraph I, as amended. Exemption certificates will be completed as required by the successful bidder.

9. BID FORM SIGNATURE(S)

The undersigned declares: that the only person interested in this proposal as principals are named herein as such; that no official of the Owner and no person acting for or employed by the Owner is interested directly or indirectly in this proposal or in any contract which may be made under it, or in any expected profits to arise there from; that his proposal is made in good faith, without fraud, collusion with any other person bidding or refraining from bidding for the same work; that he has examined the contract drawings relating to the contract covered by this proposal and in regard to all conditions pertaining to the work and carefully checked his estimates of cost and from them makes this proposal.

The Bid Sum submitted for the Base Bid includes the totals for Bid Alternates AND Unit Costs as the Bid Form requires.

\_\_\_\_\_  
(Bidder's Signature)

\_\_\_\_\_  
(Bidder's name – Printed or Typed)

\_\_\_\_\_  
(Bidder's Title – Printed or Typed)

Corporate Seal:

<p>THE CONTRACTOR SHALL PROVIDE AN AFFIDAVIT THAT THE PERSON WHO HAS AFFIXED HIS or HER SIGNATURE TO THIS BID FORM IS ACTIVELY AND LEGALLY AUTHORIZED TO BIND THE FIRM CONTRACTUALLY. THIS FORM MUST BE SUBMITTED WITH AND AFFIXED TO THE BID FORM.</p>
---

END OF SECTION 00 41 13

## PAYMENT BOND

KNOW ALL MEN BY THESE PRESENTS:

that  
of

as Principal, hereinafter call Contractor, and,  
as Surety, hereinafter called Surety, are held firmly bound unto

**TOWN OF NORTH KINGSTOWN, RHODE ISLAND**

as obligee, hereinafter called Owner, in the amount of  
in lawful money of the United States  
for the payment whereof Contractor and Surety bind themselves, their heirs, executors,  
administrators, successors and assigns, jointly and severally, firmly by these presents.

**THE CONDITION OF THIS OBLIGATION** is such that whereas, the Contractor  
entered into a certain contract with the Owner, dated the *day of*  
a copy of which is hereto attached and made a part hereof for the construction of:

for the **TOWN OF NORTH KINGSTOWN, RHODE ISLAND**, in accordance with the  
Contract and the Contract Documents.

**NOW THEREFORE, THE CONDITION OF THIS OBLIGATION** is such that, if  
Contractor shall promptly and faithfully perform said Contract, and shall promptly make  
payment to all claimants as hereinafter defined, for all labor and material used or  
reasonably required for use in the performance of the Contract, then this obligation shall  
be null and void; otherwise, it shall remain in full force and effect subject, however, to  
the following conditions:

1. The Surety, for valued received, hereby stipulates and agrees that no change,  
extension of time, alteration, or condition to the terms of the contract or to WORK  
to be performed thereunder or the SPECIFICATIONS accompanying the same  
shall in any way affect its obligation on this BOND, and it does hereby waive  
notice of any such change, extension of time, alteration or addition to the terms of  
the contract or to the WORK or to the SPECIFICATIONS.

2. A claimant is defined as one having a direct contract with the Principal or with a Subcontractor of the Principal for labor, material or both, used or reasonably required for use in the performance of the Contract, labor and material being construed to include that part of water, gas, power, light, heat, oil, gasoline, telephone service or rental of equipment directly applicable to the Contract.
3. The above named Principal and Surety hereby jointly and severally agree with the Owner that every claimant as herein defined, who has not been paid in full before the expiration of a period of ninety (90) days after the date on which the last of such claimant's work or labor was done or performed, or materials were furnished by such claimant, may sue on this bond for the use of such claimant, prosecute the suit to final judgment for such sum or sums as may be justly due claimant, and have execution thereon. The Owner shall not be liable for the payment of any costs or expenses of any such suit.
4. No suit or action shall be commenced hereunder by any claimant;
  - (a) Unless claimant, other than one having a direct contract with the Principal, shall have given written notice to any two of the following: the Principal, the Owner, or the Surety above named, within ninety (90) days after such claimant did or performed the last of the work or labor, or furnished the last of the materials for which said claim is made, stating with substantial accuracy the amount claimed and the name of the party to whom the materials were furnished, or for whom the work or labor was done or performed. Such notice shall be served by mailing the same by registered mail or certified mail, postage prepaid, in an envelope addressed to the Principal, Owner or Surety, at any place where an office is regularly maintained for the transaction of business, or served in any manner in which legal process may be served in the state in which the aforesaid project is located, save that such service need not be made by a public officer.
  - (b) After the expiration of one (1) year following the date on which Principal ceased Work on said Contract, or one (1) year from the date on which final payment under the contract falls due, whichever is later, it being understood, however, that if any limitation embodied in this bond is prohibited by any law controlling the construction hereof such limitation shall be deemed to be amended so as to be equal to the minimum period of limitation permitted by such law.
  - (c) Other than in a state court of competent jurisdiction in and for the county or other political subdivision of the state in which the Project, or any part thereof, is situated, or in the United States District Court for the district in which the Project, or any part thereof, is situated, and not elsewhere.

5. The amount of this bond shall be reduced by and to the extent of any payment or payments made in good faith hereunder, inclusive of the payment by Surety of mechanics' liens which may be filed of record against said improvement, whether or not claim for the amount of such lien be presented under and against this bond.

Signed and sealed this \_\_\_\_\_ day of \_\_\_\_\_

\_\_\_\_\_  
(Principal) (Seal)

\_\_\_\_\_  
(Witness)

By: \_\_\_\_\_  
(Title)

\_\_\_\_\_  
(Surety) (Seal)

\_\_\_\_\_  
(Witness)

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

## SECTION 00 43 43 – GENERAL WAGE DECISION

The State of Rhode Island Department of Labor, Division of Professional Regulation General Decision Modification document current as of the bid issuance date for this Project, is an integral part of the Bid Documents for use in fulfilling prevailing wage rate requirements. A copy is available on the web site of the State of Rhode Island Department of Labor and Training.

The Department of Labor and Training Web Site Address:

<https://dlt.ri.gov/wrs/prevailingwage/>

Click on “Current Wage Determinations” it will re-route you to:

<https://sam.gov/search>

Click on “Select Domain”; under “Wage Determination”; click on “Construction (DBA)”.

In accordance with RIGL 37-13-13; every contractor and subcontractor awarded a contract for school projects to submit completed RI Certified Weekly Payroll forms listing employees employed on the project to the awarding authority (North Kingstown School Department) on a monthly basis; for all work completed in the preceding month. Awarding Authorities, contractors and subcontractors shall provide any, and all, payroll records to the RI Department of Labor & Training within ten (10) days of any request that is made by the department.

END OF SECTION 00 43 43

"General Decision Number: RI20210001 09/17/2021

Superseded General Decision Number: RI20200001

State: Rhode Island

Construction Types: Building, Heavy (Heavy and Marine) and Highway

Counties: Rhode Island Statewide.

**BUILDING CONSTRUCTION PROJECTS (does not include residential construction consisting of single family homes and apartments up to and including 4 stories) HEAVY, HIGHWAY AND MARINE CONSTRUCTION PROJECTS**

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

Modification Number	Publication Date
0	01/01/2021
1	01/22/2021
2	03/05/2021
3	04/09/2021
4	04/23/2021
5	06/18/2021
6	07/30/2021
7	09/10/2021
8	09/17/2021



ASBE0006-006 12/01/2019

Rates Fringes

HAZARDOUS MATERIAL HANDLER

(Includes preparation, wetting, stripping, removal scrapping, vacuuming, bagging & disposing of all insulation materials, whether they contain asbestos or not, from mechanical systems).....\$ 36.60 22.40

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\* ASBE0006-008 09/01/2021

Rates Fringes

Asbestos Worker/Insulator  
Includes application of all insulating materials, protective coverings, coatings & finishes to all types of mechanical systems.\$ 45.00 32.89

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\* BOIL0029-001 01/01/2021

Rates Fringes

BOILERMAKER.....\$ 45.87 29.02

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BRI0003-001 06/01/2020

Rates Fringes

Bricklayer, Stonemason, Pointer, Caulker & Cleaner.....\$ 42.55 28.02

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BRI0003-002 03/01/2020

Rates Fringes

Marble Setter, Terrazzo Worker & Tile Setter.....\$ 40.78 28.92

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BRI0003-003 03/01/2020

Rates Fringes

Marble, Tile & Terrazzo Finisher.....\$ 34.10 27.88

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CARP0330-001 01/01/2021

Rates Fringes

CARPENTER (Includes Soft  
Floor Layer).....\$ 39.72 28.66  
Diver Tender.....\$ 40.72 28.66  
DIVER.....\$ 51.47 28.66  
Piledriver.....\$ 39.72 28.66  
WELDER.....\$ 40.72 28.66

FOOTNOTES:

When not diving or tending the diver, the diver and diver tender shall receive the piledriver rate. Diver tenders shall receive \$1.00 per hour above the pile driver rate when tending the diver.

Work on free-standing stacks, concrete silos & public utility electrical power houses, which are over 35 ft. in height when constructed: \$.50 per hour additional.

Work on exterior concrete shear wall gang forms, 45 ft. or more above ground elevation or on setback: \$.50 per hour additional.

The designated piledriver, known as the ""monkey"": \$1.00 per hour additional.

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CARP1121-002 01/06/2020

Rates Fringes

MILLWRIGHT.....\$ 39.07 29.15

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\* ELEC0099-002 06/02/2021

Rates Fringes

ELECTRICIAN.....\$ 43.61 54.71%  
Teledata System Installer.....\$ 32.71 12.57%+14.93

FOOTNOTES:

Work of a hazardous nature, or where the work height is 30 ft. or more from the floor, except when working OSHA-approved lifts: 20% per hour additional.

Work in tunnels below ground level in combined sewer outfall: 20% per hour additional.

-----  
ELEV0039-001 01/01/2021

Rates Fringes

ELEVATOR MECHANIC.....\$ 55.03 35.825+A+B

FOOTNOTES:

A. PAID HOLIDAYS: New Years Day; Memorial Day; Independence Day; Labor Day; Veterans' Day; Thanksgiving Day; the Friday after Thanksgiving Day; and Christmas Day.

B. Employer contributes 8% basic hourly rate for 5 years or more of service of 6% basic hourly rate for 6 months to 5 years of service as vacation pay credit.

-----  
ENGI0057-001 12/01/2020

Rates Fringes

Operating Engineer: (power plants, sewer treatment plants, pumping stations, tunnels, caissons, piers, docks, bridges, wind turbines, subterranean & other marine and heavy construction work)

GROUP 1.....	\$ 42.55	27.70+a
GROUP 2.....	\$ 40.55	27.70+a
GROUP 3.....	\$ 36.17	27.70+a
GROUP 4.....	\$ 33.32	27.70+a
GROUP 5.....	\$ 39.60	27.70+a
GROUP 6.....	\$ 30.40	27.70+a
GROUP 7.....	\$ 24.40	27.70+a
GROUP 8.....	\$ 36.25	27.70+a
GROUP 9.....	\$ 40.17	27.70+a

a. BOOM LENGTHS, INCLUDING JIBS:

- 150 feet and over + \$ 2.00
- 180 feet and over + \$ 3.00
- 210 feet and over + \$ 4.00
- 240 feet and over + \$ 5.00
- 270 feet and over + \$ 7.00
- 300 feet and over + \$ 8.00
- 350 feet and over + \$ 9.00
- 400 feet and over + \$10.00

a. PAID HOLIDAYS:

New Year's Day, President's Day, Memorial Day, July Fourth, Victory Day, Labor Day, Columbus Day, Veterans Day, Thanksgiving Day, Christmas Day. a: Any employee who works 3 days in the week in which a holiday falls shall be paid for the holiday.

a. FOOTNOTES:

Hazmat work: \$2.00 per hour additional.

Tunnel/Shaft work: \$5.00 per hour additional.

POWER EQUIPMENT OPERATORS CLASSIFICATIONS

GROUP 1: Cranes, lighters, boom trucks and derricks

GROUP 2: Digging machine, Ross Carrier, locomotive, hoist, elevator, bidwell-type machine, shot & water blasting machine, paver, spreader, graders, front end loader (3 yds. and over), vibratory hammer & vacuum truck, roadheaders, forklifts, economobile type equipment, tunnel boring machines, concrete pump and on site concrete plants.

GROUP 3: Oilers on cranes.

GROUP 4: Oiler on crawler backhoe.

GROUP 5: Bulldozer, bobcats, skid steer loader, tractor, scraper, combination loader backhoe, roller, front end loader (less than 3 yds.), street and mobile-powered sweeper (3-yd. capacity), 8-ft. sweeper minimum 65 HP).

GROUP 6: Well-point installation crew.

GROUP 7: Utility Engineers and Signal Persons

GROUP 8: Heater, concrete mixer, stone crusher, welding machine, generator and light plant, gas and electric driven pump and air compressor.

GROUP 9: Boat & tug operator.

-----  
ENGI0057-002 11/01/2020

Rates      Fringes

Power Equipment Operator  
(highway construction projects; water and sewerline projects which are incidental to highway construction projects; and bridge projects that do not span water)

GROUP 1.....	\$ 35.70	27.70+a
GROUP 2.....	\$ 30.40	27.70+a
GROUP 3.....	\$ 24.40	27.70+a
GROUP 4.....	\$ 30.98	27.70+a
GROUP 5.....	\$ 34.68	27.70+a
GROUP 6.....	\$ 34.30	27.70+a
GROUP 7.....	\$ 29.95	27.70+a

GROUP 8.....\$ 31.33      27.70+a  
 GROUP 9.....\$ 33.28      27.70+a

a. FOOTNOTE: a. Any employee who works three days in the week in which a holiday falls shall be paid for the holiday.

a. PAID HOLIDAYS: New Year's Day, President's Day, Memorial Day, July Fourth, Victory Day, Labor Day, Columbus Day, Veterans Day, Thanksgiving Day & Christmas Day.

**POWER EQUIPMENT OPERATOR CLASSIFICATIONS**

GROUP 1: Digging machine, crane, piledriver, lighter, locomotive, derrick, hoist, boom truck, John Henry's, directional drilling machine, cold planer, reclaimer, paver, spreader, grader, front end loader (3 yds. and over), vacuum truck, test boring machine operator, veemere saw, water blaster, hydro-demolition robot, forklift, economobile, Ross Carrier, concrete pump operator and boats

GROUP 2: Well point installation crew

GROUP 3: Utility engineers and signal persons

GROUP 4: Oiler on cranes

GROUP 5: Combination loader backhoe, front end loader (less than 3 yds.), forklift, bulldozers & scrapers and boats

GROUP 6: Roller,skid steer loaders, street sweeper

GROUP 7: Gas and electric drive heater, concrete mixer, light plant, welding machine, pump & compressor

GROUP 8: Stone crusher

GROUP 9: Mechanic & welder

-----  
 ENGI0057-003 12/01/2020

**BUILDING CONSTRUCTION**

Rates      Fringes

Power Equipment Operator

GROUP 1.....\$ 41.82      27.70+a  
 GROUP 2.....\$ 39.82      27.70+a  
 GROUP 3.....\$ 39.60      27.70+a  
 GROUP 4.....\$ 35.60      27.70+a  
 GROUP 5.....\$ 32.75      27.70+a  
 GROUP 6.....\$ 38.90      27.70+a  
 GROUP 7.....\$ 38.47      27.70+a  
 GROUP 8.....\$ 35.79      27.70+a

a. BOOM LENGTHS, INCLUDING JIBS:

- 150 ft. and over: + \$ 2.00
- 180 ft. and over: + \$ 3.00
- 210 ft. and over: + \$ 4.00
- 240 ft. and over: + \$ 5.00
- 270 ft. and over: + \$ 7.00
- 300 ft. and over: + \$ 8.00
- 350 ft. and over: + \$ 9.00
- 400 ft. and over: + \$10.00

a. PAID HOLIDAYS: New Year's Day, President's Day, Memorial Day, July Fourth, Victory Day, Labor Day, Columbus Day, Veterans Day, Thanksgiving Day & Christmas Day. a: Any employee who works 3 days in the week in which a holiday falls shall be paid for the holiday.

- a. FOOTNOTE: Hazmat work: \$2.00 per hour additional.  
Tunnel/Shaft work: \$5.00 per hour additional.

POWER EQUIPMENT OPERATORS CLASSIFICATIONS

GROUP 1: Cranes, lighters, boom trucks and derricks.

GROUP 2: Digging machine, Ross carrier, locomotive, hoist, elevator, bidwell-type machine, shot & water blasting machine, paver, spreader, front end loader (3 yds. and over), vibratory hammer and vacuum truck

GROUP 3: Telehandler equipment, forklift, concrete pump & on-site concrete plant

GROUP 4: Fireman & oiler on cranes

GROUP 5: Oiler on crawler backhoe

GROUP 6: Bulldozer, skid steer loaders, bobcats, tractor, grader, scraper, combination loader backhoe, roller, front end loader (less than 3 yds.), street and mobile powered sweeper (3 yds. capacity), 8-ft. sweeper (minimum 65 hp)

GROUP 7: Well point installation crew

GROUP 8: Heater, concrete mixer, stone crusher, welding machine, generator for light plant, gas and electric driven pump & air compressor

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\* IRON0037-001 09/16/2021

Rates      Fringes

IRONWORKER.....\$ 38.21      30.58

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LABO0271-001 05/30/2021

BUILDING CONSTRUCTION

Rates      Fringes

LABORER

GROUP 1.....	\$ 33.55	26.15
GROUP 2.....	\$ 33.80	26.15
GROUP 3.....	\$ 34.30	26.15
GROUP 4.....	\$ 34.55	26.15
GROUP 5.....	\$ 35.55	26.15

LABORERS CLASSIFICATIONS

GROUP 1: Laborer, Carpenter Tender, Mason Tender, Cement Finisher Tender, Scaffold Erector, Wrecking Laborer, Asbestos Removal [Non-Mechanical Systems]

GROUP 2: Asphalt Raker, Adzemen, Pipe Trench Bracer, Demolition Burner, Chain Saw Operator, Fence & Guard Rail Erector, Setter of Metal Forms for Roadways, Mortar Mixer, Pipelayer, Riprap & Dry Stonewall Builder, Highway Stone Spreader, Pneumatic Tool Operator, Wagon Drill Operator, Tree Trimmer, Barco-Type Jumping Tamper, Mechanical Grinder Operator

GROUP 3: Pre-Cast Floor & Roof Plank Erectors

GROUP 4: Air Track Operator, Hydraulic & Similar Self-Powered Drill, Block Paver, Rammer, Curb Setter, Powderman & Blaster

GROUP 5: Toxic Waste Remover

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LABO0271-002 05/30/2021

HEAVY AND HIGHWAY CONSTRUCTION

Rates      Fringes

LABORER

COMPRESSED AIR

Group 1.....	\$ 53.45	24.15
Group 2.....	\$ 50.98	24.15
Group 3.....	\$ 40.50	24.15

FREE AIR

Group 1.....	\$ 44.05	24.15
Group 2.....	\$ 43.05	24.15
Group 3.....	\$ 40.50	24.15

LABORER

Group 1.....	\$ 33.55	24.15
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Group 2.....	\$ 33.80	24.15
Group 3.....	\$ 34.55	24.15
Group 4.....	\$ 27.05	24.15
Group 5.....	\$ 35.55	24.15
OPEN AIR CAISSON, UNDERPINNING WORK AND BORING CREW		
Bottom Man.....	\$ 39.55	24.15
Top Man & Laborer.....	\$ 38.60	24.15
TEST BORING		
Driller.....	\$ 40.00	24.15
Laborer.....	\$ 38.60	24.15

## LABORER CLASSIFICATIONS

GROUP 1: Laborer; Carpenter tender; Cement finisher tender; Wrecking laborer; Asbestos removers [non-mechanical systems]; Plant laborer; Driller in quarries

GROUP 2: Adzeperson; Asphalt raker; Barcotype jumping tamper; Chain saw operators; Concrete and power buggy operator; Concrete saw operator; Demolition burner; Fence and guard rail erector; Highway stone spreader; Laser beam operator; Mechanical grinder operator; Mason tender; Mortar mixer; Pneumatic tool operator; Riprap and dry stonewall builder; Scaffold erector; Setter of metal forms for roadways; Wagon drill operator; Wood chipper operator; Pipelayer; Pipe trench bracer

GROUP 3: Air track drill operator; Hydraulic and similar powered drills; Brick paver; Block paver; Rammer and curb setter; Powderperson and blaster

GROUP 4: Flagger & signaler

GROUP 5: Toxic waste remover

## LABORER - COMPRESSED AIR CLASSIFICATIONS

GROUP 1: Mucking machine operator, tunnel laborer, brake person, track person, miner, grout person, lock tender, gauge tender, miner: motor person & all others in compressed air

GROUP 2: Change house attendant, powder watchperson, top person on iron

GROUP 3: Hazardous waste work within the ""HOT"" zone

## LABORER - FREE AIR CLASSIFICATIONS

GROUP 1: Grout person - pumps, brake person, track person, form mover & stripper (wood & steel), shaft laborer,



laborer topside, outside motorperson, miner, conveyor operator, miner welder, heading motorperson, erecting operator, mucking machine operator, nozzle person, rodperson, safety miner, shaft & tunnel, steel & rodperson, mole nipper, concrete worker, form erector (wood, steel and all accessories), cement finisher (this type of work only), top signal person, bottom person (when heading is 50' from shaft), burner, shield operator and TBM operator

GROUP 2: Change house attendant, powder watchperson

GROUP 3: Hazardous waste work within the ""HOT"" zone

-----  
 PAIN0011-005 06/01/2021

Rates      Fringes

PAINTER

Brush and Roller.....	\$ 36.42	22.90
Epoxy, Tanks, Towers, Swing Stage & Structural Steel.....	\$ 38.42	22.90
Spray, Sand & Water Blasting.....	\$ 39.42	22.90
Taper.....	\$ 37.17	22.90
Wall Coverer.....	\$ 36.92	22.90

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 PAIN0011-006 06/01/2021

Rates      Fringes

GLAZIER.....	\$ 39.98	22.90
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FOOTNOTES:

SWING STAGE: \$1.00 per hour additional.

PAID HOLIDAYS: Labor Day & Christmas Day.

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 PAIN0011-011 06/01/2021

Rates      Fringes

Painter (Bridge Work).....	\$ 54.00	22.90
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 PAIN0035-008 06/01/2011

Rates      Fringes

Sign Painter.....	\$ 24.79	13.72
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 PLAS0040-001 06/03/2019

BUILDING CONSTRUCTION

Rates Fringes

CEMENT MASON/CONCRETE FINISHER...\$ 36.00 27.15

FOOTNOTE: Cement Mason: Work on free swinging scaffolds under 3 planks width and which is 20 or more feet above ground and any offset structure: \$.30 per hour additional.

-----  
PLAS0040-002 07/01/2019

HEAVY AND HIGHWAY CONSTRUCTION

Rates Fringes

CEMENT MASON/CONCRETE FINISHER...\$ 32.85 22.20

-----  
PLAS0040-003 07/01/2019

Rates Fringes

PLASTERER.....\$ 37.55 27.50

-----  
PLUM0051-002 08/30/2021

Rates Fringes

Plumbers and Pipefitters.....\$ 46.49 31.40

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ROOF0033-004 06/01/2021

Rates Fringes

ROOFER.....\$ 39.40 29.06

-----  
SFRI0669-001 04/01/2021

Rates Fringes

SPRINKLER FITTER.....\$ 47.55 26.60

-----  
SHEE0017-002 12/01/2020

Rates Fringes

Sheet Metal Worker.....\$ 38.58 36.73

-----  
TEAM0251-001 05/01/2019

HEAVY AND HIGHWAY CONSTRUCTION

Rates Fringes

TRUCK DRIVER

GROUP 1.....	\$ 27.96	26.8525+A+B+C
GROUP 2.....	\$ 27.61	26.8525+A+B+C
GROUP 3.....	\$ 27.66	26.8525+A+B+C
GROUP 4.....	\$ 27.71	26.8525+A+B+C
GROUP 5.....	\$ 27.81	26.8525+A+B+C
GROUP 6.....	\$ 28.21	26.8525+A+B+C
GROUP 7.....	\$ 28.41	26.8525+A+B+C
GROUP 8.....	\$ 27.91	26.8525+A+B+C
GROUP 9.....	\$ 28.16	26.8525+A+B+C
GROUP 10.....	\$ 27.96	26.8525+A+B+C

FOOTNOTES:

A. Paid Holidays: New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day and Christmas Day, plus Presidents' Day, Columbus Day, Veteran's Day & V-J Day, providing the employee has worked at least one day in the calendar week in which the holiday falls.

B. Employee who has been on the payroll for 1 year or more but less than 5 years and has worked 150 Days during the last year of employment shall receive 1 week's paid vacation; 5 to 10 years - 2 weeks' paid vacation; 10 or more years - 3 week's paid vacation.

C. Employees on the seniority list shall be paid a one hundred dollar (\$100.00) bonus for every four hundred (400) hours worked, up to a maximum of five hundred dollars (\$500.00)

All drivers working on a defined hazard material job site shall be paid a premium of \$2.00 per hour over applicable rate.

TRUCK DRIVER CLASSIFICATIONS

GROUP 1: Pick-up trucks, station wagons, & panel trucks

GROUP 2: Two-axle on low beds

GROUP 3: Two-axle dump truck

GROUP 4: Three-axle dump truck

GROUP 5: Four- and five-axle equipment

GROUP 6: Low-bed or boom trailer.

GROUP 7: Trailers when used on a double hook up (pulling 2 trailers)

GROUP 8: Special earth-moving equipment, under 35 tons

GROUP 9: Special earth-moving equipment, 35 tons or over

GROUP 10: Tractor trailer

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

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

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

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

Union Rate Identifiers

A four letter classification abbreviation identifier enclosed in dotted lines beginning with characters other than ""SU"" or ""UAVG"" denotes that the union classification and rate were

prevailing for that classification in the survey. Example: PLUM0198-005 07/01/2014. PLUM is an abbreviation identifier of the union which prevailed in the survey for this classification, which in this example would be Plumbers. 0198 indicates the local union number or district council number where applicable, i.e., Plumbers Local 0198. The next number, 005 in the example, is an internal number used in processing the wage determination. 07/01/2014 is the effective date of the most current negotiated rate, which in this example is July 1, 2014.

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

### Survey Rate Identifiers

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

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

### Union Average Rate Identifiers

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

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

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WAGE DETERMINATION APPEALS PROCESS

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

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

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

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to:

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

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

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

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

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

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

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

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END OF GENERAL DECISION"

SECTION 00 45 30 – CONTRACTOR'S EQUAL EMPLOYMENT CERTIFICATION

\_\_\_\_\_ certifies that it

- 1. Intends to use the following listed construction trades in the work under the Contract:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

- 2. Will comply with the minority manpower ratio and specific affirmative action steps contained herein; and
- 3. Will obtain from each of its subcontractors and submit to the Owner prior to the award of any subcontract under this Contract the subcontractor certification.

\_\_\_\_\_  
(Signature of authorized representative of contractor)

\_\_\_\_\_  
(Date)

\_\_\_\_\_  
(Name and title)

END OF SECTION 00 45 30



SECTION 00 45 35 – SUBCONTRACTOR’S EQUAL EMPLOYMENT CERTIFICATION

\_\_\_\_\_ certifies that it

- 1. Intends to use the following listed construction trades in the work under the Contract:

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

- 2. Will comply with the minority manpower ratio and specific affirmative action steps contained herein; and
- 3. Will obtain from each of its subcontractors and submit to the Owner prior to the award of any subcontract under this Contract the subcontractor certification.

\_\_\_\_\_  
(Signature of authorized representative of contractor)

\_\_\_\_\_  
(Date)

\_\_\_\_\_  
(Name and title)

END OF SECTION 00 45 35

SECTION 00 45 39 – BCI REQUEST FORM

PART 1 - GENERAL

1.1 GENERAL DESCRIPTION

- A. Attached is the Town of North Kingstown School Department BCI Request Form.

END OF SECTION 00 45 39



## North Kingstown School Department

### Human Resources

100 Fairway

North Kingstown, RI 02852-6202

(401) 268-6440 [www.nksd.net](http://www.nksd.net)

Fax: 268-6445

TDD: 268-6457

**Educate  
Inspire  
Challenge**

TO: **All Employees & Potential Employees**

From: Human Resources Office

Date: December 7, 2011

Re: Eligibility to substitute for the North Kingstown School Dept.

As of August 1, 2001 the Department of Attorney General has required **all** substitutes and regular employees to obtain a **State & National Criminal Background Check**.  
[Rhode Island General Laws 16-2 -18.1 – 16-2-18.2]

**The background check must be initiated prior to or within one week of employment after receiving a conditional offer of employment.**

**All persons** seeking employment with the North Kingstown School Department **need to apply to their local** Police Station or the Attorney General's office to obtain a Federal Background Check. Please call **your local** Police Station for an appointment. **North Kingstown Residents will call 294-3316 ext. 8211.**

**All nationwide background checks require the taking of fingerprints. Once you, the applicant, have been fingerprinted, a search of the statewide criminal history database will be initiated. In order to expedite the processing of the requests, the results of that check will immediately be given to you, the applicant, in written form. It is your responsibility to BRING the ORIGINAL into the North Kingstown School Department, Human Resources Office.**

**The fingerprint portion of this check will be forwarded to the FBI for a nationwide search of the national criminal history database. The turnaround time for this is approximately six weeks. The BCI personnel will then inform the applicant and the perspective employer of the results of the search in writing.**

**The fee for this search in North Kingstown is \$36.00, to be paid by the applicant.**

**Background Check Hours are Monday, Wednesday, and Friday from 3pm - 5pm by appointment only. Please call 294-3316 ext. 8211 to arrange for an appointment. Please make checks or money order out to Town of North Kingstown.**

(Please see other side for request form. ↵)



North Kingstown School Department

Human Resources

100 Fairway

North Kingstown, RI 02852-6202

(401) 268-6440 [www.nksd.net](http://www.nksd.net)

Fax: 268-6445

TDD: 268-6457

Educate  
Inspire  
Challenge

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

To Whom It May Concern:

Mr./Mrs./Ms. \_\_\_\_\_, SS # \_\_\_\_\_ is being considered for a position within the North Kingstown School Department.

We ask that you do a **State & National \*Criminal Background Check** on the above named individual. **(Fingerprints required)**

You may forward the results to:

North Kingstown School Department  
Office of Human Resources  
Attn: Ms. Deborah Gardiner  
100 Fairway Drive  
North Kingstown, RI 02852

If you should have any questions regarding this matter you may reach me at 401-268-6440.

Thank you for your assistance in this matter.

Sincerely,

Deborah Gardiner  
Supervisor of Human Resources

\*As of August 1, 2001 the Department of Attorney General has required all substitutes and regular employees to obtain a **STATE & NATIONAL** Criminal Background Check. [Rhode Island General Laws 16-2-18.1; 16-2-18.2]

SECTION 00 45 46 – BIDDER OSHA CERTIFICATION

**Chapter 306 of the Acts of 2004**  
**An Act Relative to the Health and Safety on Construction Projects**

\_\_\_\_\_ (Name of General Contractor) hereby certifies  
that it, and all its subcontractors shall

certify that all employees to be employed at the worksite will have successfully completed a course in construction safety and health approved by the United States Occupational Safety and Health Administration that is at least 10 hours in duration at the time the employee begins work, and shall furnish documentation of successful completion of said course with the first certified payroll report for each employee.

Signed under the penalties of perjury. \_\_\_\_\_ (date)

\_\_\_\_\_  
Signature of authorized representative of contractor

\_\_\_\_\_  
Print name of authorized representative of contractor

END OF SECTION 00 45 46

Standard Form of Agreement Between  
**Owner and Contractor**

*where the basis of payment is a*  
STIPULATED SUM

---

**AGREEMENT**

Made as of the \_\_\_\_\_ day of \_\_\_\_\_ in the year Two Thousand and Twenty-One

**BETWEEN** the Owner: North Kingstown School Department  
(Name and address) 100 Romano Vineyard Way, Suite 120  
North Kingstown RI 02852-5762

and the Contractor:  
(Name and address)

The Project is: Rooftop Unit Replacement,  
Quidnessett Elementary School  
166 Mark Drive,  
North Kingstown RI 02852

The Owner and Contractor agree as set forth below:

ARTICLE 1

THE CONTRACT DOCUMENTS

The Contract Documents consist of this Agreement, Conditions of the Contract (General, Supplementary, and other Conditions), Drawings, Specifications, Addenda issued prior to execution of this Agreement, other documents listed in this Agreement and Modifications issued after execution of this Agreement; these form the Contract and are as fully a part of the Contract as if attached to this Agreement or repeated herein. The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations, or agreements, either written or oral, and includes the bid specifications and all documentation incorporated into the request for bids for ROOFTOP UNIT REPLACEMENT, QUIDNESSETT ELEMENTARY SCHOOL project, located within the Town of North Kingstown, Rhode Island.

ARTICLE 2  
THE WORK OF THIS CONTRACT

The Contractor shall execute the entire Work described in the Contract Documents, except to the extent specifically indicated in the Contract Documents to be the responsibility of others, or as follows:

ARTICLE 3  
DATE OF COMMENCEMENT AND SUBSTANTIAL COMPLETION

3.1 The date of commencement is the date from which the Contract Time of Paragraph 3.2 is measured, and shall be the date of this Agreement, as first written above, unless a different date is stated below, or provision is made for the date to be fixed in a notice to proceed issued by the Owner.  
**(Insert the date of commencement, if it differs from the date of this Agreement or, if applicable, state that the date will be fixed in a notice to proceed.)**

DATE SHALL BE SET IN THE NOTICE TO PROCEED.

**Unless the date of commencement is established by a notice to proceed issued by the Owner, the Contractor shall notify the Owner in writing not less than five days before commencing the Work to permit the timely filing of mortgages, mechanic's liens, and other security interests.**

3.2 The Contractor shall achieve Substantial Completion of the entire Work not later than August 10, 2020.

*(Insert the calendar date or number of calendar days after the date of commencement. Also insert any requirements for earlier Substantial Completion of certain portions of the Work, if not stated elsewhere in the Contract Documents.)*

, subject to adjustments of this Contract Time as provided in the Contract Documents.

*(Insert provisions, if any, for liquidated damages relating to failure to complete on time.)*

ARTICLE 4  
CONTRACT SUM

4.1 The Owner shall pay the Contractor in current funds for the Contractor's performance of the Contract the Contract Sum of To Be Determined (TBD), subject to additions and deductions as provided in the Contract Documents.

4.2 The Contract Sum is based upon the following alternates, if any, which are described in the Contract Documents and are hereby accepted by the Owner:  
*(State the numbers or other identification of accepted alternates. If decisions on other alternates are to be made by the Owner subsequent to the execution of this Agreement, attach a schedule of such other alternates showing the amount for each and the date until which that amount is valid.)*

4.3 Unit prices, if any, are as follows:

**ARTICLE 5**  
**PROGRESS PAYMENTS**

5.1 Based upon Applications for Payment submitted to the Owner by the Contractor, the Owner shall make progress payments on account of the Contract Sum to the Contractor as provided below and elsewhere in the Contract Documents.

5.2 The period covered by each Application for Payment shall be one calendar month ending on the last day of the month, or as follows:

5.3 OMITTED.

5.4 Each Application for Payment shall be based upon the Schedule of Values submitted by the Contractor in accordance with the Contract Documents. The Schedule of Values shall allocate the entire Contract Sum among the various portions of the Work and be prepared in such form and supported by such data to substantiate its accuracy as the Owner may require. This Schedule, unless objected to by the Owner, shall be used as a basis for reviewing the Contractor's Applications for Payment.

5.5 Applications for Payment shall indicate the percentage of completion of each portion of the Work as of the end of the period covered by the Application for Payment.

5.6 Subject to the provisions of the Contract Documents, the amount of each progress payment shall be computed as follows:

5.6.1 Take that portion of the Contract Sum properly allocable to completed Work as determined by multiplying the percentage of completion of each portion of the Work by the share of the total Contract Sum allocated to that portion of the Work in the Schedule of Values, less retainage of five percent (5%).

5.6.2 Add that portion of the Contract Sum properly allocable to materials and equipment delivered and suitably stored at the site for subsequent incorporation in the completed construction (or, if approved in advance by the Owner, suitably stored off the site at a location agreed upon in writing), less retainage of five percent (5%).

5.6.3 Subtract the aggregate of previous payments made by the Owner; and

5.6.4 Subtract amounts, if any, for which the Owner has withheld or nullified an Application for Payment.

5.7 The progress payment amount determined in accordance with Paragraph 5.6 shall be further modified under the following circumstances:

5.7.1 Add, upon Substantial Completion of the Work, a sum sufficient to increase the total payments to ninety-eight percent (98%) of the Contract Sum, less such amounts as the Engineer shall determine for incomplete Work and unsettled claims.



**ARTICLE 6**  
**FINAL PAYMENT**

**6.1 Final payment, constituting the entire unpaid balance of the Contract Sum, shall be made by the Owner to the Contractor when:**

**6.1.1 The Contract has been fully performed by the Contractor; and**

**6.1.2 A final Application for Payment has been issued by the Contractor and approved by the Town.**

**6.2 Such final payment shall be made by the Owner not more than 45 days after the issuance of the Final Application for**

**Payment, or as follows:**

**(Usury laws and requirements under the Federal Truth in Lending Act, similar state and local consumer credit laws and other regulations at the Owner's and Contractor's principal places of business, the location of the Project and elsewhere may affect the validity of this provision. Legal advice should be obtained with respect to deletions or modifications, and also regarding requirements such as written disclosures or waivers.)**

**ARTICLE 7**  
**MISCELLANEOUS PROVISIONS**

**7.1 Other provisions:**

**All payment applications must include certified payrolls for the time period being billed.**

**7.2 Where reference is made in this Agreement to a provision of the General Conditions or another Contract Document, the reference refers to that provision as amended or supplemented by other provisions of the Contract Documents.**

**7.3 Payments due and unpaid under the Contract shall bear interest from the date payment is due at the rate stated below, or in the absence thereof, at the legal rate prevailing from time to time at the place where the Project is located.**

**(Insert rate of interest agreed upon, if any.)**

**ARTICLE 8**  
**TERMINATION OR SUSPENSION**

**8.1 The Contract may be terminated by the Owner, or the Contractor as provided in Articles 13, 54 & 55 of the General Conditions.**

**8.2 The Work may be suspended by the Owner as provided in Article 60 of the General Conditions.**

**This Agreement is entered into as of the day and year first written above and is executed in at least three original copies of which one is to be delivered to the Contractor and the remainder to the Owner.**

**OWNER**

**CONTRACTOR**

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

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

Ralph Mollis, Town Manager  
(Printed name and title)

\_\_\_\_\_  
(Printed name and title)

General Terms

**RELEASE OF LIENS**

Whereas, the undersigned, have furnished labor or materials or both for the execution of work described in a contract named: “ \_\_\_\_\_ , dated \_\_\_\_\_ , owned by the Town of North Kingstown, hereinafter called “Owner.” Now, therefore, the undersigned, for and in consideration of the property and of other valuable consideration to each of them paid, the receipt whereof is hereby acknowledged, do hereby release and discharge any and all manner of liens, claims and demands whatsoever which the undersigned on any of them now have or might or could have on or against said property of the Owner thereof for work done or materials furnished as aforesaid, or in any other manner, from the commencement of work on said property to the date hereof.

The Contractor also certifies that all of his sub-Contractors and suppliers which have furnished any labor or materials for an amount of \$500.00 or more, for said job, have signed this Release of Liens.

The Contractor assumes full responsibility to hold the Town of North Kingstown safe and harmless from any lien for materials and/or labor which might occur from aforesaid work.

IN WITNESS WHEREOF, the undersigned have caused this Release of Liens to be duly executed on the respective dates indicated.

\_\_\_\_\_ by \_\_\_\_\_ Date \_\_\_\_\_  
Contractor Authorized Signature

**Trade (Supplier) / Company Name / Authorized Signature / Date**

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Contractor may sign if materials and/or Subcontractors charges are \$500.00 or less.

R. I. G. L. 44-1-6 ADDITIONAL COLLECTION POWERS- Nonresident Contractors. – (a) Any person doing business with a nonresident Contractor shall withhold payment of an amount of three percent (3%) of the contract price until thirty (30) days after the Contractor has completed the contract and has requested the tax administrator, in writing, to audit the records for the particular project, a receipted copy of the request to be furnished to the person holding the funds. The tax administrator shall, within thirty (30) days after receipt of the request, furnish to the nonresident Contractor and to the person holding the funds either a certificate of no tax due or a certificate of sales and use tax or income tax withheld, or both, due from the nonresident Contractor.

(b) Upon receipt of a certificate of no tax due, the person holding the payment may pay the nonresident Contractor. Upon receipt of a certificate of taxes due, the person may pay to the Contractor out of the amount withheld the excess over the amount of taxes set forth in the certificate together with the interest and penalties then assessed. If the tax administrator furnished neither certificate to both parties within thirty (30) days after receipt of a written request for the making of the audit, the person holding the payment may forthwith pay the payment withheld to the nonresident Contractor under the terms of the contract free from any claims of the tax administrator against either the person holding the payment or the nonresident Contractor for payment of sales or use taxes or income taxes withheld, or both.

(c) In the event the tax administrator shall serve upon the Contractor and the person holding the payment a certificate showing the taxes due within a thirty (30) day period, the person holding the payment shall deposit with the tax administrator the amount set forth in the certificate which is not in excess of three percent (3%) of the contract price, taking a receipt for the amount, and shall thereupon be free from any claim of the nonresident Contractor for that amount or of the tax administrator for sales and use taxes or income taxes withheld, or both, arising out of the materials, equipment, and services used in performance of the contract of the nonresident Contractor on that project.

(d) As used in this section, a nonresident Contractor is one who does not maintain a regular place of business in this state. “A regular place of business” means and includes any bona fide office (other than a statutory office), factory, warehouse, or other space in this state at which the taxpayer is doing business in its own name in a regular and systematic manner, and which is continuously maintained, occupied, and used by the taxpayer in carrying on its business through its regular employees regularly in attendance. A temporary office at the site of construction shall not constitute a regular place of business.

For further information, please contact the Rhode Island State Tax Administrator at (401) 222-6269; or Al Pugliese – (401) 222-3053.

## PERFORMANCE BOND

KNOW ALL MEN BY THESE PRESENTS: that

as Principal, hereinafter call Contractor and,

as Surety, hereinafter called Surety, are held firmly bound unto  
TOWN OF NORTH KINGSTOWN, RHODE ISLAND

as obligee, hereinafter called Owner, in the amount of  
in lawful money of the United States

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

THE CONDITION OF THIS OBLIGATION is such that whereas the Contractor entered into a certain contract with the Owner, dated the *day of*. a copy of which is hereto attached and made a part hereof for the construction of:

for the TOWN OF NORTH KINGSTOWN, RHODE ISLAND, in accordance with the Contractor and the Contract Documents.

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.

The Surety, for value received, hereby stipulates and agrees that no change, extension of time, alteration, or condition to the terms of the contract or to WORK to be performed thereunder or the SPECIFICATIONS accompanying the same shall in any way affect its obligation on this BOND, and it does hereby waive notice of any such change,

extension of time, alteration or addition to the terms of the contract or to the WORK or to the SPECIFICATIONS.

WHENEVER Contractor shall be and declared by Owner to be in default under the Contract, the Owner having performed Owner's Obligations

thereunder, the Surety shall promptly remedy the default, or shall promptly

- 1) Complete the Contract in accordance with its terms and conditions, or
- 2) Obtain a bid or bids from qualified contractors acceptable to Owner for completing the Contract in accordance with its terms and conditions, and upon determination by the Owner and Surety shall arrange for a contract between such bidder and Owner, 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 the Owner to Contractor under the Contract and any amendments thereto, less the amount properly paid by Owner to Contractor.

No right of action shall accrue on this Bond to or for the use of any person or corporation other than the Owner named herein or the heirs, executors, administrators, or successors of the Owner.

Signed and sealed this        day of

\_\_\_\_\_  
WITNESS

BY: \_\_\_\_\_

\_\_\_\_\_  
WITNESS

BY: \_\_\_\_\_

**IMPORTANT:** Surety Companies executing BONDS Must appear on the Treasury Department's most current list (Circular 570 as amended) and be authorized to transact business in the state where the PROJECT is located.

**LAWS PERTAINING TO PUBLIC WORKS PROJECTS**  
**(General Laws of Rhode Island [1977 Reenactment])**  
**Chapter 37-12 and 37-13, as amended**

**37-13-1. “Public works” defined.** – “Public Works” as used in this chapter shall mean any public work consisting of grading, clearing, demolition, improvement, completion, repair, alteration, or construction of any public road or any bridge, or portion thereof, or any public building, or portion thereof, or any heavy construction, or any public works projects of any nature or kind whatsoever.

**37-13-4. Provisions applicable to public works contracts – Lists of subcontractors.** – All public works shall be done by contract, subject to the same provisions of law relating thereto and to the letting thereof, which are applicable to similar contracts of the awarding authority or authorized agency, hereinafter called the “proper authority”, in the general location where the work is to be performed and which are not contrary to the provisions of § 37-13-1 – 37-13-14 and § 37-13-16. Each contractor after the award of a contract for public works shall submit to the proper authority a list of his or her subcontractors of any part or all of the work. The list shall be submitted in such manner or form as the proper authority shall uniformly require from contractors in all public works.

**37-13-6. Ascertainment of prevailing rate of wages and other payments- Specifications of rate in call for bids and in contract.** – Before awarding any contract for public works to be done, the proper authority shall ascertain from the director of labor and training the general prevailing rate of the regular, holiday, and overtime wages paid and the general prevailing payments on behalf of employees only, to lawful welfare, pension, vacation, apprentice training, and educational funds (payments to the funds must constitute an ordinary business expense deduction for federal income tax purposes by contractors) in the city, town, village, or other appropriate political subdivision of the state in which the work is to be performed, for each craft, mechanic, teamster, laborer, or type of workman needed to execute the contract for the public works. The proper authority shall, also, specify in the call for bids for the contract and in the contract itself the general prevailing rate of the regular, holiday, and overtime wages paid and the payments on behalf of employees only, to the welfare, pension, vacation, apprentice training, and education funds existing in the locality for each craft, mechanic, teamster, laborer, or type of worker needed to execute the contract or work.

**37-13-7. Specifications in contract of amount and frequency of payment of wages.** – (a) Every call for bids for every contract in excess of one thousand dollars (\$1,000), to which the state of Rhode Island or any political subdivision thereof or any public agency or quasi-public agency is a party, for construction, alteration, and/or repair, including painting and decorating, of public buildings or public works of the state of Rhode Island or any political subdivision thereof, or any public agency or quasi-public

agency and which requires or involves the employment of employees, shall contain a provision stating the minimum wages to be paid various types of employees which shall be based upon the wages that will be determined by the director of labor and training to be prevailing for the corresponding types of employees employed on projects of a character similar to the contract work in the city, town, village, or other appropriate political subdivision of the state of Rhode Island in which the work is to be performed. Every contract shall contain a stipulation that the contractor or his or her subcontractor shall pay all the employees employed directly upon the site of the work, unconditionally and not less often than once a week, and without subsequent deduction or rebate on any account, the full amounts accrued at time of payment computed at wage rates not less than those stated in the call for bids, regardless of any contractual relationships which may be alleged to exist between the contractor or subcontractor and the employees, and that the scale of wages to be paid shall be posted by the contractor in a prominent and easily accessible place at the site of the work; and the further stipulation that there may be withheld from the contractor so much of the accrued payments as may be considered necessary to pay to the employees employed by the contractor, or any subcontractor on the work, the difference between the rates of wages required by the contract to be paid the employees on the work and the rates of wages received by the employees and not refunded to the contractor, subcontractors, or their agents.

(b) The terms "wages", "scale of wages", "wage rates", "minimum wages", and "prevailing wages" shall include:

- (1) The basic hourly rate of pay; and
- (2) The amount of:

- (A) The rate of contribution made by a contractor or subcontractor to a trustee or to a third person pursuant to a fund, plan, or program; and
- (B) The rate of costs to the contractor or subcontractor which may be reasonably anticipated in providing benefits to employees pursuant to an enforceable commitment to carry out a financially responsible plan or program which was communicated in writing to the employees affected, for medical or hospital care, pensions on retirement or death, compensation for injuries or illness resulting from occupational activity, or insurance to provide any of the foregoing, for unemployment benefits, life insurance, disability and sickness insurance, or accident insurance, for vacation and holiday pay, for defraying costs of apprenticeship or other similar programs, or for other bona fide fringe benefits, but only where the contractor or subcontractor is not required by other federal, state, or local law to provide any of the benefits; provided, that the obligation of a contractor or subcontractor to make payment in accordance with the prevailing wage determinations of the director of labor and training insofar as this chapter of this title and other acts incorporating this chapter of this title by reference are concerned may be discharged by the making of payments in cash, by the making of contributions of a type referred to in subsection (b)(2), or by the assumption of an enforceable commitment to bear the costs of a plan or program of a type referred to in this subdivision, or any combination thereof, where the aggregate of any payments, contributions,

and costs is not less than the rate of pay described in subsection (b)(1) plus the amount referred to in subsection (b)(2).

(c) The term "employees", as used in this section, shall include employees of contractors or subcontractors performing jobs on various types of public works including mechanics, apprentices, teamsters, chauffeurs, and laborers engaged in the transportation of gravel or fill to the site of public works, the removal and/or delivery of gravel or fill or ready-mix concrete, sand, bituminous stone, or asphalt flowable fill from the site of public works, or the transportation or removal of gravel or fill from one location to another on the site of public works, and the employment of the employees shall be subject to the provisions of subsections (a) and (b).

(d) omitted

**37-13-8. Investigation and determination of prevailing wages – Filing of schedule.-** The director of labor and training shall investigate and determine the prevailing wages and payments made to or on behalf of employees, as set forth in § 37-13-7, paid in the trade or occupation in the city, town, village, or other appropriate political subdivision of the state and keep a schedule on file in his or her office of the customary prevailing rate of wages and payments made to or on behalf of the employees which shall be open to public inspection. In making a determination, the director of labor may adopt and use such appropriate and applicable prevailing wage rate determinations as have been made by the secretary of labor of the United State of America in accordance with the Davis-Bacon Act, as amended, 40 U.S.C. § 276a.

**37-13-9 Statutory provisions included in contracts. –** A copy of §§ 37-13-5, 37-13-6, and 37-13-7 shall be inserted in all contracts for public works awarded by the state, any city, town, committee, an authorized agency, or awarding authority thereof, or any person or persons in their behalf in which state or municipal funds are used if the contract price is in excess of one thousand dollars (\$1,000).

**37-13-13. Furnishing payroll record to director of labor and training. –** Each contractor awarded a contract with a contract price in excess of one thousand dollars (\$1,000) for public works, and each subcontractor who performs work on public works, shall furnish a certified copy of his or her payroll record of his or her employees employed upon the public works to the director of labor and training on a weekly basis for the preceding week. The director of labor and training may promulgate reasonable rules and regulations to enforce the provisions of this section. A contractor or subcontractor who fails to comply with the provisions of this section shall be deemed guilty of a misdemeanor and shall pay to the director of labor and training one hundred dollars (\$100) for each calendar day of noncompliance as determined by the director of labor and training. Any of those revenues shall be deposited as general revenues.



**37-13-15 Review.** – (a) There is hereby created an appeals board which shall be comprised of three (3) members who shall be appointed by the governor; provided, however, that each member of the appeals board shall have at least five (5) years experience with prevailing wage rates as they apply to the construction industry. The members of such appeals board shall serve without compensation. The members of the appeals board shall be appointed for terms of three (3) years except that of the three (3) members originally appointed by each of the appointing authorities: one (1) shall be appointed for a term of one (1) year, one (1) shall be appointed for a term of two (2) years and one (1) for a term of three (3) years.

- (b) Any person aggrieved by any action taken by the director of labor or his or her designated hearing officer under the authority of this chapter, or by the failure or refusal of the director of labor to take any action authorized by this chapter, may obtain a review thereof for the purpose of obtaining relief from the action or lack of action by filing a petition for administrative review and relief, to the appeals board as provided herein. Such petition for administrative review shall be filed within twenty (20) days of the action taken by the director of labor or designated hearing officer. The petition for administrative review shall be heard within ten (10) days of the date of filing. An aggrieved person under this section shall include:
- (1) Any person who is required to pay wages to his or her employees or make payments to a fund on behalf of his or her employees, as provided in this chapter;
  - (2) Any person who is required to be paid wages for his or her labor or on whose behalf payments are required to be paid to funds, as provided by this chapter;
  - (3) The lawful collective bargaining representative of a person defined in subdivision (2) above;
  - (4) A trade association of which a person defined in subdivision (1) above is a member;
  - (5) A proper authority as defined in this chapter;
  - (6) A contractor who submitted a bid for work to be or which has been awarded under the provisions of this chapter or a trade association of which he or she is a member, and
  - (7) A labor organization which has one or more written collective bargaining agreements with one or more employers or a trade association which sets forth the hours, wages, and working conditions of a craft, mechanic, teamster, or type or worker needed to execute the work, as provided in this chapter to the extent that it would be affected by the action or the failure to act of the director of labor or the hearing officer.

(c) Any aggrieved person as defined herein may obtain a review of a decision of the

appeals board by filing a petition in the superior court in Providence County pursuant to the provisions of the administrative procedures act, praying for review and relief and the petition shall follow the course of and be subject to the procedures for causes filed in the court.

(d) The director is hereby empowered to enforce his or her decision and/or the decision of the appeals board in the superior court for the county of Providence.

**37-13-16 -- Termination of work on failure to pay agreed wages -- Completion of work.** – Every contract within the scope of this chapter shall contain the further provision that in the event it is found by the director of labor that any employee employed by the contractor or any subcontractor directly on the site of the work covered by the contract has been or is being paid a rate of wages less than the rate of wages required by the contract to be paid as aforesaid, the awarding party may, by written notice to the contractor or subcontractor, terminate his or her right as the case may be, to proceed with the work, or such part of the work as to which there has been a failure to pay the required wages, and shall prosecute the work to completion by contract or otherwise, and the contractor and his or her sureties shall be liable to the awarding party for any excess costs occasioned the awarding authority thereby.

# GENERAL CONDITIONS

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PART I

**ARTICLE 1: CONTRACT AND CONTRACT DOCUMENTS**

The drawings, specifications, and addenda enumerated in Article 1 of the Special Conditions, the Advertisement for Bids, the Information for Bidders, and the Bid Proposal as accepted by the OWNER, shall be binding upon the parties to this Agreement as if fully set forth therein. Whenever the terms Contract Documents is used, it shall mean and include this Contract, Special Conditions, General Conditions, the Information for Bidders, the Bid Proposal, Addenda, the Technical Specifications and the Drawings. The OWNER shall interpret his own requirements. In case of conflict or inconsistency between the provisions of the signed portions of the Contract Documents and those of the specifications, the provisions of the signed portions shall govern.

**ARTICLE 2: DEFINITIONS**

The following terms as used in this Contract are defined as follows:

- a. CHANGE ORDER - A written order to the Contractor authorizing an addition, deletion or revision in the work within the general scope of the Contract Documents, or authorizing an adjustment in the Contract Price or Contract Time.
- b. CONTRACT DOCUMENTS - The contract, including Advertisement for Bids, Information for Bidders, Bid, Bid Bond, Agreement, Payment Bond, Performance Bond, General Conditions, Special Conditions, Technical Specifications, Notice of Award, Notice To Proceed, Change Order, Drawings, and Addenda.
- c. CONTRACTOR - A person, firm or corporation with whom the Contract is made by the OWNER.
- d. DRAWINGS - The part of the Contract Documents which show the characteristics and scope of the work to be performed and which have been prepared or approved by the Engineer.
- e. ENGINEER - Shall mean for the purpose of this Contract, the firm of Public Works Director who shall act as the authorized representative of the Owner whenever reference is made for such authorization.
- f. FIELD ORDER - A written order effecting a change in the work not involving an adjustment in the Contract Price or an extension of the Contract Time, issued by the Engineer to the Contractor during construction.
- g. NOTICE OF AWARD - The written notice of the acceptance of the Bid from the Owner to the successful Bidder.
- h. NOTICE TO PROCEED - Written communication issued by the Owner to the Contractor authorizing him to proceed with the work and establishing the date of commencement of the work.
- i. OWNER: - shall mean, for the purpose of this Contract, the party as defined in the Agreement section of the Contract Documents.

j. RESIDENT PROJECT REPRESENTATIVE - The authorized representative of the Owner who is assigned to the Project Site or any part thereof.

k. SHOP DRAWINGS - All drawings, diagrams, illustrations, brochures, schedules and other data which are prepared by the Contractor, a SubContractor, Manufacturer, Supplier or Distributor, which illustrate how specific portions of the work shall be fabricated or installed.

l. SPECIFICATIONS (TECHNICAL SPECIFICATIONS) - A part of the Contract Documents consisting of written descriptions of a technical nature of materials, equipment, construction systems, standards and workmanship.

m. SUBCONTRACTOR - A person, firm, or corporation supplying labor and materials, or only labor, for work at the site of the project; for, and under a separate Contract or Agreement with the CONTRACTOR.

n. SUBSTANTIAL COMPLETION - That data as certified by the Engineer when the construction of the Project or the specified part thereof is sufficiently completed, in accordance with the Contract Documents, so that the Project or specified part can be utilized for the purpose for which it is intended.

o. WORK ON THE PROJECT: - Work to be performed at the location of the project, including the transportation of materials and supplies to or from the site by employees of the CONTRACTOR or any SUBCONTRACTOR.

#### **ARTICLE 3: QUANTITIES OF ESTIMATE**

Whenever the estimated quantities of work to be done and materials to be furnished under this Contract are shown in any of the documents including the Bid Proposal; they are given for use in comparing bids and the right is especially reserved by the OWNER to increase or diminish them as may be deemed necessary or desirable by the OWNER. Such increases or decreases shall in no way affect this Contract, nor shall any such increases or decreases give cause for claims or liabilities for damages.

#### **ARTICLE 4: CONFLICTING CONDITIONS**

Any provisions of these General Conditions which may be in conflict or inconsistent with any of the articles in the Special Conditions shall be void to the extent of such conflict or inconsistency.

#### **ARTICLE 5: PROVISIONS OF LAW DEEMED INSERTED**

Each and every provision of law and clause required by law to be inserted in this Contract shall be deemed to be inserted herein and the Contract shall be read and enforced as though it were included herein, and if through mistake or otherwise, any such provision is not inserted, or is not correctly inserted, the Contract shall forthwith be physically amended to make such insertion or correction.

#### **ARTICLE 6: NOTICE AND SERVICE THEREOF**

The service of any notice, letter, or other communication shall be deemed to have been made by one of the contracting parties on the other party to the Contract when such letter, notice or other communication has been



delivered to the legal office address of the addressee, by a duly authorized representative of the addressor in person, or when such notice, letter, or other communication has been deposited in any regularly maintained mailbox of the United States Post Office, in a properly addressed, postpaid wrapper. The date of such service shall be considered to be the date of such personal delivery or mailing.

The address of the Contractor noted in his bid and/or the address of his field office on or near the site of work shall be considered his legal address for the purposes as set forth above.

#### **ARTICLE 7: GRATUITIES**

a. If it is found, after notice and hearing, by the Owner that gratuities (in the form of entertainment, gifts or otherwise) were offered or given by the Contractor, or any agent or representative of the Contractor, to any official, employee or agent of the Owner, or of the State, with a view toward securing a contract or securing favorable treatment with respect to the awarding or amending, or the making of any determinations with respect to the performance of this Contract, the Owner may, by written notice to the Contractor, terminate the right of the Contractor to proceed under this Contract or may pursue each other rights and remedies provided by law or under this Contract: Provided, that the existence of the facts upon which the Owner makes such findings shall be in issue any may be reviewed in proceedings pursuant to the "Remedies" clause of this Contract.

b. In the event this Contract is terminated as provided in Paragraph (a) hereof, the Owner shall be entitled (1) to pursue the same remedies against the Contractor as it could pursue in the event of a breach of the Contract by the Contractor, and (a) as a penalty in addition to any other damages to which it may be entitled by law, to exemplary damages in an amount (as determined by the Owner) which shall be not less than three nor more than ten times the cost incurred by the Contractor in providing any such gratuities to any such officer or employee.

#### **ARTICLE 8: COVENANT AGAINST CONTINGENT FEES**

The Contractor warrants that no person or selling agency has been employed or retained to solicit or secure this Contract upon an agreement or understanding for a commission, percentage, brokerage, or contingent fee, excepting bona fide employees or bona fide established commercial or selling agencies maintained by the Contractor for the purpose of securing business. For breach or violation of this warranty, the Owner shall have the right to annul this Contract without liability or in its discretion to deduct from the contract price or consideration, or otherwise recover, the full amount of such commission, percentage, brokerage, or contingent fee.

#### **ARTICLE 9: REMEDIES**

Except as may be otherwise provided in this contract, all claims, counterclaims, disputes and other matters in question between the Owner and the Contractor arising out of or relating to this agreement or the breach thereof will be decided by arbitration if the parties hereto mutually agree, or in a court of competent jurisdiction within the State in which the Owner is located.

## PART II

The rights and obligations of the CONTRACTOR under this Contract shall include, but not be limited to the following:

### ARTICLE 10: REPRESENTATIONS OF THE CONTRACTOR

The Contractor represents and warrants:

- a. That he is financially solvent and that he is experienced and competent to perform the type of work required under this Contract and that he is able to furnish the plant materials, supplies, or equipment that may be necessary to perform the work as specified.
- b. That he is familiar with all Federal, State and municipal laws, ordinances, orders, and regulations which may in any way affect the project work, or the employment of persons thereon, including but not limited to any special acts relating to the work or to the project of which is a part.
- c. That such temporary and permanent work required by the Contract Documents to be done by him will be satisfactorily constructed and can be used for the purpose for which it was intended and that such construction will not injure any person or damage property.
- d. That he has carefully examined the drawings, specifications, and addenda, if any, and the site of the work and that from his own investigations, he has satisfied himself as to the nature and location of the work, the character of equipment and other facilities needed for the performance of the work, the general and local conditions, and all other items that may effect the work.
- e. That he is aware of the hazards involved in the work and the danger to life and property both evident and inherent and that he will conduct the work in a careful and safe manner without injury to persons or property.

### ARTICLE 11: CONTRACTOR'S OBLIGATIONS

The Contractor shall perform all work in a good Workmanlike manner, and in accordance with the plans and specifications and any supplements thereto, and according to any directions or orders given by the Owner. He shall furnish all supplies, materials, facilities, equipment, and means necessary or proper to perform and complete the work required by this Contract. He shall furnish, erect, maintain, and remove any construction plant or temporary work as may be required. He alone shall be responsible for the safety, efficiency, and adequacy of his plant, appliances, and methods, and for any damage which may result from their failure or their improper construction, maintenance, or operation.

The Contractor shall observe, comply with, and be subject to all terms, conditions, requirements, and limitations of the Contract and specifications and shall do, carry on, and complete the entire work to the satisfaction of the Owner.

The Contractor shall be solely responsible for all the work and shall provide all precautionary measures necessary for preventing injury to persons or damage to property. All injury or damage of whatever nature resulting from the work or resulting to persons, property, or the work during its progress,

from whatever cause, shall be the responsibility of the Contractor.

The Contractor shall hold the Owner and Engineer, or their duly authorized agents, harmless and defend and indemnify them against damages or claims for damages due to injuries to persons or property arising out of the execution of the project work, and for damages to materials furnished for the work, for infringement of inventions, patents, and patent rights used in doing the work, and for any act, omission, or instance of neglect by the Contractor, his agents, employees, or subContractors.

The Contractor shall bear all losses resulting to him, including but not limited to losses sustained on account of the character, quality, or quantity of any part of the work, or all parts of the work, or because the nature of the conditions in or on the project site are different from what was estimated or indicated, or on account of the weather, elements, or other causes.

#### **ARTICLE 12: TIME FOR COMPLETION AND LIQUIDATED DAMAGES**

a. It is hereby understood and mutually agreed by and between the Contractor and the Owner that the date of beginning and the time of completion of the work as specified in this Contract are ESSENTIAL CONDITIONS of this Contract, and it is further mutually understood and agreed that the work embraced in this Contract shall be Commenced on a date to be specified in the Notice to Proceed.

b. The Contractor agrees that said work shall be prosecuted regularly, diligently, and uninterruptedly at such rate of progress as will insure full completion thereof within the time specified, and further that time of completion as agreed upon is reasonable, taking into consideration the average climatic range and usual industrial conditions prevailing in this locality.

c. If the said Contractor shall neglect, fail or refuse to complete the work within the time herein specified, or any proper extension thereof granted by the Owner, then the Contractor does hereby agree, as a partial consideration for the awarding of this Contract, to pay to the Owner the amount specified in the Contract, not as a penalty, but as liquidated damages for such breach of Contract as hereinafter set forth for each and every calendar day that the Contractor shall be in default after the time stipulated in the Contract for completing the work.

d. The said amount is fixed and agreed upon by and between the Owner and the Contractor, and said amount is agreed to be the amount of damages the Owner would sustain in such an event as the above-mentioned, and said amount shall be retained from time to time by the Owner from current periodical payments.

e. It is further agreed that time is of the essence in each and every portion of the Contract and specifications; where in a definite and certain length of time is fixed for the performance of any act whatsoever; and where under the Contract an additional time is allowed for the completion of any work, the new time limit fixed by such extension shall be of the Contractor shall not be charged when the delay in completion of the work is due to:

1. Any preference, priority, or allocation order duly issued by the government, subsequent to the date of the Contract.

2. Unforeseeable causes beyond the control and without the fault or negligence of the Contractor, including, but not restricted to acts of God, or of the public enemy, act of the Owner, acts of another contractor, floods, epidemics, strikes, and unusually severe weather.

3. Any delays of subContractors or suppliers approved by the Owner. Provided further that the Contractor shall within ten days (10) from the beginning of the delay, unless the Owner shall grant a further period of time prior to the date of final settlement of the Contract, notify the Owner in writing of the causes of the delay. The Owner shall ascertain the facts and extent of the delay and notify the Contractor within a reasonable time of its decision in the matter.

**ARTICLE 13: TERMINATION FOR DEFAULT; DAMAGES FOR DELAY; TIME EXTENSIONS**

a. If the Contractor refuses or fails to prosecute the work, or any separable part thereof, with such diligence as will insure its completion within the time specified in this Contract, or any extension thereof, or fails to complete said work within such time, the Owner may, by written notice to the Contractor, terminate his right to proceed with the work or such part of the work as to which there has been a delay. In such event, the Owner may take over the work and prosecute the same to completion, by Contract or otherwise, and may take possession of and utilize in completing the work such materials, appliances, and plant as may be on the site of the work and necessary therefore. Whether or not the Contractor's right to proceed with the work is terminated, he and his sureties shall be liable for any damage to the Owner resulting from his refusal or failure to complete the work within the specified time.

b. If fixed and agreed liquidated damages are provided in the Contract and if the Owner so terminates the Contractor's right to proceed, the resulting damage will consist of such liquidated damages until such reasonable time as may be required for final completion of the work together with any increased costs occasioned the Owner in completing the work.

c. If fixed and agreed liquidated damages are provided in the Contract and if the Owner does not so terminate the Contractor's right to proceed, the resulting damage will consist of such liquidated damages until the work is completed or accepted.

d. The Contractor's right to proceed shall not be so terminated nor the Contractor charged with resulting damage if:

1. The delay in the completion of the work arises from causes other than normal weather beyond the control and without the fault or negligence of the Contractor, including but not restricted to, acts of God, acts of the public enemy, acts of the Owner in either its sovereign or contractual capacity, acts of another Contractor in the performance of a Contract with the Owner, fires, floods, epidemics, quarantine restrictions, strikes, freight embargoes, unusually severe weather, or delays of subContractors or suppliers arising from causes other than normal weather beyond the control and without the fault or negligence of both the Contractor and such subContractors or suppliers; and

1. The Contractor, within 10 days from the beginning of any such delay (unless the Owner grants a further period of time before the date of final payment under the Contract), notifies the Owner in writing of the causes of delay.

The Owner shall ascertain the facts and the extent of the delay and extend the time for completing the work when, in his judgment, the findings of fact justify such and extension, and his findings of fact shall be final and conclusive on the parties, subject only to appeal as provided in the Remedies clause of this Contract.

e. If, after notice of termination of the Contractor's right to proceed Under the provisions of this clause, it is determined for any reason that the Contractor was not in default under the provisions of this clause, or that the delay was excusable under the provisions of this clause, the rights and obligations of the parties shall, if the Contract contains a clause providing for termination for convenience of the Owner, be the same as if the notice of termination had been issued pursuant to such clause. If, in the foregoing circumstances, this Contract does not contain a clause providing for termination for convenience of the Owner, the Contract shall be equitably adjusted accordingly; failure to agree to any such adjustment shall be subject to the Remedies clause of this Contract.

f. The rights and remedies of the Owner provided in this clause are in addition to any other rights and remedies provided by law or under this Contract.

g. As used in paragraph (d) (1) of this clause, the term, "SubContractors or suppliers", means Contractors or suppliers at any tier.

#### **ARTICLE 14: CONTRACT SECURITY**

The Contractor shall furnish Payment and Performance Bonds in an amount equal to at least one hundred percent (100%) of the Contract price as security for the faithful performance of the Contract, and for the payment of all persons performing labor on the project under this Contract and furnishing materials, equipment and all other incidentals in connection with this Contract. The Surety on such bonds shall be a duly authorized surety company, licensed to do business in the State of Rhode Island and satisfactory to the Owner. The cost of the same shall be paid by the Contractor. Prior to the starting of any work, the bonds must be approved by the Owner.

#### **ARTICLE 15: ADDITIONAL OR SUBSTITUTE BOND**

If at any time the Owner, for justifiable cause, shall become dissatisfied with any Surety or Sureties holding payment bonds, the Contractor shall, within five (5) days after notice from the Owner to do so, substitute an acceptable bond or bonds in such form and Signed by such other Surety as may be satisfactory to the Owner. The Premiums of such bonds shall be paid by the Contractor. No further payments will be deemed due, nor will be made until the new Surety or Sureties shall have furnished such an acceptable bond to the Owner.

#### **ARTICLE 16: INDEMNITY**

The Contractor shall at all times indemnify and save harmless the Owner and the Engineer, their servants and agents, from any and all claims and from any suits, litigations, damages, losses or the like arising out of injuries sustained or alleged to have been sustained by any persons or property in connection with the contract work, caused in whole or in part by acts or omissions of the Contractor, his subcontractors, materialmen, or anyone directly or indirectly connected with the contract work.

**ARTICLE 17: SUPERINTENDENCE BY THE CONTRACTOR**

The Contractor shall give the work the constant attention necessary to facilitate the progress thereof and shall cooperate with the Owner in every possible way.

At the site of the work, the Contractor shall, at all times, employ a construction superintendent who shall have full authority to act for the Contractor. It is understood that the employment of such representative shall be acceptable to the Owner and shall be such a person as can be continued in the capacity for the duration of the Contract, unless he ceases to be on the Contractor's payroll.

**ARTICLE 18: CONTRACTOR TO LAY OUT HIS OWN WORK**

The Owner will establish such general reference points as in his judgment will enable the Contractor to proceed with the work. The Contractor, at his own expense, shall provide all materials and equipment and such qualified helpers as the Owner may require for setting the general reference points and shall protect and preserve all stakes, benches, and other markers used to identify the reference points. The Contractor shall lay out all the Contract work from the above and shall be responsible for the accuracy of all lines, grades and measurements.

**ARTICLE 19: COMPETENT HELP TO BE EMPLOYED**

The Contractor shall employ experienced foremen, craftsmen and other workmen competent in the work in which they are to be engaged.

**ARTICLE 20: PERMITS AND REGULATIONS**

The Contractor shall procure all permits, licenses, and approvals necessary for the execution of the Contract work. The Town shall waive all application fees for Town permits. **STATE FEES ARE NOT WAIVED.**

The Contractor shall comply with all laws, regulations, ordinances, orders and rules relating to the performance of the work, the protection of the adjacent property, and the maintenance of passageways, guard fences, and other protective facilities.

**ARTICLE 21: CONSTRUCTION SCHEDULE AND PERIODIC ESTIMATES**

Within five (5) days after the date of "Notice to Proceed", the Contractor shall deliver to the Owner an estimated construction progress schedule in a form satisfactory to the Owner, showing the proposed dates of commencement and completion of each of the various subdivisions of work required under the contract documents and the anticipated amount of each monthly payment that will become due the Contractor in accordance with the progress schedule. The Contractor shall also furnish on forms to be supplied by the Owner: 1. a detailed estimate, giving a complete breakdown of the contract price; and 2. periodic itemized estimates of the work done for the purpose of making partial payments thereon.

The Contractor shall perform the work of this Contract to conform with the schedule as approved by the Owner, except that the Owner reserves the right to amend and alter the construction schedule at any time, in a manner which is deemed to be in the best interest of the Owner to do so. The Contractor shall arrange his work to conform with this schedule as it may be revised from time to time by the Owner, at no additional expense to the Owner. The Contractor shall notify the Owner immediately of any circumstances which may affect the performance of the work in accordance with current construction schedule.

**ARTICLE 22: SEQUENCE OF THE WORK**

The Contractor shall be required to prosecute his work in accordance with a schedule prepared by him in advance in accordance with additional requirements specified herein and approved by the Owner. This scheduling shall state the methods and shall forecast the times of doing each portion of the work. Before beginning any portion of the work, the Contractor shall give the Owner advance notice and ample time for making necessary preparations.

**ARTICLE 23: AUDIT; ACCESS TO RECORDS**

The Contractor shall maintain books, records, documents and other evidence directly pertinent to performance of work under this Contract in accordance with generally accepted accounting principles and practices. The Contractor shall also maintain the financial information and data used by the Contractor in the preparation or support of the cost submission or for any negotiated contract or change order and a copy of the cost summary submitted to the Owner. The Contractor will provide proper facilities for such access and inspection.

Audits conducted pursuant to this Provision shall be in accordance with generally accepted auditing standards and established procedures and guidelines of the reviewing or audit agency(ies).

The Contractor agrees to the disclosure of all information and reports resulting from the access to records pursuant to paragraphs above, to any of the agencies referred to above, provided that the Contractor is afforded the opportunity for an audit exit conference, and an opportunity to comment and submit any supporting documentation on the pertinent portions of the draft audit report that the final audit report will include written comments of reasonable length, if any, of the Contractor.

Records under paragraphs above, shall be maintained and made available during performance on work under this Contract and until three years from the date of final payment for the project. In addition, those records which relate to any "Dispute", appeal agreement, or litigation, or the settlement of claims arising out of such performance, or costs or items to which an audit exception has been taken, shall be maintained and made available until three years after the date of resolution of such appeal, litigation, claim or exception.

**ARTICLE 24: REPORTS, RECORDS AND DATA**

The Contractor and each of his subcontractors, shall submit to the Owner such schedules of quantities, and costs, progress schedules, pay-

rolls, reports, estimates, records and other data as the Owner may request concerning the work performed or to be performed under this Contract.

**ARTICLE 25: DIFFERING SITE CONDITIONS**

- a. The Contractor shall promptly and before such conditions are disturbed, notify the Owner in writing of: (1) subsurface or latent physical conditions at the site differing materially from those indicated in this Contract, or (2) unknown physical conditions at the site, of any unusual nature, differing materially from those ordinarily encountered and generally recognized as inhering in work of the character provided for in this Contract. The Owner shall promptly investigate the conditions, and if he finds that such conditions do materially so differ and cause an increase or decrease in the Contractor's cost of, or the time required for, performance of any of the work under this Contract, whether or not changed as a result of such conditions, an equitable adjustment shall be made and the Contract modified in writing accordingly.
- b. No claim of the Contractor under this clause shall be allowed unless the Contractor has given the notice required in (a) above; provided, however, the time prescribed therefore may be extended by the Owner.
- c. No claim by the Contractor for an equitable adjustment hereunder shall be allowed if asserted after final payment under this Contract.

**ARTICLE 26: PAYMENTS BY THE CONTRACTOR**

The Contractor shall pay:

- a. for all transportation and utility services not later than the 20th day of each calendar month following that in which services were rendered.
- b. for all materials, tools, and other expendable equipment to the extent of 90 percent of the cost thereof, not later than the 20th day of the calendar month following that in which such items were delivered to the site of work, and the balance of the cost thereof not later than the 30th day following the completion of that part of the work in or on which such material, tools, or equipment are incorporated or used.
- c. To each of his subcontractors, not later than the 5th day following each payment to the Contractor, the respective amounts allowed the Contractor on account of the work performed by his subcontractors to the extent of such subcontractor's interest therein.

**ARTICLE 27: GENERAL GUARANTEE**

Neither the final certificate of payment nor any provision in the contract documents nor partial or entire occupancy of the premises by the Owner shall constitute an acceptance of work not done in accordance with the contract documents or relieve the Contractor of liability in respect to any express warranties or responsibility for faulty workmanship or materials. The Contractor shall remedy any defects in the work and pay for any damage to other work resulting therefrom, which shall appear within a



period of one year (1) from the date of final acceptance of the work, unless a longer period is specified by the Owner. The Owner will give final notice of observed defects with reasonable promptness.

**ARTICLE 28: COMPLETENESS OF THE WORK**

In addition to the specified or described portions of the work, all other work and all other materials, equipment and labor of whatever description, necessary or required to complete the work, or for carrying out the full intent of the drawings and specifications, such work, labor, materials, and equipment shall be provided by the Contractor, and payment therefore shall be considered as having been included in the prices stipulated for the appropriate item of work listed in the bid.

**ARTICLE 29: CARE OF THE WORK**

The Contractor shall be responsible for all damages to persons or property that occur as a result of his fault or negligence in connection with the prosecution of the work and shall be responsible for the proper care and protection of all materials delivered and work performed until completion and final acceptance by the Owner, whether or not the same has been covered by partial payments made by the Owner.

**ARTICLE 30: PROTECTION OF CONSTRUCTION FEATURES**

The Contractor shall take adequate precautions to protect existing sidewalks, curbs, pavements, utilities, adjoining property and such incidentals, and to avoid damage thereto. The Contractor shall completely repair any damage at no additional expense to the Owner.

**ARTICLE 31: SAFETY AND HEALTH REGULATIONS**

These Contract Documents, and the joint and several phases of construction hereby contemplated, are to be governed, at all times, by the applicable provisions of the Federal law(s) including but not limited to the following:

1. Williams-Steiger Occupational Safety and Health Act, 1970, Public Law 92-596;
2. Part 1910 of the Occupational Safety and Health Standards, Chapter XVII of Title 29, Code of Federal Regulations;
3. This project is subject to all of the Safety and Health Regulations (CFR 29, Part 1926 and all subsequent amendments) as promulgated by the U.S. Department of Labor on June 24, 1974. Contractors are urged to become familiar with the requirements of These regulations.

In the event of any inconsistencies between the above laws and regulations and the provisions of these Contract Documents, the laws and regulations shall prevail.

**ARTICLE 32: PROTECTION OF WORK AND PROPERTY - EMERGENCY**

- a. The Contractor shall at all times safely guard the Owner's property from injury or loss in connection with this Contract. He shall at all times safely guard and protect his own work, materials incorporated into the work or stockpiled at the site, and that of adjacent property, from damage. The Contractor shall replace or make good any such damage, loss or injury.
- b. In case of an emergency which threatens loss or injury of property, and/or safety of life, the Contractor will be allowed to act, without previous instructions from the Owner, in a diligent manner. He shall notify the Owner immediately thereafter. Any claim for compensation by the Contractor due to such extra work shall be promptly submitted to the Owner for approval.
- c. Where the Contractor has not taken action but has notified the Owner of an emergency threatening injury to persons or damage to the work or to any adjoining property, he shall act as instructed or authorized by the Owner.
- d. The amount of reimbursement claimed by the Contractor on account of any Emergency action shall be determined in the manner provided elsewhere in the Contract Documents.

**ARTICLE 33: FIRE PREVENTION AND PROTECTION**

All State and municipal rules and regulations with respect to fire prevention, fire-resistant construction, and fire protection shall be strictly adhered to and all work and facilities necessary therefor shall be provided and maintained by the Contractor in an approved manner.

All fire protection equipment such as water tanks, hoses, pumps, extinguishers, and other materials, and apparatus, shall be provided for the protection of the contract work, temporary work, and adjacent property. Trained personnel experienced in the operation of all fire protection equipment and apparatus shall be available on the site whenever work is in progress, and at such other times as may be necessary for the safety of the public and the work.

**ARTICLE 34: PROTECTION OF LIVES AND HEALTH**

- a. In order to protect the lives and health of his employees under this Contract, the Contractor shall comply with all pertinent provisions of the "Manual of Accident Prevention in Construction", issued by the Associated General Contractors of America, Inc., and shall maintain an accurate record of all cases of death, occupational diseases, and injuries requiring medical attention or causing loss of time from work arising out of, and in the course of employment on the Contract work.
- b. The Contractor alone shall be responsible for the safety, efficiency, and adequacy of his plant, appliances, and methods, and for any damage which may result from their failure or their improper construction, maintenance, or operation.

**ARTICLE 35: PROTECTION AGAINST HIGH WATER AND STORM**

The Contractor shall take all precautions to prevent damage to work or equipment by high water or by storms. The Owner may prohibit the carrying out of work at any time when in his judgment high waters or storm conditions are unfavorable or unsuitable, or at any time regardless of the weather when proper precautions are not being taken to safeguard previously constructed work or work in progress.

In case of damage caused by the failure of the Contractor to take adequate precautions, the Contractor shall repair or replace equipment damaged and shall make such repairs or rebuild such parts of the damaged work as the Owner may require, at no additional cost to the Owner.

**ARTICLE 36: FIRST AID TO INJURED**

The Contractor shall keep in his office, ready for immediate use, all articles necessary for giving first aid to injured employees. He shall also provide arrangements for the immediate removal and hospital treatment of any employees injured on the work who require the same.

**ARTICLE 37: HURRICANE PROTECTION**

Should hurricane warnings be issued, the Contractor shall take every precaution to minimize danger to person, to the work and to adjacent property. These precautions shall include closing all openings, removing all loose materials, tools and equipment from exposed locations, and removing all scaffolding and other temporary work.

**ARTICLE 38: USE OF PREMISES AND REMOVAL OF DEBRIS**

The Contractor undertakes, at his own expense:

- a. To take every precaution against injuries to persons or damage to property.
- b. To store his apparatus, materials, equipment, and supplies in such orderly fashion at the site of the work as will not unduly interfere with the progress of his work or any others.
- c. To place upon the work or any part thereof, only such loads as are consistent with the safety of that portion of the work.
- d. To clean frequently all refuse, scrap, and debris caused by his operations, so that the work site is maintained in a neat, workmanlike appearance.
- e. To effect all cutting, fitting, or patching of his work required to make the same conform to the drawings and specifications, and except with the consent of the Owner, not to cut or otherwise alter the work of any other Contractor.
- f. Before final payment, to remove all surplus materials falsework, temporary structures, including foundations thereof, plants of any description, and debris of any nature resulting from his operations, so that the site is left in a neat, orderly, and workmanlike condition.

**ARTICLE 39: CORRECTION OF WORK**

All work, materials, all processes of manufacture, and all methods of construction shall be at all times and places subject to the inspection of the Owner, who shall be the final judge of the quality and suitability of the work performed under this Contract. Should any of the work performed fail to meet with his approval, it shall be forthwith reconstructed, made good, replaced, and/or corrected as the case may be, by the Contractor, at his own expense. Rejected material shall be immediately removed from the site. If, in the opinion of the Owner, it is undesirable to replace, reconstruct, or correct any of the work not performed in accordance with the Contract Documents, the compensation to be paid to the Contractor shall be reduced by such amounts as in the judgment of the Owner shall be equitable.

**ARTICLE 40: FAILURE TO REPAIR**

Any emergency arising from the interruption of electric, gas, water, or sewer service due to the activities of the Contractor, shall be repaired by the Contractor as quickly as is possible. If and when, in the opinion of the Owner, the Contractor is not initiating repair work as expeditiously as possible upon notification to do so, the Owner may, at his own option, make the necessary repairs using his own forces or those of others. The cost of such repairs shall be subtracted from the payments due to the Contractor.

**ARTICLE 41: WEATHER CONDITIONS**

In the event of temporary suspension of the work, or during inclement weather, or whenever the Owner shall direct, the Contractor shall, and shall cause his subContractors to protect carefully his and their work and materials against damage or injury from the weather. If, in the opinion of the Owner, any work or materials are damaged or injured by reason of failure to protect them on the part of the Contractor, or any of his subContractors, or otherwise damaged or injured by the Contractor's negligence, or are found to be defective, such materials or work shall be removed and replaced at the expense of the Contractor.

**ARTICLE 42: WORK IN COLD WEATHER**

The Owner may determine when conditions are unfavorable for work and may order the work, or any portion thereof, suspended whenever, in his opinion, the conditions are not such as will insure first class work.

**ARTICLE 43: BUS LINE INTERFERENCE**

Whenever it may be necessary to interfere with any bus lines, notice shall be given to the corporation owning the same, and reasonable time will be given to said corporation to arrange the schedule for operation of the bus line, as it may be necessary.

**ARTICLE 44: NIGHTWORK**

Nightwork, or work on Saturdays, Sundays, or legal holidays requiring the presence of an engineer or inspector, will not be permitted except in case of emergency, and only upon the approval of the Owner.

Should it be necessary for the Owner to operate an organization for continuous nightwork or for emergency nightwork, the lighting, safety and other facilities which are deemed necessary shall be provided by the Contractor. Compensation for this work shall be considered as having been included in the prices stipulated for the appropriate items of work as listed in the bid, and no extra compensation will be paid by the Owner.

**ARTICLE 45: LIGHTS, BARRIERS, WATCHMEN, AND INDEMNITY**

The Contractor shall erect and maintain such barriers, lighting, warning lights, danger warning signals, and signs that will prevent accidents during the construction work and protect the work and insure the safety of personnel and the public at all times and places; the Contractor shall indemnify and protect the Owner and Engineer in every respect from injury or damage whatsoever caused by any act of neglect by the Contractor or his subContractors, or their servants or agents. In addition to the above, when and as necessary, or when required by the Owner, the Contractor shall post signs and employ watchmen or flagmen, for the direction of traffic at the site and for excluding at all times unauthorized persons from the work site, for which the Contractor shall be paid no additional compensation. The Contractor shall be responsible for excluding at all times from the land within the easement areas, all persons not directly connected with the work.

All work occurring on State of Rhode Island highways shall be clearly identified, protected and the public's safety ensured by erection of signs, barriers and all other provisions as outlined in the Manual on Uniform Traffic Control Devices for Streets and Highways; issued by U. S. Department of Transportation, Federal Highway Administration, 1978; Part VI, Traffic Controls for Streets and Highway Construction and Maintenance Operations.

**ARTICLE 46: LOADING**

No part of the structures involved in this Contract shall be loaded during construction with a load greater than it is calculated to carry with safety. Should any accidents or damage occur through any violation of this requirement, the Contractor will be held responsible under his Contract and bond.

**ARTICLE 47: DISPOSAL OF MATERIALS**

The materials used in the construction of the work, shall be deposited in such manner so they will not endanger persons or the work, and so that free access may be had at any time to all hydrants and gates in the vicinity of the work. The materials shall be kept trimmed up so that as little inconvenience as possible to the public or adjoining tenants is caused.

**ARTICLE 48: FINISHING AND CLEANING UP**

In completing his operations, the Contractor shall immediately remove all surplus material, tools, and other property belonging to him, leaving the entire street or surroundings free and clean and in good order, at no additional expense to the Owner. The Contractor shall exercise special care in keeping the rights-of-way and private lands upon which work

is performed free and clean of all debris, and shall remove all tools and other property when they are not in use.

In case the Contractor fails or neglects to promptly remove all surplus materials, tools, and incidentals after backfilling, leaving the street or surrounding area clean and free of debris, and do the required repaving when ordered, the Owner may, after 24 hours notice, cause the work to be done and the cost thereof deducted from any payment due to the Contractor.

#### **ARTICLE 49: SPIRITUOUS LIQUORS**

The Contractor shall neither permit nor suffer the introduction of spirituous liquors upon the work embraced in this Contract, nor the use of the same.

#### **ARTICLE 50: DUST CONTROL**

The Contractor shall exercise every precaution and means to prevent and control dust arising out of all construction operations from becoming a nuisance to abutting property owners or surrounding neighborhoods. Pavements adjoining the pipe trench shall be kept broomed off and washed clean of excess materials wherever and whenever directed. Repeated daily dust control treatment shall be provided to satisfactorily prevent the spread of dust until permanent pavement repairs are made and until earth stockpiles have been removed, and all construction operations that might cause dust have been completed. No extra payment will be made for these dust control measures, compensation shall be considered to be included in the prices stipulated for the appropriate items as listed in the bid.

If so directed by the Owner, the Contractor shall furnish and apply calcium chloride for supplemental control of dust.

Calcium chloride shall conform to the requirements of AASHO M 144 (ASTM D-98) except that the pellet form and the flake form shall be equally acceptable.

Calcium chloride shall be applied only at the locations, at such times and in the amount as may be directed by the Owner. It shall be spread in such manner and by such devices that uniform distribution is attained over the entire area on which it is ordered placed.

There will be no separate payment for this work. The cost of the work shall be included in the price bid for the various other items of work.

### **PART III**

The rights and obligations of the OWNER under this Contract shall include, but not be limited to the following:

#### **ARTICLE 51: THE OWNER'S AUTHORITY**

The Owner shall give all orders and directions contemplated under this Contract and specifications relative to the execution of the work.

The Owner shall determine the amount, quality, acceptability, and fitness of the several kinds of work and materials which are to be paid for under this Contract and shall decide all questions which may arise in relation to said work and the construction thereof.

The Owner's estimates and decisions shall be final and conclusive, except as herein otherwise expressly provided. In case any question shall arise between the parties hereto relative to said Contract or specifications, the determination or decision of the Owner shall be a condition precedent to the right of the Contractor to receive any money or payment for work under this Contract affected by such questions. The Owner shall decide the meaning and intent of any portion of the specifications and of any plans or drawings where the same may be found to be obscure or be in dispute. Any differences or conflicts in regard to their work which may arise between the Contractor and other Contractors performing work for the Owner, shall be adjusted and determined by the Owner.

**ARTICLE 52: ALL WORK SUBJECT TO CONTROL BY THE OWNER**

a. In the performance of the work, the Contractor shall abide by all orders, directions, and requirements of the Owner, and shall perform all work to the satisfaction of the Owner, and at such times and places, but such methods, and in such manner and sequence as he may require. The Owner shall determine the amounts, quality, acceptability, and fitness of all parts of the work. The Owner shall interpret the drawings, specifications, contract documents, all other documents, and the extra work orders. The Owner shall also decide all other questions in connection with the work. The Contractor shall employ no plant, equipment, materials, methods or men to which the Owner objects and shall remove no plant, materials, or equipment or other facilities from the work site without the Owner's permission. Upon request, the Owner will confirm in writing any oral order, direction, requirement, or determination.

b. Inspectors shall be authorized to inspect all work done and materials furnished. Such inspection may extend to all parts of the work and to the preparation or manufacture of the materials to be used. The presence or absence of an inspector shall not relieve the Contractor from any requirements of the Contract. In case of any dispute arising between the Contractor and the inspector as to materials furnished or the manner in which the work is being executed, the inspector shall have the authority to reject material or suspend work until the question has been decided by the Owner. The inspector shall not be authorized to revoke, alter, enlarge, relax, or release any requirement of these specifications, nor to approve or accept any portion of the work, nor to issue instructions contrary to the drawings and specifications. The inspector shall in no case act as foreman or perform other duties for the Contractor, or interfere with the management of the work by the latter. Any advice which the inspector may give the Contractor shall in no way be construed as binding the Owner, or the Engineers in any way, nor releasing the Contractor from the fulfillment of the terms of the Contract.

**ARTICLE 53: THE OWNER'S CONTROL NOT LIMITED**

The enumeration in this Contract of particular instances in which the opinion, judgment, discretion, or determination of the Owner shall control or in which work shall be performed to his satisfaction or subject to his approval or inspection, shall not imply that only matters similar to those enumerated shall be so governed and performed, but without exception all the work shall be so governed and performed.

**ARTICLE 54: RIGHT OF THE OWNER TO TERMINATE THE CONTRACT**

In the event that any of the provisions of this Contract are violated by the Contractor, or any of his subcontractors, the Owner may serve written notice upon the Contractor and the Surety of its intention to terminate the Contract, such notice to contain the reasons for such intention to Terminate the Contract. If, within ten days (10) such violation or delay shall not cease and satisfactory arrangement or correction made, the Contract shall, at the expiration of the ten days, cease and immediately serve notice thereof upon the Surety and the Contractor, and the Surety shall have the power to take over and perform the Contract, provided, however, that if the Surety does not commence performing thereof within ten days 10) from the date of mailing to such Surety a Notice of Termination, the Owner may take over the work and prosecute the same to completion by Contract or force account at the expense of the Contractor, and the Contractor and his Surety shall be liable to the Owner for any excess cost occasioned the Owner thereby.

**ARTICLE 55: TERMINATION FOR CONVENIENCE**

a. The performance of work under this Contract may be terminated by the Owner in accordance with this clause in whole, or from time to time in part, whenever the Owner shall determine that such terminate shall be effected by delivery to the Contractor of a Notice of Termination specifying the extent to which performance of work under the Contract is terminated, and the date upon which such termination becomes effective.

b. After receipt of a Notice of Termination, and except as otherwise directed by the Owner, the Contractor shall:

1. Stop work under the Contract on the date and to the extent specified in the Notice of Termination;

2. Place no further orders or subcontracts for materials, services, or facilities except as may be necessary for completion of such portion of the work under the Contract as is not terminated;

3. Terminate all orders and subcontracts to the extent that they relate to the performance of work terminated by the Notice of Termination;

4. Assign to the Owner, in the manner, at the times, and to the extent directed by the Owner, all of the right, title and interest of the Contractor under the orders and subcontracts so terminated. In which case, the Owner shall have the right, in its discretion, to settle, or pay any or all claims arising out of the termination of such orders and subcontracts;

5. Settle all outstanding liabilities and all claims arising out of such termination of orders and subcontracts, with the approval or ratification of the Owner to the extent he may require, which approval or ratification shall be final for all the purposes of this clause;

6. Transfer title to the Owner, and deliver in the manner, at the times, and to the extent, if any, directed by the Owner,



(i) the fabricated or unfabricated parts, work in process, completed work, supplies, and other material produced as a part of, or acquired in connection with the performance of the work terminated by the Notice of Termination, and

(ii) the completed or partially completed plans, drawings, information, and other property which, if the Contract had been completed, would have been required to be furnished to the Owner.

7. Use his best efforts to sell, in the manner, at the times, to the extent, and at the price or prices directed or authorized by the Owner, any property of the types referred to in (6) above; provided, however, that the Contractor (i) shall not be required to extend credit to any purchaser, and (ii) may acquire any such property under the conditions prescribed and at a price or prices approved by the Owner: And, provided further, that the proceeds of any such transfer or disposition shall be applied in reduction of any payments to be made by the Owner to the Contractor under this Contract or shall otherwise be credited to the price or cost of the work covered by this Contract or paid in other such manner as the Owner may direct;

8. Complete performance of such part of the work as shall not have been terminated by the Notice to Termination; and

9. Take such action as may be necessary, or as the Owner may direct, for the protection and preservation of the property related to this Contract which is in the possession of the Contractor and in which the Owner has or may acquire an interest.

C. After receipt of a Notice of Termination, the Contractor shall submit to the Owner his termination claim, in the form and with the certification prescribed by the Owner. Such claim shall be submitted promptly but in no event later than one year from the effective date of termination, unless one or more extensions in writing are granted by the Owner upon request of the Contractor made in writing within such one-year period or authorized extension thereof. However, if the Owner determines that the facts justify such action, he may receive and act upon any such termination claim at any time after such one-year period or extension thereof. Upon failure of the Contractor to submit his termination claim within the time allowed, the Owner may determine, on the basis of information available to him, the amount, if any, due to the Contractor by reason of the termination and shall thereupon pay to the Contractor the amount so determined.

d. Subject to the provisions of paragraph (c), the Contractor and the Owner may agree upon the whole or any part of the amount or amounts to be paid to the Contractor by reason of the total or Partial termination of work pursuant to this clause which amount or amounts may include a reasonable allowance for profit on work done: Provided, that such agreed amount or amounts, exclusive of Settlement costs, shall not exceed the total contract price as reduced by the amount of payments otherwise made and as further reduced by the contract price or work not terminated. The Contract shall be amended accordingly, and the Contractor shall be paid the agreed amount. Nothing in Paragraph (e) of this clause, prescribing the amount to be paid to the Contractor in the event of failure of the Contractor and the Owner to agree upon the whole amount to be

paid to the Contractor by reason of the termination of work pursuant to this clause, shall be deemed to limit, restrict, or otherwise determine or affect the amount or amounts which may be agreed upon to be paid to the Contractor pursuant to this Paragraph (d).

E. In the event of the failure of the Contractor and the Owner to agree as provided in Paragraph (d) upon the whole amount to be paid to the Contractor by reason of the termination of work pursuant to this clause, the Owner shall determine, on the basis of information available to him, the amount, if any, due to the Contractor the amounts determined as follows:

1. With respect to all contract work performed prior to the effective date of the Notice of Termination, the total (without duplication of any items) of:

i. The cost of such work;

ii. The cost of settling and paying claims arising out of the termination of work under subcontracts or orders provided in Paragraph (b) (5) above, exclusive of the amounts paid or payable on account of supplies or materials delivered or services furnished by the subcontractor prior to the effective date of the Notice of Termination of work under this Contract, which amounts shall be included in the cost on account of which payment is made under (i) above, and

iii. A sum, as profit on (i) above, determined by the Owner to be fair and reasonable: Provided, however, that if it appears that the Contractor would have sustained loss on the entire Contract had it been completed, no profit shall be included or allowed under this subdivision (iii) and an appropriate adjustment shall be made reducing the amount of the settlement to reflect the indicated rate of loss; and

2. The reasonable cost of the preservation and protection of property incurred pursuant to Paragraph (b) (9); and any other reasonable cost incidental to termination of work under this Contract, including expense incidental to the determination of the amount due to the Contractor as the result of the termination of work under this Contract.

The total sum to be paid to the Contractor under (1) above shall not exceed the total contract price as reduced by the amount of payments otherwise made and as further reduced by the contract price of work not terminated. Except for normal spoilage, and except to the extent that the Owner shall have otherwise expressly assumed the risk of loss, there shall be excluded from the amounts payable to the Contractor under (1) above, the fair value, as determined by the Owner, of property which is destroyed, lost, stolen, or damaged so as to become undeliverable to the Owner, or to a buyer pursuant to Paragraph (b) (7).

F. The Contractor shall have the right to dispute under the clause of this Contract entitled "Remedies" from any determination made by the Owner under Paragraph (c) or (e) above, except that, if the Contractor has failed to submit his claim within the time provided in Paragraph (c) above and has failed to request extension of such time, he shall have no such right of appeal. In any case where the Owner has made a determination of the amount due under Paragraph (c) or (e) above, the Owner shall pay to the Contractor the following: (1) if there is no right of appeal hereunder or if no timely appeal has been taken, the amount so determined by the Owner or (2) if a "Remedies" proceeding is initiated, the amount finally determined in such "Remedies" proceeding.

g. In arriving at the amount due the Contractor under this clause, there shall be deducted (1) all unliquidated advance or other payments on account theretofore made to the Contractor, applicable to the terminated portion of this Contract, (2) any claim which the Owner may have against the Contractor in connection with this Contract, and (3) the agreed price for, or the proceeds of sale of any materials, supplies, or other things kept by the Contractor or sold, pursuant to the provisions of this clause, and not otherwise recovered by or credited by the Owner.

h. If the termination hereunder be partial, prior to the settlement of the terminated portion of this Contract, the Contractor may file with the Owner a request in writing for an equitable adjustment of the price or prices specified in the Contract relating to the continued portion of the Contract (the portion not terminated by the Notice of Termination) and such equitable adjustment as may be agreed upon shall be made in such price or prices; however, nothing contained herein shall limit the right of the Owner and the Contractor to agree upon the amount or amounts to be paid to the Contractor for the completion of the continued portion of the Contract when said Contract does not contain an established contract price for such continued portion.

#### **ARTICLE 56: RIGHTS OF ACCESS**

Nothing herein contained or shown on the drawings shall be construed as giving the Contractor exclusive occupancy of the work area. The Owner or any other Contractors employed by him, the various utility companies, Contractors or subcontractors employed by State or Federal agencies, or any other agencies involved in the general project or upon public rights-of-way, may enter upon or cross the area of work or occupy portions of the area as is directed or necessary.

When the territory of one contract is the convenient means of access to the other, the Contractor shall arrange his work in such a manner as to permit such access to the other and prevent unnecessary delay to the work as a whole.

#### **ARTICLE 57: RIGHTS-OF-WAY AND SUSPENSION OF WORK**

Land and rights-of-way for the purpose of this Contract shall be furnished by the Owner to the extent shown on the drawings; the Owner will use due diligence in acquiring said lands and rights-of-way as speedily as possible. If, however, lands or rights-of-way cannot be obtained before work on the project begins, the Contractor shall begin his work upon such

land or rights-of-way as have been previously acquired by the Owner, and no claims for damages whatsoever will be allowed by reason of the delay in obtaining the remaining land and rights-of-way. Should the Owner be prevented or enjoined from proceeding with the work, or from authorizing its prosecution, either before or after the commencement by reason of litigation, or by reason of its inability to procure the lands or rights-of-way for the said work, the Contractor shall not be entitled to make or assert a claim for damages by reason of the said delay, or to withdraw from the Contract except by consent of the Owner. Time for completion of work will be extended to such time as the Owner determines will compensate for the time lost by such delay, such determination to be set forth in writing.

#### **ARTICLE 58: CONFORMANCE WITH DIRECTIONS**

The Owner may make alterations in the line, grade, plan, form, dimension, or materials of the work, or any part thereof, either before or after the commencement of construction. Should such alterations diminish the quantity included in any item of work to be done and paid for at a unit price, the Contractor shall have no claim for damages or for anticipated profits on the work that thus may be dispensed with. If they increase the quantity included in any such item, such increase shall be paid for at the stipulated prices.

#### **ARTICLE 59: INTERPRETATION OF THE DRAWINGS AND SPECIFICATIONS**

Except for the Contractor's executed set, all drawings and specifications are the property of the Owner. The Owner will furnish the Contractor, without charge, three (3) sets of the drawings and specifications. Additional sets will be furnished upon request, at actual cost of reproduction. Such drawings and specifications are not to be used on other work and those sets in usable condition shall be returned to the Owner upon request at the completion of cessation of the work or termination of the Contract. The Contractor shall keep one (1) copy of the drawings and specifications at the work site at all times and shall give the Owner and their representatives access thereto. Anything on the drawings and not mentioned in the specifications, or anything in the specifications that is not shown on the drawings shall have the same force and effect as if mentioned in both. In case of conflict or inconsistency between the drawings and the specifications, the specifications shall take precedence. Any discrepancy in the figures and the drawings shall be immediately submitted to the Owner for decision and the decision of the Owner shall be final.

In case of differences between small and large scale drawings, the large scale drawings shall take precedence.

#### **ARTICLE 60: SUSPENSION OF WORK**

a. The Owner may order the Contractor in writing to suspend, delay, or interrupt all or any part of the work for such period of time as he may determine to be appropriate for the convenience of the Owner.

b. If the performance of all or any part of the work is, for an unreasonable period of time, suspended, delayed, or interrupted by an act of the Owner in administration of this Contract, or by his failure to act within the time specified in this Contract

(or if no time is specified, within a reasonable time), an adjustment shall be made for any increase in the cost of performance of this Contract (excluding profit) necessarily caused by such unreasonable suspension, delay, or interruption and the Contract modified in writing accordingly. However, no adjustment shall be made under this clause for any suspension, delay, or interruption to the extent (1) that performance would have been so suspended, delayed, or interrupted by any other cause, including the fault or negligence of the Contractor or (2) for which an equitable adjustment is provided for or excluded under any other provision of this Contract.

c. No claim under this clause shall be allowed (1) for any costs incurred more than 20 days before the Contractor shall have notified the Owner in writing of the act or failure to act involved (but this requirement shall not apply as to a claim resulting from a suspension order), and (2) unless the claim, in an amount stated, is asserted in writing as soon as practicable after the termination of such suspension, delay or interruption, but not later than the date of final payment under the Contract.

#### **ARTICLE 61: INSPECTION**

The authorized representatives and agents of the Owner shall be permitted to inspect all work materials, payrolls, records of personnel, invoices for materials, and other relevant data and records.

#### **PART IV**

#### **ARTICLE 62: SUBCONTRACTORS**

The Contractor may utilize the services of specialty subcontractors on those parts of the work which, under normal contracting practices, are performed by specialty subcontractors.

The Contractor shall not award work to any subcontractor other than those listed in his bid, without the prior written approval of the Owner, which approval will not be given until the Contractor submits a written statement concerning the proposed award to the subcontractor, which statement shall contain such information as the Owner may require.

The Contractor shall cause appropriate provisions to be inserted in all subcontracts relative to the work, to bind the subcontractors to the contract documents insofar as applicable to the subcontract work and to give the Contractor the same power as regards to terminating any subcontract that the Owner may exercise over the Contractor under any provisions of the contract documents.

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

#### **ARTICLE 63: 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 to the work, the Contractor agrees to settle with such other Contractor or subcontractor by agreement or arbitration. If such other Contractor or subcontractor shall assert any claim against the Owner on account of any damage alleged to have been sustained, the Owner shall notify the Contractor who shall indemnify and save harmless the Owner against any such claim.

**ARTICLE 64: ASSIGNMENTS**

The Contractor shall not assign the whole or any part of this Contract or any monies due or to become due hereunder without the written consent of the Owner. In case the Contractor assigns all or part of any monies due or to become due under this Contract, the instrument of assignment shall contain a clause substantially to the effect that it is agreed that the right of the assignee in and to any monies due or to become due to the Contractor shall be subject to prior claims of all persons, firms, or corporations for services rendered or materials supplied for the performance of the work called for in this Contract.

**ARTICLE 65: SEPARATE CONTRACTS**

The Owner reserves the right to let other contracts in connection with the construction of the contemplated work of the project, or contiguous projects of the Owner. The Contractor, therefore, will afford to any such other Contractors reasonable opportunity for the introduction and storage of their materials and the execution of their work, will properly connect and coordinate his work with theirs, and will not commit or permit any act which will interfere with the performance of their work.

The Contractor shall coordinate his operations with those of other Contractors. Cooperation will be required in the arrangement for storage of materials and in the detailed execution of the work. Failure by the Contractor to keep informed on the progress or defective workmanship by others, shall be construed as acceptance by him of the status of the work as being satisfactory for proper coordination with and performance of his own work.

**ARTICLE 66: WORK BY OTHERS**

The Owner reserves the right to do any other work which may be connected with, or become a part of, or be adjacent to the work embraced by this Contract, at any time, by Contract or otherwise. The Contractor shall not interfere with the work of such others as the Owner may employ, and shall execute his own work in such a manner as to aid in the execution of the work of others as may be required. No backfilling of trenches or excavations will be permitted until such work by the Owner is completed.

**PART V**

**ARTICLE 67: WAGE UNDERPAYMENTS AND ADJUSTMENTS**

The Contractor agrees that in case of underpayment of wages to any worker on the project under this Contract by the Contractor or any of his subcontractors, the OWNER will withhold from the Contractor out of payments due to him, an amount sufficient to pay such worker the difference between the wages required to be paid under this contract and the wages actually paid such worker for the total number of hours worked, and that the OWNER may disburse such amount so withheld by it for, and on account of the Contractor to the employee to whom such amount is due. The Contractor further agrees that the amount withheld pursuant to this article may be in addition to the percentage to be retained by the OWNER pursuant to other provisions of this Contract.

**ARTICLE 68: PAYMENT OF EMPLOYEES**

The Contractor and each of his subcontractors shall pay each of their employees engaged in the work on the project under this Contract in full, in cash, and not less than once a week, less legally required deductions, provided, that when circumstances render payment in cash unfeasible or impracticable, then payment by check may be effected upon consideration that funds are made available in a local bank and checks may be cashed without charge, trade requirements, or inconvenience to the worker.

**ARTICLE 69: NON-DISCRIMINATION IN EMPLOYMENT**

In connection with the performance of the work under this Contract, the Contractor agrees not to discriminate against employee because of race, religion, color, or national origin. The aforesaid provisions shall include but not be limited to the following: employment, upgrading, demotion or transfer, recruitment or recruitment advertising, layoff or termination, rate of pay or other forms of compensation and selection for training, including apprenticeship.

**ARTICLE 70: APPRENTICES**

Apprentices shall be permitted to work only under a bona fide apprenticeship program registered with a State Apprenticeship Council which is recognized by the Federal Committee on Apprenticeship, United States Department of Labor; or if no such Council exists in a State, under a program registered with the Bureau of Apprenticeship, United States Department of Labor.

**PART VI**

**ARTICLE 71: SHOP OR SETTING DRAWINGS**

a. The Contractor shall submit promptly to the Owner six (6) copies of each shop or setting drawing prepared in accordance with a schedule predetermined by the Contractor. After examination of such drawings by the Owner, and the return thereof, if resubmission is required, the Contractor shall make such corrections to the drawings as have been indicated and shall furnish the Owner with six (6) corrected copies.

Regardless of corrections made in or approval given to such drawings by the Owner, the Contractor will, nevertheless, be responsible for the accuracy of such drawings and for their conformity to the drawings and specifications, unless he notifies the Owner in Writing of any deviations at the time he furnishes the drawings.

b. Shop drawings of all fabricated work shall be submitted to the Owner for approval and no work shall be fabricated by the Contractor save at his own risk until approval has been given by the owner. The Special Conditions define the shop drawings required for this project.

c. The Contractor shall submit all shop and setting drawings on dates sufficiently in advance of requirements to enable the Owner ample time for reviewing the same, including time for correcting, resubmission and reviewing, if necessary, and no claim for delay will be granted the Contractor by reason of his failure in this respect.

d. All shop drawings submitted must bear the stamp of the Contractor as evidence that the drawings have been checked by him. Any drawings submitted without this stamp of approval will not be considered and will be returned to the Contractor for resubmissions. If the shop drawings show deviations from the requirements of the Contract Documents because of standard shop practice or other reason, the Contractor shall make specific mention of such variation in his letter of transmittal to the Owner, in order that an acceptable, suitable action may be taken for proper adjustment; otherwise the Contractor will not be relieved of the responsibility for executing the work in accordance with the Contract Documents even though the shop drawings have been approved.

e. Where shop drawings are submitted by the Contractor that indicate a departure from the Contract which the Owner deems to be a minor adjustment in his interest and not involving a change in the contract price or extension of time, the Owner may approve the drawings but the approval will contain in substance, the following:

"The modification shown on the attached drawings is approved in the interest of the Owner 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 an extension of time, that it is subject generally to all contract stipulations and covenants; and that it is without prejudice to any rights of the Owner under the contract and bond or bonds."

f. The approval of the shop drawings will be general and shall not relieve the Contractor from the responsibility for adherence to the Contract, nor shall it relieve him of the responsibility for any error which may exist.

g. The Contractor agrees to hold the Engineer and the Owner harmless and defend them against damages or claims for damages arising out of injury to others or property of third persons which result from errors on shop, working or setting drawings whether or not they have been approved by the Engineer and/or the Owner.

**ARTICLE 72: WORK TO BE ACCOMPLISHED IN ACCORDANCE WITH THE DRAWINGS AND SPECIFICATIONS**

The work, during its progress and its completion, shall conform to the lines and grades shown on the drawings and to the directions given by the Owner from time to time, subject to such modifications or additions as he shall determine to be necessary during the execution of the work; and in no case will any work be paid for in excess of such requirements. The work shall also be accomplished in accordance with the data in these specifications.

**ARTICLE 73: CONTRACTOR TO CHECK DIMENSIONS AND SCHEDULES**

The Contractor will be required to check all dimensions and quantities shown on the drawings or schedules given to him by the Owner, and shall notify the Owner of all errors therein which he may discover by examining and checking the same. The Contractor shall not take advantage of any error or omissions in these specifications, drawings, or schedules. The Owner will furnish all instructions should such error or omissions be discovered,



and the Contractor shall carry out such instructions as if originally specified.

**ARTICLE 74: PLANIMETER**

For estimating quantities in which the computation of areas by analytic and geometric methods would be comparatively laborious, it is stipulated and agreed that the planimeter shall be considered an instrument of precision adapted to the measurement of such areas.

**ARTICLE 75: ADDITIONAL INSTRUCTIONS AND DETAIL DRAWINGS**

The Contractor will be furnished additional instructions and detail drawings as necessary to carry out the work included in the Contract. The additional drawings and instructions thus supplied to the Contractor will coordinate with the Contract Documents and will be so prepared that they can be reasonably interpreted as part thereof. The Contractor shall carry out the work in accordance with the additional detail drawings and instructions. The Contractor and the Owner prepare jointly a schedule fixing the respective dates for the submission of shop drawings, the beginning of manufacture, testing, and installation of materials, supplies, and equipment, and the completion of the various parts of the work; each schedule to be subject to change from time to time in accordance with the progress of the work.

**ARTICLE 76: MATERIALS, SERVICES AND FACILITIES**

It is understood that, except as otherwise specifically stated in the Contract Documents, the Contractor shall provide and pay for all materials, labor, tools, equipment, water, light, power, transportation, superintendence, temporary construction of every nature, and all other services and facilities of every nature whatsoever, necessary to protect, execute, complete, and deliver the work within the specified time. If approved by the Owner, any work necessary to be performed after regular hours, on Saturdays, Sundays, or legal holidays, shall be performed by the Contractor without additional expense to the Owner.

**ARTICLE 77: CONTRACTOR'S TITLE TO MATERIALS**

No material, supplies, or equipment for the work shall be purchased by the Contractor or any subcontractor, 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 or supplier. The Contractor warrants good title to all material, supplies, and equipment installed or incorporated in the work and further warrants upon completion of all work, to deliver the premises, together with all improvements and appurtenances constructed or placed thereon by him, to the Owner free from any claims, liens, or charges, or encumbrances and further agrees that neither he nor any person, firm or corporation furnishing any material or labor for any work covered by this Contract shall have the right to alien upon the premises or any improvement or appurtenance thereon.

#### **ARTICLE 78: INSPECTION AND TESTING OF MATERIALS**

All materials and equipment used in the construction of the project shall be new and of current manufacture. Testing will be done in accordance with accepted standards and as directed by the Owner; the laboratory or inspection agency shall be selected by the Owner. Except as specified elsewhere in these specifications, the Owner will pay for laboratory inspection. All materials and workmanship shall be subject to inspection, examination, and testing by the Owner at any and all times during manufacture and/or construction and at any and all places where such manufacture and or construction is carried on, to establish conformance with these specifications and suitability for uses intended. Without additional charge, the Contractor shall furnish promptly all reasonable facilities, labor, and materials necessary to make tests so required safe and convenient. He shall also furnish and mill, factory, or other such tests based on the standards and Tentative Standards of the American Society for Testing Materials as required by the Owner.

#### **ARTICLE 79: DEFECTIVE MATERIALS**

No materials shall be laid or used which are known, or may be found to be in any way defective. Any materials found to be defective at the site of work or upon installation shall be replaced by the Contractor at his own expense. Notice shall be given to the Owner of any defective or imperfect material. Defective or unfit material found to have been laid, shall be removed and replaced by the Contractor with sound and unobjectionable material without additional cost to the Owner.

#### **ARTICLE 80: PATENTS**

- a. The Contractor shall hold and save the Owner harmless from liability of Any nature or kind, including cost and expenses for, or on account of, any patented or unpatented invention, process, article, or appliance manufactured or used in the Contract, including its use by the Owner.
- b. License and/or royalty fees for the use of a process which is authorized by the Owner must be reasonable, and paid to the holder of the patent, or his authorized agent, directly by the Contractor.
- c. If the Contractor uses any design, device or material covered by letters, patent, or copyright, he shall provide for such use by suitable agreement with the Owner of such patent or copyrighted design, device, or material.
- d. It is mutually agreed and understood that, without exception, the contract prices shall include all royalties, license fees, or costs arising out of the use of such process, design, device, or materials, in any way involved in the work. The Contractor and/or his Surety shall indemnify and save the Engineer and the Owner harmless from all claims for infringement by reason of use of such patented material, device or design, in connection with the work under this Contract, and shall indemnify the Engineer and the Owner for any cost, expense, or damage which it may be obligated to pay for reason of such infringement at any time during the prosecution of the work.

**ARTICLE 81: "OR APPROVED EQUAL CLAUSE"**

a. 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 the Owner's opinion. It shall not be purchased or installed without his written approval. In all cases, new material shall be used on the project.

b. If two or more brands, makes of material, devices or equipment are shown or specified, each should be regarded as the approved equal of the other. Any other brand, make or material, device or equipment, which, in the opinion of the Owner or his authorized agent, is the recognized approved equal of that specified, considering quality, workmanship, and economy of operation, and is suitable for the purpose intended, may be accepted.

c. If any other material or article is substituted for items shown or specified, the project must result in a savings in the contract price and the Contractor shall submit evidence that the substitute product is equal. Upon approval of the substitute product, the Owner will issue a deductive change order.

d. If an equipment manufacturer must have a specified period of experience with his product, equipment which does not meet with the specified experience period may, at the option of the owner, be considered if the equipment supplier or manufacturer is willing to provide a bond or cash deposit for the duration of the specified time period which will guarantee replacement of that equipment in the event of failure.

**PART VII**

**ARTICLE 82: INSURANCES**

The Contractor shall be responsible for maintaining insurance coverage in force for the life of this Contract of the kind and adequate amounts to secure all of his obligations under this Contract and with insurance companies licensed to write such insurance in the State of Rhode Island and acceptable to the Owner. The kinds and amounts of such insurance carried shall not be less than the kinds and amounts of insurance coverage designated in the Insurance Requirements, and the Contractor agrees that the stipulation herein of the kinds and minimum amounts of coverage or the acceptance by the Owner of certificates indicating the kinds and limits of coverage shall in no way limit the liability of the Contractor to any such kinds and amounts of insurance coverage. All policies issued shall indemnify and save harmless the Owner, the Engineer, and their agents or representatives from any and all claims for damages arising out of the Contract, to either persons or property. Policies and certificates of all insurance shall be submitted to the Owner by the Contractor prior to preparation of the construction contract. In the event that the form of any policy or certificate of the amount of the insurance of the companies writing the same are not satisfactory to the Owner, the Contractor shall secure other policies or certificates in form and amount and with such companies that are satisfactory to the Owner.

The Contractor shall not cause policies to be cancelled or permit them to lapse and all insurance policies shall include a clause to the effect that the policy shall not be subject to cancellation or a reduction in the required limits of liability amounts of insurance until notice has been sent by registered mail to the Owner, stating when, not less than ten (10) days thereafter, such cancellation or reduction shall be effective. All certificates of insurance shall contain true transcripts from the policy, authenticated by the proper officer of the insurer evidencing in particular, those insured, the extent of the insurance, the location and operations to which the insurance applies the expiration date, and the above-mentioned notice of cancellation clause.

The Contractor shall be responsible for the provision of identical insurance coverages for all his subcontract operations and, in the event that the Contractor's policies do not cover each and every subcontractor, certificates of insurance issued on policies by companies that are acceptable to the Owner covering each and every subcontractor shall be filed under the Owner prior to the commencement of such subcontract operations. All insurance specified in this Contract shall be provided by the Contractor, at no additional expense to the Owner.

#### PART VIII

#### ARTICLE 83: COMPENSATION TO BE PAID TO THE CONTRACTOR

a. The Owner will pay and the Contractor shall receive as full compensation for everything furnished and done by the Contractor under this Contract, the unit prices and lump sum prices set opposite the respective items in the accepted bid form herein contained, and payment for approved extra work. The cost of all work required not specifically included in any items herein mentioned, and also for all loss or damage arising out of the nature of the work aforesaid or from the action of the elements, or from any unforeseen obstruction or difficulty encountered in the prosecution of the work and for all risks of every description connected with the work, and for all expenses incurred by or in consequence of the suspension or discontinuance of the work as herein specified, and for assuming all duties, and liabilities, herein required, and for well and faithfully completing the work, and the whole thereof, as herein provided, shall be the responsibility of the Contractor.

b. The amount of the Contract (accepted bid prices) listed in the bid is based on the estimated quantities and the unit and/or lump sum price as set forth in the bid. It is understood and agreed that the Contractor will accept as payment the actual measured quantities at the unit and/or lump sum price as set forth in the accepted bid.

c. The estimated quantities given in the bid proposal for the various items of work are given for the purpose of comparing the bids offered for the work under this Contract and if it is found in the performance of the Contract work that any or all of the said estimated quantities are not even approximately correct the Contractor shall have no claim for anticipated profits, or for loss of profit, or for increase in prices as listed in the accepted bid because of the difference between the quantities of the various items of work actually done and the estimated quantities stated in the accepted bid.

d. No payment or compensation will be made to the contractor for damages because of hindrance or delay from any cause in the progress of the work, whether such hindrances or delays be avoidable or unavoidable.

**ARTICLE 84: PAYMENTS TO CONTRACTOR**

a. At least ten (10) days before each progress payment falls due (but not more often than once a month), the CONTRACTOR shall submit to the OWNER a partial payment estimate filled out and signed by the CONTRACTOR covering the WORK performed during the period covered by the partial payment estimate and supported by such data as the OWNER may reasonably require. If payment is requested with the OWNER'S permission on the basis of materials and equipment not incorporated in the WORK but delivered and suitably stored at or near the site, in accordance with the manufacturers' recommendation and as required by the Owner, the partial payment estimate shall also be accompanied by such supporting data satisfactory to the OWNER as will establish the OWNER'S title to the material and equipment and protect his interest therein, including applicable insurance. The OWNER will within ten (10) days after receipt of each partial payment estimate either indicate in writing his approval or return the partial payment estimate to the CONTRACTOR indicating in writing his reasons for refusing to approve payment. In the latter case, the CONTRACTOR may make the necessary corrections and resubmit the partial payment estimate. The OWNER will within thirty (30) days of presentation to him of an approved partial payment estimate pay the CONTRACTOR a progress payment on the basis of the approved partial payment estimate.

b. Removed.

c. With each partial payment estimate, the CONTRACTOR shall certify in writing that the project AS-BUILT DRAWINGS are being maintained accurately and currently. Said certificate shall be signed by the CONTRACTOR'S SUPERINTENDENT and the CONTRACTOR'S ENGINEER or SURVEYOR. Any payment estimate not having said certification attached will be subject to refusal of payment.

d. Prior to SUBSTANTIAL COMPLETION, the OWNER, with the approval and concurrence of the CONTRACTOR, may use any completed or substantially completed portions of the WORK. Such use shall not constitute an acceptance of such portions of the WORK.

e. The OWNER shall have the right to enter the premises for the purpose of doing work not covered by the CONTRACT DOCUMENTS. This provision shall not be construed as relieving the CONTRACTOR of the sole responsibility for the care and protection of the WORK or the restoration of any damaged WORK except such as may be caused by agents or employees of the OWNER.

f. Upon completion and acceptance of the WORK, the OWNER shall issue a certificate attached to the final payment request that the WORK has been accepted by him under the conditions of the CONTRACT DOCUMENTS. The entire balance found to be due the CONTRACTOR, including the retained percentages but except such sums as may be lawfully retained by the OWNER shall be paid to the CONTRACTOR within forty-five (45) days of completion and acceptance of the WORK.

g. The CONTRACTOR will indemnify and save the OWNER or the OWNER'S REPRESENTATIVE harmless from all claims growing out of the lawful demands of SUBCONTRACTORS, laborers, workmen, mechanics, materialmen, and furnishers of machinery and parts thereof, equipment, tools and all supplies incurred in the furtherance of the performance of the WORK. The CONTRACTOR shall at the OWNER's request furnish satisfactory evidence that all obligations of the nature designated above have been paid, discharged or waived. If the CONTRACTOR fails to do so the OWNER may, after having notified the CONTRACTOR, either pay unpaid bills or withhold from the CONTRACTOR'S unpaid compensation a sum of money deemed reasonably sufficient to pay any and all such lawful claims until satisfactory evidence is furnished that all liabilities have been fully discharged whereupon payment to the CONTRACTOR shall be resumed in accordance with the terms of the CONTRACT DOCUMENTS but in no event shall the provisions of this Sentence be construed to impose any obligations upon the OWNER to either the CONTRACTOR, his Surety, or any third party. In paying any unpaid bills of the CONTRACTOR, any payment so made by the OWNER shall be considered as a payment made under the CONTRACT DOCUMENTS by the OWNER to the CONTRACTOR and the OWNER shall not be liable to the CONTRACTOR for any such payments made in good faith.

#### ARTICLE 85: CHANGE ORDERS

a. The Owner may, at any time, without notice of the sureties, by written order designated or indicated to be a Change Order, make any change in the work within the general scope of this Contract, including but not limited to changes:

1. In the Specifications (including drawings and designs);
2. In the method or manner of performance of the work;
3. In the Owner-furnished facilities, equipment, materials, services, or site; or
4. Directing acceleration in the performance of the work.

b. Any other written order or an oral order (which terms as used in this paragraph (b) shall include direction, instruction, interpretation or determination) from the Owner, which causes any such change, shall be treated as a change order under this clause, provided that the Contractor gives the Owner written notice stating the date, circumstances and source of the order and that the Contractor regards the order as a Change Order.

c. Except as herein provided, no order, statement, or conduct of the Owner shall be treated as a change under this clause or entitle the Contractor to an equitable adjustment hereunder.

d. If any change, by change order, causes an increase or decrease in the Contractor's cost of, or the time required for, the performance of any part of the work under this Contract, an equitable adjustment shall be made and the Contract modified in writing accordingly: Provided, however, that no claim for any change order (b) above shall be allowed

for any costs incurred more than 20 days before the Contractor gives written notice as therein required: and, provided, further, that in case of defective specifications for which the Owner is responsible, the equitable adjustment shall include only increased cost reasonably incurred by the Contractor in attempting to comply with such defective specifications.

e. If the Contractor intends to assert a claim for an equitable adjustment under this clause, he must, within 30 days after receipt of a written change order under (a) above or the furnishing of a written notice under (b) above, submit to the Owner a written statement setting forth the general nature and monetary extent of such claim, unless this period is extended by the Owner. The statement of claim hereunder may be included in the notice under (b) above.

f. No claim by the Contractor for an equitable adjustment hereunder for any amount shall be allowed unless agreed to by Change Order prior to the work being done.

#### **ARTICLE 86: CHANGES IN THE WORK**

No changes in the work covered by the approved Contract Documents shall be made without having prior written approval of the Owner. Charges or credits for the work covered by the approved changes shall be determined by one or more, or a combination of the following methods as the Owner shall direct:

- a. Unit price bid previously approved;
- b. The actual cost of: labor, materials, ownership or rental costs of construction plant and equipment during the use of item on the extra work; power and consumable supplies for the operation of power and equipment;
- c. Insurance;
- d. Social Security, Old Age, and Unemployment contributions.

To the cost of "b" above, there shall be added a fixed fee to be agreed upon but not to exceed 15%. The fee shall be compensation to cover the cost of supervision, overhead, bonds, profit, and any other general expenses.

If a subcontractor performs the work, he shall be entitled to a maximum of 15% as a fixed fee, and the general Contractor be entitled to a maximum of 5% (of the cost of the subcontract work excluding subcontractor fixed fee) as a fixed fee.

#### **ARTICLE 87: CLAIMS FOR EXTRA COST**

No claims for extra work or cost will be allowed unless the same were done in pursuance of a written order of the Owner as aforesaid, and the claim presented with the first estimate after the changed or extra work is done. When the work is performed under terms specified elsewhere in the

Contract, the Contractor shall furnish satisfactory bills, payrolls, and vouchers covering all items of cost and upon the Owner's request, give him full access to the accounts relating thereto.

**ARTICLE 88: CHANGES AND MODIFICATIONS**

The Owner reserves the right to delete or cancel any item or items or parts thereof as listed in the bid, without recourse by the Contractor. The Owner also reserves the right to add to any item as listed in the bid. The compensation to be paid to the Contractor for such additional extensions, appurtenances or items shall be made under the applicable items in the bid. If no applicable items are provided in the bid, the compensation to be paid the Contractor shall be set forth under the article entitled "Changes in the Work" as found herein.

**ARTICLE 89: ACCEPTANCE OF THE FINAL PAYMENT CONSTITUTES RELEASE**

The acceptance of the Final Payment by the Contractor shall be and shall operate as a release to the Owner for all claims and all liability to the Contractor for all things done or furnished in connection with this work and for every act or neglect of the Owner and others relating to or arising out of this work. No payment, however, final or otherwise, shall operate as a release of the Contractor or his Surety from any obligations under this Contract or the performance and payment bond.



## SECTION 01 10 00 – SUMMARY

## PART 1 - GENERAL

## 1.1 RELATED DOCUMENTS

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

## 1.2 SUMMARY

- A. This Section includes the following:

1. Project Information
2. Work covered by the Contract Documents.
3. Type of the Contract.
4. Work phases.
5. Work under other contracts.
6. Products ordered in advance.
7. Owner-furnished products.
8. Use of premises.
9. Owner's occupancy requirements.
10. Work restrictions.
11. BCI Checks and Security Plans.
12. Specification formats and conventions.
13. Payment Procedures
14. Miscellaneous provisions.

## 1.3 PROJECT INFORMATION

- A. Project Identification: Rooftop Unit Replacement – Quidnessett Elementary School
1. Project Location: 166 Mark Drive,  
North Kingstown, RI 02852
  2. Owner: Town of North Kingstown Rhode Island, 100 Fairway Drive,  
North Kingstown, RI 02852-5762
  3. Owner's Representatives:  
Mary King, North Kingstown School Department,  
Chief Operating Officer  
  
Stephen Tremblay, North Kingstown School Department,  
Director of Facilities
  4. Owners Project Manager:  
Keough Construction Management  
312 Waterman Avenue  
East Providence, Rhode Island 02914
    1. Representative: Jesse Alvarado, Project Manager

- B. Architect: Edward Rowse Architects, Inc.,  
400 Massasoit Avenue, Suite 300, Second Floor,  
East Providence, Rhode Island 02914
1. Architect's Representative:  
James M. Partridge, AIA, Project Architect  
Email: [jpartridge@rowsearch.com](mailto:jpartridge@rowsearch.com)
- C. MEP Engineer: Building Engineering Resources, Inc.,  
66 Main Street, North Easton, Massachusetts 02356
1. Engineer's Representatives:  
Geraldo Alba, Senior Project Manager  
Kris Becker, Project Manager
- D. Structural Engineer: Pare Corporation  
8 Blackstone Valley Place  
Lincoln, RI 02865
1. Engineers Representative:  
Michael Rongione, Project Manager
- E. Commissioning Agent: Consulting Engineering Services  
128 Carnegie Row, Suite 204  
Norwood, MA 02062
1. Commissioning Representative:  
Mr. Michael Walsh, PE, President  
Jeanine Palmieri, Project Manager

#### 1.4 DEFINITIONS

- A. General: Basic Contract definitions are included in the Conditions of the Contract.
- B. "Approved": When used to convey Architect's action on Contractor's submittals, applications, and requests, "approved" is limited to Architect's duties and responsibilities as stated in the Conditions of the Contract.
- C. "Directed": A command or instruction by Architect. Other terms including "requested," "authorized," "selected," "required," and "permitted" have the same meaning as "directed."
- D. "Indicated": Requirements expressed by graphic representations or in written form on Drawings, in Specifications, and in other Contract Documents. Other terms including "shown," "noted," "scheduled," and "specified" have the same meaning as "indicated."
- E. "Regulations": Laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, and rules, conventions, and agreements within the construction industry that control performance of the Work.
- F. "Furnish": Supply and deliver to Project site, ready for unloading, unpacking, assembly, installation, and similar operations.

- G. "Install": Operations at Project site including unloading, temporarily storing, unpacking, assembling, erecting, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations.
- H. "Provide": Furnish and install, complete and ready for the intended use.

#### 1.5 WORK COVERED BY CONTRACT DOCUMENTS

- A. Work of this Contract is comprised of removing Six (6) existing packaged roof top heating and ventilation units and replace them with Six (6) new packaged roof top units with heating, air conditioning and humidification components at the Quidnessett Elementary School, 166 Mark Drive, North Kingstown, Rhode Island.
- B. The contractor must provide all material, labor, tools, plant, supplies, equipment, transportation, superintendence, temporary construction of every nature and all other services and facilities necessary to complete the construction for the Owner, including all incidental work as required or described in the contract documents.
- C. **The selected Contractor shall be responsible for pre-ordering and storing all new rooftop units well prior to the start of construction scheduled for June 2022. The contractor shall include in their bid all costs associated with the storage of the roof top units in a secure off-site facility and the delivery of the units to the site when the project is ready to receive the units to be installed on the existing building roof.**
- D. Type of Contract:
  - 1. Project will be constructed under a single prime contract.

#### 1.6 WORK UNDER OTHER CONTRACTS

- A. General: Cooperate fully with separate contractors so work on those contracts may be carried out smoothly, without interfering with or delaying work under this Contract. Coordinate the Work of this Contract with work performed under separate contracts.
- B. Concurrent Work: Owner may separate contract(s) for additional construction operations, equipment, and furnishings at Project school buildings. Those operations will be conducted simultaneously with work under this Contract.
- C. Future Work: Owner may separate contract(s) for the additional work to be performed at each school building after Substantial Completion. Completion of that work will depend on successful completion of preparatory work under this Contract.
- D. The Owner hereby notifies the Contractor, Subcontractors, Sub-Subcontractors and any and all personnel employed at the Project school buildings the Owners intends to engage the services of non-union related personnel under separate contracts. The Contractors, Subcontractors, Sub-Subcontractors and any and all personnel employed at the Project school buildings shall not Strike, Picket, or stop the progress of the Work at any time due to the Owner's separate contracts or use of personnel.

#### 1.7 USE OF PREMISES

- A. General: During the construction period the Contractor shall have full use of the premises within the construction limits shown on the drawings for construction operations, including use of the site. The Contractor's use of the premises is limited only by the Owner's right to operate the school for its intended use.

1. Driveways and Entrances: Keep driveways, loading areas and entrances serving premises clear and available to Owner, Owner's employees, and emergency vehicles at all times. Do not use these areas for parking or storage of materials.
  2. The Project School Building and the campus site is to remain free from dust, debris etc. all in accordance with the Contract Documents.
  3. The school building and site is "Tobacco, Drug and Alcohol Free". Use or possession of tobacco, alcohol or drugs will not be tolerated.
- B. It is essential to point out that the Owner shall have full access to the site and building to conduct business as required to perform their work. The Contractor must not under any circumstances, at any time during the project plan or otherwise schedule any shut down of any services, including but not limited to utilities, access to and from the facilities, including public roadways and walkways, that will adversely affect the operations of the existing building unless these interruptions are otherwise coordinated previously in advance with the Owner.
- C. Limit use of the site premises to work in areas as indicated on drawings. Confine operations to areas within contract limits indicated. Do not disturb portions of the site beyond the areas in which the Work is indicated unless otherwise approved in writing by the Architect and Owner. The Contractor shall plan and budget accordingly to account for this condition as disruptions to daily business activities will not be tolerated.
- D. The following are some of the identified issues:
1. Driveways, Walkways, and Entrances to and from the existing building(s) complex:
    - a. Keep driveways, parking areas, walkways and entrances serving the existing building premises clear and available to the Owner, the Owner's employees, public and emergency vehicles at all times. Do not use these areas for parking or storage of materials at any time during operations.
  2. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.
  3. Driveway and Entrances: Daily maintenance of all affected parking areas, roadways and walkways is required.
  4. Vehicular and pedestrian traffic is expected to be always maintained at all existing doorways during construction operations.
- E. Parking of Trade Contractor's vehicles, his employee's vehicles or those of trade subcontractors are not allowed on any public or private road bordering the site. The Contractor shall submit to the Architect and Owner's representatives an on-site parking plan for review which shall include assigned parking places for the Owner's representatives, Engineer and Architect.
- F. The Owner will continue to use the existing building parking lot(s) not affected by the construction. These parking lot(s) are not available for the contractors, or his employees use unless approved by the Owner. Any on site parking permitted shall take place within the project property lines except for vehicle access areas and emergency routes.
- G. Notify the Owner a minimum of seventy-two (72) hours before terminating or interrupting utilities on site.
- 1.8 BCI CHECKS AND SECURITY PLANS
- A. All existing facilities will be considered to be secure facilities. Site security will be maintained before, during and after construction, at all times of the day. Contractor shall develop a security plan and submit prior to start of construction for owner's approval. The Owner has the right to approve or reject the plan.

1. Workers will be identified by a contractor issued photo identification pass. The pass system shall be approved by the Owner. If any discrepancies exist, the worker will not be permitted entry to the property. Visitors and short-term workers shall receive a visitor's pass issued by the Contractor. This pass shall be approved by the Owner.
2. This pass will be worn above the waist in a clearly visible, conspicuous place by all workers/visitors.
3. Before a construction worker identification pass can be issued for contract workers providing a service on the property requiring a period more than eight (8) hours to complete, a formal inquiry must be made through the Bureau of Criminal Identification to determine whether the applicant has a criminal record. A copy of the completed Criminal History Check from the individual workers state of residence shall be given to the Owner. If the applicant has no criminal record the identification pass will be processed. Should an applicant be found to have a criminal record sufficient to be deemed inappropriate for entry (felony conviction) the identification pass will not be processed.
4. Visitors Pass: This type of pass is temporarily issued to persons who will be visiting or working on the construction site for a limited time to provide a service requiring a period not to exceed eight (8) hours to complete and will not require completion of a criminal background consent form. This category of pass is issued by the contractor to persons entering the property under the above-mentioned circumstances. Special visitor passes are considered controlled security items. Hence, the Contractor will obtain proper identification from the individual the pass is to be issued to. The Contractor will retain the identification until the special visitor's pass is returned. In addition, each pass recipient will sign a Visitor Pass Logbook. Workers who have not yet received their photo identification pass will be issued this pass in an interim basis until their pass is processed. This pass will be worn above the waist in a clearly visible, conspicuous place by all visitors.

B. See section 004539 for additional information pertaining to this requirement.

#### 1.9 OCCUPANCY REQUIREMENTS

A. Occupancy: Maintain existing exits, unless otherwise indicated.

1. Maintain access to existing walkways, corridors, and other means of egress components. Do not close or obstruct walkways, corridors, or other building means of egress components without written permission from Owner and authorities having jurisdiction.
2. Provide not less than seventy-two (72) hours notice to Owner of activities that will affect Owner's operations.

B. Owner Occupancy of Completed Areas of Construction: Owner reserves the right to occupy and to place and install equipment in completed areas of building, before Substantial Completion, provided such occupancy does not interfere with completion of the Work. Such placement of equipment and partial occupancy shall not constitute acceptance of the total Work.

#### 1.10 WORK RESTRICTIONS

A. Work Restrictions, General: Comply with restrictions on construction operations.

1. Comply with limitations on use of public streets and with other requirements of authorities having jurisdiction.

B. On-Site Work Hours: Limit work to working hours of 7:00 AM to 3:30 PM, Monday through Friday during the summer break period, unless otherwise indicated.

1. Weekend and Overtime Hours: Shall be as approved by the Owner and Architect. This is not to limit the hours the Contractor can perform work, but to only allow the Owner and

- Architect to have personnel available (in person or by phone) for questions or other issues.
2. Early Morning or Evening Hours: Shall be as regulated by authorities having jurisdiction for restrictions on noisy work.
- C. Existing Utility Interruptions: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:
1. Notify Architect and Owner not less than seventy-two (72) hours in advance of proposed utility interruptions.
  2. Do not proceed with utility interruptions without Architect's and Owner's written permission.
- D. Noise, Vibration, and Odors: Coordinate operations that may result in high levels of noise and vibration, odors, or other disruption to Owner or others.
1. Notify Owner not less than four days in advance of proposed disruptive operations.
  2. Obtain Owner's written permission before proceeding with disruptive operations.

#### 1.11 SPECIFICATION FORMATS AND CONVENTIONS

- A. Specification Format: The Specifications are organized into Divisions and Sections using the 48-division format numbering system.
1. Division 1: Sections in Division 1 govern the execution of the Work of all Sections in the Specifications.
- B. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:
1. Abbreviated Language: Language used in the Specifications and other Contract Documents is abbreviated. Words and meanings shall be interpreted as appropriate. Words implied, but not stated, shall be inferred as the sense requires. Singular words shall be interpreted as plural and plural words shall be interpreted as singular where applicable as the context of the Contract Documents indicates.
  2. Imperative mood and streamlined language are generally used in the Specifications. Requirements expressed in the imperative mood are to be performed by Contractor. Occasionally, the indicative or subjunctive mood may be used in the Section Text for clarity to describe responsibilities that must be fulfilled indirectly by Contractor or by others when so noted.
    - a. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.
- C. Drawing Coordination: Requirements for materials and products identified on Drawings are described in detail in the Specifications. One or more of the following are used on Drawings to identify materials and products:
1. Terminology: Materials and products are identified by the typical generic terms used in the individual Specifications Sections.
  2. Abbreviations: Materials and products are identified by abbreviations published as part of the U.S. National CAD Standard and scheduled on Drawings.

3. Keynoting: Materials and products are identified by reference keynotes referencing Specification Section numbers found in this Project Manual.

#### 1.12 CODES, RULES AND REGULATIONS

- A. All work is to be in accordance with the latest requirements of:
  1. Federal, State and Municipal Laws
  2. Rhode Island Building and Fire Codes
  3. National Plumbing Code
  4. National Electric Code
  5. Any prevailing rules, regulations pertaining to adequate protection and/or guarding of any moving parts or otherwise hazardous locations.

#### 1.13 INDUSTRY STANDARDS

- A. Applicability of Standards: Unless the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.
- B. Publication Dates: Comply with standards in effect as of date of the Contract Documents unless otherwise indicated.
- C. Copies of Standards: Each entity engaged in construction on Project should be familiar with industry standards applicable to its construction activity. Copies of applicable standards are not bound with the Contract Documents.
  1. Where copies of standards are needed to perform a required construction activity, obtain copies directly from publication source.

#### 1.14 JOB SAFETY AND ACCIDENT PREVENTION

- A. All construction work on this project must be performed in compliance with the Occupational Safety and Health Act of 1970 or with local or State occupational safety and health regulations enforced by an agency of the locality or State under a plan approved by the U.S. Department of Labor Occupational Safety and Health Administration (OSHA)
- B. All contractors and subcontractors shall comply with requirements of the Occupational Safety and Health Act of 1970 or revisions thereto, which are applicable during the term of this contract and hold the Owner and Architect and/or their agents harmless from any claim or loss that may result from violations of or claims under this act.
- C. See the General Conditions for further requirements.

#### 1.15 SCHEDULE OF VALUES

- A. Coordination: Coordinate preparation of the schedule of values with preparation of Contractor's construction schedule.
  1. Coordinate line items in the schedule of values with other required administrative forms and schedules, including the following:

- a. Application for Payment forms with continuation sheets.
  - b. Submittal schedule.
  - c. Items required to be indicated as separate activities in Contractor's construction schedule.
2. Submit the schedule of values to Architect and Owner at earliest possible date but no later than 15 days from date of notice to proceed.
  3. Sub schedules for Phased Work: Where the Work is separated into phases requiring separately phased payments; provide sub schedules showing values coordinated with each phase of payment.
- B. Format and Content: Use Project Manual table of contents as a guide to establish line items for the schedule of values. Provide at least one-line item for each Specification Section.
1. Identification: Include the following Project identification on the schedule of values:
    - a. Project name and location.
    - b. Name of Architect.
    - c. Architect's project number.
    - d. Contractor's name and address.
    - e. Date of submittal.
  2. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Coordinate with Project Manual table of contents. Provide multiple line items for principal subcontract amounts in excess of five percent of the Contract Sum.
    - a. Include separate line items labor and materials.
  3. Round amounts to nearest whole dollar; total shall equal the Contract Sum.
  4. Provide a separate line item in the schedule of values for each part of the Work where Applications for Payment may include materials or equipment purchased or fabricated and stored, but not yet installed.
  5. Provide separate line items in the schedule of values for initial cost of materials, for each subsequent stage of completion, and for total installed value of that part of the Work.
  6. Allowances: Provide a separate line item in the schedule of values for each allowance. Show line-item value of unit-cost allowances, as a product of the unit cost, multiplied by measured quantity. Use information indicated in the Contract Documents to determine quantities.
  7. Each item in the schedule of values and Applications for Payment shall be complete. Include total cost and proportionate share of general overhead and profit for each item.
    - a. Temporary facilities and other major cost items that are not direct cost of actual work-in-place may be shown either as separate line items in the schedule of values or distributed as general overhead expense, at Contractor's option.
  8. Schedule Updating: Update and resubmit the schedule of values before the next Applications for Payment when Change Orders or Construction Change Directives result in a change in the Contract Sum.

#### 1.16 APPLICATIONS FOR PAYMENT

- A. Each Application for Payment shall be consistent with previous applications and payments as certified by Architect and paid for by Owner.



1. Initial Application for Payment, Application for Payment at time of Substantial Completion, and final Application for Payment involve additional requirements.
- B. Payment Application Times: Submit Application for Payment to Architect by the 23rd of the month. The period covered by each Application for Payment is one month, ending on the last day of the month.
- C. Application for Payment Forms: Use AIA Document G702 and AIA Document G703 as form for Applications for Payment.
- D. Application Preparation: Complete every entry on form. Notarize and execute by a person authorized to sign legal documents on behalf of Contractor. Architect will return incomplete applications without action.
  1. Entries shall match data on the schedule of values and Contractor's construction schedule. Use updated schedules if revisions were made.
  2. Include amounts of Change Orders and Construction Change Directives issued before last day of construction period covered by application.
- E. Transmittal: Submit digital signed and notarized copy of each Application for Payment to Owner's Representative, the Owner's Project Manager (OPM), and Architect by a method ensuring receipt within 24 hours. Include waivers of lien and similar attachments if required.
  1. Transmit each copy with a transmittal form listing attachments and recording appropriate information about application.
- F. Waivers of Mechanic's Lien: With each Application for Payment, submit waivers of mechanic's lien from entities lawfully entitled to file a mechanic's lien arising out of the Contract and related to the Work covered by the payment.
  1. Submit partial waivers on each item for amount requested in previous application, after deduction for retainage, on each item.
  2. When an application shows completion of an item, submit conditional final or full waivers.
  3. Owner reserves the right to designate which entities involved in the Work must submit waivers.
  4. Waiver Forms: Submit executed waivers of lien on forms acceptable to Owner.
- G. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of first Application for Payment include the following:
  1. List of subcontractors.
  2. Schedule of values.
  3. Contractor's construction schedule (preliminary if not final).
  4. Schedule of unit prices.
  5. Submittal schedule (preliminary if not final).
  6. List of Contractor's staff assignments.
  7. List of Contractor's principal consultants.
  8. Copies of building permits.
  9. Copies of authorizations and licenses from authorities having jurisdiction for performance of the Work.
  10. Initial progress report.
  11. Report of preconstruction conference.
  12. Certificates of insurance and insurance policies.

- H. Application for Payment at Substantial Completion: After Architect issues the Certificate of Substantial Completion, submit an Application for Payment showing 100 percent completion for portion of the Work claimed as substantially complete.
1. Include documentation supporting claim that the Work is substantially complete and a statement showing an accounting of changes to the Contract Sum.
  2. This application shall reflect Certificates of Partial Substantial Completion issued previously for Owner occupancy of designated portions of the Work.
- I. Final Payment Application: After completing Project closeout requirements, submit final Application for Payment with releases and supporting documentation not previously submitted and accepted, including, but not limited, to the following:
1. Evidence of completion of Project closeout requirements.
  2. Insurance certificates for products and completed operations where required and proof that taxes, fees, and similar obligations were paid.
  3. Updated final statement, accounting for final changes to the Contract Sum.
  4. AIA Document G706-1994, "Contractor's Affidavit of Payment of Debts and Claims."
  5. AIA Document G706A-1994, "Contractor's Affidavit of Release of Liens."
  6. AIA Document G707-1994, "Consent of Surety to Final Payment."
  7. Evidence that claims have been settled.

#### 1.17 MISCELLANEOUS PROVISIONS

##### A. Project Schedule...

1. It is mandatory that the project be substantially completed on the date indicated on the Bid Form at which time a phased move in and occupancy period has been established for use through on date indicated on the Bid Form which is the date that Full Business operations are to commence. All shelled spaces and specific elevators will be made available to the Owner (exclusively) on date indicated on the Bid Form which will permit the Owner to begin receiving, assembling and start distribution of furnishings, equipment, and other miscellaneous systems to the appropriate building locations.
2. The Final Completion date for all Work shall be on date indicated on the Bid Form.

##### B. "TIME IS OF THE UTMOST ESSENCE"

1. Once the work is completed and accepted by the Architect for full business operations on date indicated on the Bid Form, work required to complete the project shall take place during normal hours as described above in Section 1.10 above so that the facility is in operation, from 6:30 AM to 2:30 PM during school semesters, late afternoons (after 3:30 p.m.), evenings, Saturdays and holidays), as such the Contractor shall plan and budget this work accordingly. When requested by the Contractor, the Owner will evaluate if some work tasks can take place during after business hours and the Owner will approve or disapprove the requests in writing on a case-by-case basis. The Owner reserves the right to reject the proposed work schedule to maintain efficient and undisturbed business and security operations.
2. Once work has been established as substantially complete the Contractor shall have a maximum of thirty (30) days to complete the work.

##### C. SUPERINTENDENCE OF SUBCONTRACTORS

1. The Contractor must supervise subcontractors in accordance with the provisions of General Conditions. A project superintendent shall be on site whenever any work is being performed. Superintendent shall be an employee of the Contractor.
2. Project superintendent shall be acceptable to the Owner and Architect. Submit superintendent's qualifications for review and acceptance within two days of the notice of award or notice to proceed whichever is first.

#### D. COORDINATION

1. Prior to commencement of subcontract work, a designated representative of each subcontractor shall meet with project superintendent, Owner and Architect at the site to discuss requirements and scope of Work.
2. The Contractor and all subcontractors will be required to attend a preconstruction conference at a date and time set by the Owner.

#### E. BEHAVIOR OF PERSONNEL

1. If in the opinion of the Owner or Architect, any employee of the Contractor or his subcontractors is physically or mentally unfit for work or exhibits behavior incompatible with work site environment, said employee may be required to leave property and may be refused re-admittance.

#### F. SUBSTITUTIONS

1. In all cases where a proprietary designation is used in connection with materials or articles to be furnished under this contract and the phrase "or equal" is not used, the Contractor shall furnish the specified item, unless a written request for a substitute has been submitted by the Contractor and review by the Architect to his satisfaction.
2. See Section 01 60 00 for additional requirements and Contractor responsibility relating to substitutions. Specifically, subparagraphs relating to speculative substitutions and additional liabilities.

#### G. DRAWINGS AND SPECIFICATIONS

1. All work drawn on Plans and not specified or all work specified and not drawn are part of Contract Work required to be done and are to be executed as fully as if described in both of these ways. Only work specifically noted in the following manner shall be considered as not being in the contract:
  2. ".....by Owner".
  3. ".....NIC (Not In Contract)".
4. If, after examination of Contract Drawings and Specifications, or after a visit to the premises, any discrepancies, omissions, ambiguities, or conflicts are found in or amount contract documents or there is doubt as to their meaning, Architect is to be notified at the earliest possible date. Where information sought is not clearly indicated or specified, the Architect will issue addendum to the Contractor clarifying conditions, which addendum will become part of the Contract Documents. Neither the Owner nor the Architect will be responsible for any oral instructions.
5. If there are two ways and/or instruction in drawings and/or specifications, it shall be assumed that the Contractor has based his base bid price on the most expensive way.
6. If duplication is shown on drawings and/or specifications of work by more than one trade, Architect shall determine which trade shall do work and rebate shall be due from the other trades to Owner.
7. Drawings DO NOT include any necessary components for construction safety.
8. In all work shown on Drawings, figured dimensions are to be followed in all cases, though they may differ from scaled measurements. Before beginning the work, Contractor is to check through and verify all dimensions/elevations and call to the attention of the Architect any apparent or manifest discrepancy.

9. Contractor shall verify all dimensions with existing and actual field conditions, prior to start of any work.
10. All work and materials shown on drawings shall be interpreted by the Contractor as being new work and materials to be furnished and installed unless are specifically indicated as existing to remain.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 10 00

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**SECTION 01 11 16 – CONSTRUCTION PHASING AND SCHEDULING****PART 1 - GENERAL****1.1 GENERAL REFERENCE**

- A. The General Conditions and Division 1 of these specifications are hereby included as part of this section.

**1.2 REQUIREMENTS INCLUDED**

- A. Date of Completion
- B. Coordination
- C. Work Hours
- D. Work Sequence and Scheduling

**1.3 RELATED REQUIREMENTS**

- A. Section 013200 – Construction Progress Documentation: Construction Schedules.
- B. Section 015000 - Temporary Facilities and Controls: Temporary enclosures, protection of completed work, and cleaning.
- C. Section 017300 – Execution: Cutting and patching.
- D. Section 024119 – Selective Demolition: Demolition requirements.

**1.4 DATE OF COMPLETION**

- A. Date of substantial and final completion shall be as indicated on the Bid Form.

**1.5 COORDINATION**

- A. Coordinate work of the various sections of specifications and all drawings, to assure efficient and orderly sequence of installation of construction elements, and with provisions for accommodating items installed later.
- B. Verify characteristics of elements of interrelated operating equipment are compatible; coordinate work of various sections having interdependent responsibilities for installing, connecting to, and placing in service, such equipment.

**C. COOPERATION**

- 1. Contractor and Subcontractors shall make every effort to cooperate with the other Contractors on the site and in such manner not to delay or interfere with carrying forward other Contractor's work.
- 2. Contractor and Subcontractors shall coordinate their work with adjacent work and cooperate with other trades so as to facilitate general progress of work. Each trade shall afford other trades every reasonable opportunity for installation of

their work and for storage of their materials. All material storage locations shall be approved by the Architect.

#### 1.6 WORKING HOURS

- A. It is contemplated that work outside of normal working hours (overtime and premium time) shall be required to complete this project within the time limits and scheduling restrictions set by the Owner. The Contractor shall include all cost for such working hours in the base bid.
- B. In no case shall Contractor or any Subcontractor perform any work on project, except during regular working hours without in each instance, notifying the Architect and Owner's Representative in order that they may be present to assist during work. This shall not be interpreted as a measure to prevent the Contractor from working "overtime" under any circumstances, but merely to ensure that the Architect or Owner's Representative may have the opportunity to be on hand to assist the Contractor, as may be required, to interpret Contract Documents, Plans or Specifications and to ensure that construction operations will not interfere with Owner's Operations.
  - 1. Normal working hours for the purpose of this construction project shall be 7:00 AM to 3:30 PM, Monday through Friday, during the summer break period. The building will **NOT** be occupied by the Owner during construction.
  - 2. Once the building has been opened (substantial completion) for full operation on date indicated on the Bid Form, work required to complete the project with-in the facility and adjacent site shall take place during hours that the facility is not in operation early morning (before 7:00 AM), late afternoons (after 3:30 PM), evenings, weekends, and holidays, as such the Contractor shall plan and budget this work accordingly. When requested by the Contractor, the Owner will evaluate if some work tasks can take place during normal business hours and the Owner will approve or disapprove the requests in writing on a case-by-case basis. The Owner reserves the right to reject the proposed work schedule to maintain efficient and undisturbed business and security operations.
- C. If found necessary to reach a proper stopping place in any portion of the work, or to complete work within the Contract time limit, the Contractor shall work his forces and forces of his Subcontractors overtime without addition to the Contract Price. The Contractor shall insure that installation of Work under any subcontract does not interfere with nor delay progress of the building work, nor with progress of any independent contracts running concurrently.

#### 1.7 GENERAL WORK SEQUENCE and SCHEDULING REQUIREMENTS

- A. All work must be completed as described in Section 011000.
- B. The building will **NOT** be occupied during all of the construction process. The construction schedule shall be developed around the understanding that the building will **NOT** be occupied. Regardless of the building **NOT** being occupied; the following shall be administered:
  - 1. NO EXITS OR WALKWAYS SHALL BE CLOSED WITHOUT THE WRITTEN PERMISSION OF OWNER.
  - 2. Construction schedule shall be approved by the Owner.

3. The cleaning and securing of the area(s) shall be acceptable to the Owner. It shall be the responsibility of the Contractor to obtain these requirements prior to start of any such work.
- C. Owner's use and occupancy schedule:
1. Project Substantial Completion as indicated on the Bid Form
    - a. A Certificate of Occupancy must be obtained by the Contractor for the occupancy of the buildings as indicated on the Bid Form. Failure to obtain this certificate will be reason to initiate Liquidated Damage clauses of the contract.
    - b. Building will no longer be fully available after August 31, 2020, to Contractor for work required to complete work needed for Final Completion. All work will have to be performed when students are not in the building areas where work needs to be completed. In general terms this means work will be performed at nights, weekends, and holidays.
    - c. Contractor will be responsible to have the building fully operational and cleaned to the Owner's satisfaction at the end of each work period and before students and staff are scheduled to occupy the building.
      - 1) Contractor shall completely clean and secure the area to the Owner's satisfaction prior to any student occupancy. If the Contractor fails to accomplish this, they shall be considered in non-conformance with the Contract. The Owner shall take whatever actions are required to ready the space for student occupation. Costs of these actions will be back charged to the Contractor.
      - 2) The cleaning and securing of the area(s) shall be acceptable to the Owner. It shall be the responsibility of the Contractor to obtain these requirements prior to start of any such work.
- D. Final Completion shall be as indicated on the Bid Form.
- E. At the option of the Owner, portions of the site and building may be turned over to the Contractor for early start. The Contractor shall not assume this will take place when scheduling the work or bidding the project.
- F. The General Contractor must submit a detailed schedule of work for the entire project. This schedule must include manufacturers' delivery dates. No work will begin within building until all delivery dates are established and approved by the Owner.
1. Preliminary schedule shall be submitted within 10 working days of notice to proceed or purchase order whichever shall come first.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 11 16

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**SECTION 01 25 00 - SUBSTITUTION PROCEDURES****PART 1 - GENERAL****1.1 RELATED DOCUMENTS**

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

**1.2 SUMMARY**

- A. Section includes administrative and procedural requirements for substitutions.
- B. Related Requirements:
  - 1. Section 016000 "Product Requirements" for requirements for submitting comparable product submittals for products by listed manufacturers.

**1.3 DEFINITIONS**

- A. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by Contractor.
  - 1. Substitutions for Cause: Changes proposed by Contractor that are required due to changed Project conditions, such as unavailability of product, regulatory changes, or unavailability of required warranty terms.
  - 2. Substitutions for Convenience: Changes proposed by Contractor or Owner that are not required in order to meet other Project requirements but may offer advantage to Contractor or Owner.

**1.4 ACTION SUBMITTALS**

- A. Substitution Requests: Submit three copies of each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
  - 1. Substitution Request Form: Use CSI Form 13.1A.
  - 2. Documentation: Show compliance with requirements for substitutions and the following, as applicable:
    - a. Statement indicating why specified product or fabrication, or installation cannot be provided, if applicable.
    - b. Coordination information, including a list of changes or revisions needed to other parts of the Work and to construction performed by Owner and separate contractors that will be necessary to accommodate proposed substitution.
    - c. Detailed comparison of significant qualities of proposed substitution with those of the Work specified. Include annotated copy of applicable Specification Section. Significant qualities may include attributes such as performance, weight, size, durability, visual effect, sustainable design characteristics, warranties, and specific



- features and requirements indicated. Indicate deviations, if any, from the Work specified.
- d. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
  - e. Samples, where applicable or requested.
  - f. Certificates and qualification data, where applicable or requested.
  - g. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners.
  - h. Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.
  - i. Research reports evidencing compliance with building code in effect for Project, from ICC-ES.
  - j. Detailed comparison of Contractor's construction schedule using proposed substitution with products specified for the Work, including effect on the overall Contract Time. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating date of receipt of purchase order, lack of availability, or delays in delivery.
  - k. Cost information, including a proposal of change, if any, in the Contract Sum.
  - l. Contractor's certification that proposed substitution complies with requirements in the Contract Documents except as indicated in substitution request, is compatible with related materials, and is appropriate for applications indicated.
  - m. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.
3. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within seven days of receipt of a request for substitution. Architect will notify Contractor of acceptance or rejection of proposed substitution within 15 days of receipt of request, or seven days of receipt of additional information or documentation, whichever is later.
- a. Forms of Acceptance: Change Order, Construction Change Directive, or Architect's Supplemental Instructions for minor changes in the Work.
  - b. Use product specified if Architect does not issue a decision on use of a proposed substitution within time allocated.

## 1.5 QUALITY ASSURANCE

- A. Compatibility of Substitutions: Investigate and document compatibility of proposed substitution with related products and materials. Engage a qualified testing agency to perform compatibility tests recommended by manufacturers.

## 1.6 PROCEDURES

- A. Coordination: Revise or adjust affected work as necessary to integrate work of the approved substitutions.

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**PART 2 - PRODUCTS****2.1 SUBSTITUTIONS**

- A. Substitutions for Cause: Submit requests for substitution immediately on discovery of need for change, but not later than 15 days prior to time required for preparation and review of related submittals.
1. Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:
- a. Requested substitution is consistent with the Contract Documents and will produce indicated results.
  - b. Substitution request is fully documented and properly submitted.
  - c. Requested substitution will not adversely affect Contractor's construction schedule.
  - d. Requested substitution has received necessary approvals of authorities having jurisdiction.
  - e. Requested substitution is compatible with other portions of the Work.
  - f. Requested substitution has been coordinated with other portions of the Work.
  - g. Requested substitution provides specified warranty.
  - h. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.
- B. Substitutions for Convenience: Owner may require, and Contractor shall provide, a credit Change Order equal to the fee assessed by the Architect for the Extra Services required to review a substitution.
- C. Owner can require a credit Change Order from the Contractor for the amount of any extra design services associated in response to an unreasonable amount of substitutions proposed by the Contractor or responding to unreasonable and excessive requests for information (RFI's) by the Contractor, where such information is available from a careful study and review of the Construction Documents.

**PART 3 - EXECUTION (Not Used)**

END OF SECTION 01 25 00

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**SECTION 01 26 00 - CONTRACT MODIFICATION PROCEDURES****PART 1 GENERAL****1.1 RELATED DOCUMENTS**

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

**1.2 SUMMARY**

- A. Section includes administrative and procedural requirements for handling and processing Contract modifications.
- B. Related Requirements:
  - 1. Section 012500 "Substitution Procedures" for administrative procedures for handling requests for substitutions made after the Contract award.

**1.3 MINOR CHANGES IN THE WORK**

- A. Architect will issue through Contractor supplemental instructions authorizing minor changes in the Work, not involving adjustment to the Contract Sum or the Contract Time, on AIA Document G710, "Architect's Supplemental Instructions."

**1.4 PROPOSAL REQUESTS**

- A. Owner-Initiated Proposal Requests: Architect will issue a detailed description of proposed changes in the Work that may require adjustment to the Contract Sum or the Contract Time. If necessary, the description will include supplemental or revised Drawings and Specifications.
  - 1. Work Change Proposal Requests issued by Architect are not instructions either to stop work in progress or to execute the proposed change.
  - 2. Within time specified in Proposal Request or 10 days, when not otherwise specified, after receipt of Proposal Request, submit a quotation estimating cost adjustments to the Contract Sum and the Contract Time necessary to execute the change.
    - a. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
    - b. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
    - c. Include costs of labor and supervision directly attributable to the change.
    - d. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
    - e. Quotation Form: Use CSI Form 13.6D, "Proposal Worksheet Summary," and Form 13.6C, "Proposal Worksheet Detail" forms acceptable to Architect.
- B. Contractor-Initiated Proposals: If latent or changed conditions require modifications to the Contract, Contractor may initiate a claim by submitting a request for a change to Architect.

1. Include a statement outlining reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and the Contract Time.
2. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
3. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
4. Include costs of labor and supervision directly attributable to the change.
5. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
6. Comply with requirements in Section 012500 "Substitution Procedures" if the proposed change requires substitution of one product or system for product or system specified.
7. Proposal Request Form: Use CSI Form 13.6A, "Change Order Request (Proposal)," with attachments CSI Form 13.6D, "Proposal Worksheet Summary," and Form 13.6C, "Proposal Worksheet Detail" form acceptable to Architect.

#### 1.5 ADMINISTRATIVE CHANGE ORDERS

- A. Unit-Price Adjustment: See Section 012200 "Unit Prices" for administrative procedures for preparation of Change Order Proposal for adjusting the Contract Sum to reflect measured scope of unit-price work.

#### 1.6 CHANGE ORDER PROCEDURES

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

#### 1.7 CONSTRUCTION CHANGE DIRECTIVE

- A. Construction Change Directive: Architect may issue a Construction Change Directive on AIA Document G714. Construction Change Directive instructs Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order.
  1. Construction Change Directive contains a complete description of change in the Work. It also designates method to be followed to determine change in the Contract Sum or the Contract Time.
- B. Documentation: Maintain detailed records on a time and material basis of work required by the Construction Change Directive.
  1. After completion of change, submit an itemized account and supporting data necessary to substantiate cost and time adjustments to the Contract.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 26 00

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**SECTION 01 31 00 - PROJECT MANAGEMENT AND COORDINATION****PART 1 - GENERAL****1.1 RELATED DOCUMENTS**

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

**1.2 SUMMARY**

- A. Section includes administrative provisions for coordinating construction operations on Project including, but not limited to, the following:
  - 1. General coordination procedures.
  - 2. Requests for Information (RFIs).
  - 3. Project meetings.
- B. Each contractor shall participate in coordination requirements. Certain areas of responsibility are assigned to a specific contractor.
- C. Related Requirements:
  - 1. Section 013200 "Construction Progress Documentation" for preparing and submitting Contractor's construction schedule.
  - 2. Section 017700 "Closeout Procedures" for coordinating closeout of the Contract.
  - 3. Section 017300 "Execution" for procedures for coordinating general installation and field-engineering services, including establishment of benchmarks and control points.

**1.3 DEFINITIONS**

- A. RFI: Request from Owner, Architect, or Contractor seeking information required by or clarifications of the Contract Documents.

**1.4 INFORMATIONAL SUBMITTALS**

- A. Subcontract List: Prepare a written summary identifying individuals or firms proposed for each portion of the Work, including those who are to furnish products or equipment fabricated to a special design. Include the following information in tabular form:
  - 1. Name, address, and telephone number of entities performing subcontract or supplying products.
  - 2. Number and title of related Specification Section(s) covered by subcontract.
  - 3. Drawing number and detail references, as appropriate, covered by subcontract.
- B. Key Personnel Names: Within 15 days of starting construction operations, submit a list of key personnel assignments, including superintendent and other personnel in attendance at Project site. Identify individuals and their duties and responsibilities; list addresses and telephone numbers, including home, office, and cellular telephone numbers and e-mail addresses. Provide names, addresses, and telephone numbers of individuals assigned as alternates in the absence of individuals assigned to Project.

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## 1.5 GENERAL COORDINATION PROCEDURES

- A. Coordination: Coordinate construction operations included in different Sections of the Specifications to ensure efficient and orderly installation of each part of the Work. Coordinate construction operations, included in different Sections, which depend on each other for proper installation, connection, and operation.
1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
  2. Coordinate installation of different components to ensure maximum performance and accessibility for required maintenance, service, and repair.
  3. Make adequate provisions to accommodate items scheduled for later installation.
- B. Prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and list of attendees at meetings.
1. Prepare similar memoranda for Owner and separate contractors if coordination of their Work is required.
- C. Conservation: Coordinate construction activities to ensure that operations are carried out with consideration given to conservation of energy, water, and materials. Coordinate use of temporary utilities to minimize waste.
1. Salvage materials and equipment involved in performance of, but not actually incorporated into, the Work. See other Sections for disposition of salvaged materials that are designated as Owner's property.

## 1.6 REQUESTS FOR INFORMATION (RFIs)

- A. General: Immediately on discovery of the need for additional information or interpretation of the Contract Documents, Contractor shall prepare and submit an RFI in the form specified.
1. Architect will return RFIs submitted to Architect by other entities controlled by Contractor with no response.
  2. Coordinate and submit RFIs in a prompt manner so as to avoid delays in Contractor's work or work of subcontractors.
- B. Frivolous RFIs: RFIs generated by the contractor because of his failure to adequately study and compare the Contract Documents, or coordinating their own work, shall be considered frivolous. The contractor shall pay all A/E and owner costs associated with responding to these RFIs.
- C. Content of the RFI: Include a detailed, legible description of item needing information or interpretation and the following:
1. Project name.
  2. Project number.
  3. Date.
  4. Name of Contractor.
  5. Name of Architect
  6. RFI number, numbered sequentially.
  7. RFI subject.
  8. Specification Section number and title and related paragraphs, as appropriate.
  9. Drawing number and detail references, as appropriate.
  10. Field dimensions and conditions, as appropriate.

11. Contractor's suggested resolution. If Contractor's suggested resolution impacts the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
  12. Contractor's signature.
  13. Attachments: Include sketches, descriptions, measurements, photos, Product Data, Shop Drawings, coordination drawings, and other information necessary to fully describe items needing interpretation.
    - a. Include dimensions, thicknesses, structural grid references, and details of affected materials, assemblies, and attachments on attached sketches.
- D. RFI Forms: AIA Document G716 or another form that in the sole opinion of the Architect is acceptable.
1. Attachments shall be electronic files in Adobe Acrobat PDF format.
- E. Architect's Action: Architect will review each RFI, determine action required, and respond. Allow seven working days plus seven days for consultants for Architect's response for each RFI. RFIs received by Architect after 1:00 p.m. will be considered as received the following working day.
1. The following Contractor-generated RFIs will be returned without action:
    - a. Requests for approval of submittals.
    - b. Requests for approval of substitutions.
    - c. Requests for approval of Contractor's means and methods.
    - d. Requests for coordination information already indicated in the Contract Documents.
    - e. Requests for adjustments in the Contract Time or the Contract Sum.
    - f. Requests for interpretation of Architect's actions on submittals.
    - g. Frivolous, incomplete, or inaccurately prepared RFIs.
  2. Architect's action may include a request for additional information, in which case Architect's time for response will date from time of receipt of additional information.
    - a. If Contractor believes the RFI response warrants change in the Contract Time or the Contract Sum, notify Architect in writing within 5 days of receipt of the RFI response.
- F. RFI Log: Prepare, maintain, and submit a tabular log of RFIs organized by the RFI number. Include the following:
1. Project name.
  2. Name and address of Contractor.
  3. Name and address of Architect
  4. RFI number including RFIs that were returned without action or withdrawn.
  5. RFI description.
  6. Date the RFI was submitted.
  7. Date Architect's response was received.
- G. On receipt of Architect's action, update the RFI log and immediately distribute the RFI response to affected parties. Review response and notify Architect within five days if Contractor disagrees with response.
1. Identification of related Minor Change in the Work, Construction Change Directive, and Proposal Request, as appropriate. Identification of related Field Order, Work Change Directive, and Proposal Request, as appropriate.

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## 1.7 PROJECT MEETINGS

- A. General: Schedule and conduct meetings and conferences at Project site unless otherwise indicated.
1. Attendees: Inform participants and others involved, and individuals whose presence is required, of date and time of each meeting. Notify Owner and Architect of scheduled meeting dates and times.
  2. Agenda: Prepare the meeting agenda. Distribute the agenda to all invited attendees.
  3. Minutes: Entity responsible for conducting meeting will record significant discussions and agreements achieved. Distribute the meeting minutes to everyone concerned, including Owner and Architect, within three days of the meeting.
- B. Preconstruction Conference: Schedule and conduct a preconstruction conference before starting construction, at a time convenient to Owner and Architect, but no later than 15 days after execution of the Agreement.
1. Conduct the conference to review responsibilities and personnel assignments.
  2. Attendees: Authorized representatives of Owner, Architect, and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the conference. Participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
  3. Agenda: Discuss items of significance that could affect progress, including the following:
    - a. Tentative construction schedule.
    - b. Phasing.
    - c. Critical work sequencing and long-lead items.
    - d. Designation of key personnel and their duties.
    - e. Lines of communications.
    - f. Procedures for processing field decisions and Change Orders.
    - g. Procedures for RFIs.
    - h. Procedures for testing and inspecting.
    - i. Procedures for processing Applications for Payment.
    - j. Distribution of the Contract Documents.
    - k. Submittal procedures.
    - l. Preparation of record documents.
    - m. Use of the premises and existing building.
    - n. Work restrictions.
    - o. Working hours.
    - p. Owner's occupancy requirements.
    - q. Responsibility for temporary facilities and controls.
    - r. Procedures for moisture and mold control.
    - s. Procedures for disruptions and shutdowns.
    - t. Construction waste management and recycling.
    - u. Parking availability.
    - v. Office, work, and storage areas.
    - w. Equipment deliveries and priorities.
    - x. First aid.
    - y. Security.
    - z. Progress cleaning.
  4. Minutes: Entity responsible for conducting meeting will record and distribute meeting minutes.
- C. Project Closeout Conference: Schedule and conduct a project closeout conference, at a time convenient to Owner and Architect, but no later than 30 days prior to the scheduled date of Substantial Completion.



1. Conduct the conference to review requirements and responsibilities related to Project closeout.
  2. Attendees: Authorized representatives of Owner, Architect, and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the meeting. Participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.
  3. Agenda: Discuss items of significance that could affect or delay Project closeout, including the following:
    - a. Preparation of record documents.
    - b. Procedures required prior to inspection for Substantial Completion and for final inspection for acceptance.
    - c. Submittal of written warranties.
    - d. Requirements for preparing operations and maintenance data.
    - e. Requirements for delivery of material samples, attic stock, and spare parts.
    - f. Requirements for demonstration and training.
    - g. Preparation of Contractor's punch list.
    - h. Procedures for processing Applications for Payment at Substantial Completion and for final payment.
    - i. Submittal procedures.
    - j. Responsibility for removing temporary facilities and controls.
  4. Minutes: Entity conducting meeting will record and distribute meeting minutes.
- D. Progress Meetings: Conduct progress meetings at weekly intervals.
1. Coordinate dates of meetings with preparation of payment requests.
  2. Attendees: In addition to representatives of Owner, Owner's Project Manager (OPM) and Architect, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.
  3. Agenda: Review and correct or approve minutes of previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.
    - a. Contractor's Construction Schedule: Review progress since the last meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to Contractor's construction schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.
      - 1) Review schedule for next period.
    - b. Review present and future needs of each entity present, including the following:
      - 1) Interface requirements.
      - 2) Sequence of operations.
      - 3) Status of submittals.
      - 4) Deliveries.
      - 5) Off-site fabrication.
      - 6) Access.
      - 7) Site utilization.
      - 8) Temporary facilities and controls.
      - 9) Progress cleaning.
      - 10) Quality and work standards.
      - 11) Status of correction of deficient items.

- 12) Field observations.
- 13) Status of RFIs.
- 14) Status of proposal requests.
- 15) Pending changes.
- 16) Status of Change Orders.
- 17) Pending claims and disputes.
- 18) Documentation of information for payment requests.

4. Minutes: Entity responsible for conducting the meeting will record and distribute the meeting minutes to each party present and to parties requiring information.

- 1.8 Schedule Updating: Revise Contractor's construction schedule after each progress meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with the report of each meeting

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 31 00

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**SECTION 01 32 00 CONSTRUCTION PROGRESS DOCUMENTATION****PART 1 – GENERAL****1.1 RELATED DOCUMENTS**

- A. Procurement and Contracting Requirements and other Division 01 General Requirements apply to this Section.

**1.2 SUMMARY**

- A. Section includes administrative and procedural requirements for documenting the progress of construction during performance of the Work, including the following:

1. Startup construction schedule.
2. Contractor's construction schedule.
3. Daily construction reports.
4. Material location reports.
5. Site condition reports.
6. Special reports.

- B. Related Requirements:

1. Section 01 33 00 "Submittal Procedures" for submitting schedules and reports.
2. Section 01 40 00 "Quality Requirements" for submitting a schedule of tests and inspections.

**1.3 DEFINITIONS**

- A. Activity: A discrete part of a project that can be identified for planning, scheduling, monitoring, and controlling the construction project. Activities included in a construction schedule consume time and resources.

1. Critical Activity: An activity on the critical path that must start and finish on the planned early start and finish times.
2. Predecessor Activity: An activity that precedes another activity in the network.
3. Successor Activity: An activity that follows another activity in the network.

- B. CPM: Critical path method, which is a method of planning and scheduling a construction project where activities are arranged based on activity relationships. Network calculations determine when activities can be performed and the critical path of the Project.

- C. Critical Path: The longest connected chain of interdependent activities through the network schedule that establishes the minimum overall Project duration and contains no float.

- D. Event: The starting or ending point of an activity.

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

1. Float time is not for the exclusive use or benefit of either Owner or Contractor, but is a jointly owned, expiring Project resource available to both parties as needed to meet schedule milestones and Contract completion date.
2. Free float is the amount of time an activity can be delayed without adversely affecting the early start of the successor activity.
3. Total float is the measure of leeway in starting or completing an activity without

adversely affecting the planned Project completion date.

- F. Resource Loading: The allocation of manpower and equipment necessary for the completion of an activity as scheduled.

#### 1.4 INFORMATIONAL SUBMITTALS

- A. Format for Submittals: Submit required submittals in the following format:

1. Working electronic copy of schedule file.
2. PDF electronic file.
3. Three paper copies.

- B. Startup construction schedule.

1. Approval of cost-loaded startup construction schedule will not constitute approval of schedule of values for cost-loaded activities.
2. Owner's Project Representative will review and approve Construction Schedule. Submittal of schedule shall not relieve Contractor of responsibility for timing, planning and scheduling Work, nor impose any duty on the Architect or Owner with respect to the timing, planning, or scheduling of the Work.

- C. Startup Network Diagram: Of size required to display entire network for entire construction period. Show logic ties for activities.

- D. Contractor's Construction Schedule: Submit 11 by 17-inch color copies displaying entire schedule for entire construction period.

1. Submit one additional color copy minimum 30 by 40 inches.
2. Submit a working electronic copy of schedule, using software indicated, and labeled to comply with requirements for submittals. Include type of schedule (initial or updated) and date on label.

- E. CPM Reports: Concurrent with CPM schedule, submit each of the following reports. Format for each activity in reports shall contain activity number, activity description, cost, and resource loading, original duration, remaining duration, early start date, early finish date, late start date, late finish date, and total float in calendar days.

1. Activity Report: List of all activities sorted by activity number and then early start date, or actual start date if known.
2. Logic Report: List of preceding and succeeding activities for all activities, sorted in ascending order by activity number and then early start date, or actual start date if known.
3. Total Float Report: List of all activities sorted in ascending order of total float.
4. Earnings Report: Compilation of Contractor's total earnings from the Notice to Proceed until most recent Application for Payment.

- F. Construction Schedule Updating Reports: Submit with Applications for Payment.

- G. Two Week Look-Ahead: Submit every other week.

- H. Look-Ahead and Look-Back Gantt Charts: Submit at monthly intervals.

- I. Daily Construction Reports: Submit at weekly to Owner's on-site clerk of the Works, and at monthly intervals to Architect.

- J. Field Condition Reports: Submit at time of discovery of differing conditions.

K. Special Reports: Submit at time of unusual event.

L. Qualification Data: For scheduling consultant.

#### 1.5 QUALITY ASSURANCE

A. Scheduling Consultant Qualifications: An experienced specialist in CPM scheduling and reporting, with capability of producing CPM reports and diagrams within 24 hours of Owner Project Manager's request.

B. Prescheduling Conference: Conduct conference at Project site to comply with requirements in Section 01 31 00 "Project Management and Coordination." Review methods and procedures related to the preliminary construction schedule and Contractor's construction schedule, including, but not limited to, the following:

1. Review software requirement and schedule content and format for reports.
2. Verify availability of qualified personnel needed to develop and update schedule.
3. Discuss constraints, including phasing, area separations, and interim milestones.
4. Review delivery dates for Owner-furnished products.
5. Review schedule for work of Owner's separate contracts.
6. Review time required for review of submittals and resubmittals.
7. Review requirements for tests and inspections by independent testing and inspecting agencies.
8. Review time required for Project closeout and Owner startup procedures, including commissioning activities.
9. Review and finalize list of construction activities to be included in schedule.
10. Review submittal requirements and procedures.
11. Review procedures for updating schedule.

#### 1.6 COORDINATION

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

B. Coordinate Contractor's construction schedule with the schedule of values, list of subcontracts, submittal schedule, progress reports, payment requests, and other required schedules and reports.

1. Secure time commitments for performing critical elements of the Work from entities involved.
2. Coordinate each construction activity in the network with other activities and schedule them in proper sequence.

### PART 2 - PRODUCTS

#### 2.1 CONTRACTOR'S CONSTRUCTION SCHEDULE, GENERAL

A. Time Frame: Extend schedule from date established for the Notice to Proceed to date of final completion.

1. Contract completion date shall not be changed by submission of a schedule that shows an early completion date, unless specifically authorized by Change Order.

B. Activities: Treat each phase, wing (as delineated on the Drawings), story, and each major area

of the site as a separate numbered activity for each main element of the Work. Comply with the following:

1. Activity Duration: Define activities so no activity is longer than 20 working days, unless specifically allowed by Architect.
  2. Procurement Activities: Include procurement process activities for the following long lead items and major items, requiring a cycle of more than 60 calendar days, as separate activities in schedule. Procurement cycle activities include, but are not limited to, submittals, approvals, purchasing, fabrication, and delivery.
  3. Submittal Review Time: Include review and resubmittal times indicated in Section 01 33 00 "Submittal Procedures" in schedule. Coordinate submittal review times in Contractor's construction schedule with submittal schedule.
  4. Startup and Testing Time: Include not less than 15 working days for startup and testing.
  5. Substantial Completion: Indicate completion in advance of date established for Substantial Completion, and allow time for Architect's administrative procedures necessary for certification of Substantial Completion.
  6. Punch List and Final Completion: Include not more than 30 calendar days for completion of punch list items and final completion.
- C. Constraints: Include constraints and work restrictions indicated in the Contract Documents and as follows in schedule and show how the sequence of the Work is affected.
1. Phasing: Arrange list of activities on schedule by phase.
  2. Work by Owner: Include a separate activity for each portion of the Work performed by Owner.
  3. Products Ordered in Advance: Include a separate activity for each product. Include delivery date indicated in Section 01 10 00 "Summary." Delivery dates indicated stipulate the earliest possible delivery date.
  4. Owner-Furnished Products: Include a separate activity for each product. Include delivery date indicated in Section 01 10 00 "Summary." Delivery dates indicated stipulate the earliest possible delivery date.
  5. Work Restrictions: Show the effect of the following items on the schedule:
    - a. Coordination with existing construction.
    - b. Limitations of continued occupancies.
    - c. Uninterruptible services.
    - d. Partial occupancy before Substantial Completion.
    - e. Use of premises restrictions.
    - f. Provisions for future construction.
    - g. Seasonal variations.
    - h. Environmental control.
  6. Work Stages: Indicate important stages of construction for each major portion of the Work, including, but not limited to, the following:
    - a. Subcontract awards.
    - b. Submittals.
    - c. Purchases.
    - d. Mockups.
    - e. Fabrication.
    - f. Sample testing.
    - g. Deliveries.
    - h. Installation.
    - i. Tests and inspections.
    - j. Adjusting.
    - k. Curing.

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- I. Startup and placement into final use and operation.
7. Construction Areas: Identify each major area of construction for each major portion of the Work. Indicate where each construction activity within a major area must be sequenced or integrated with other construction activities to provide for the following:
- a. Structural completion.
  - b. Temporary enclosure and space conditioning.
  - c. Permanent space enclosure.
  - d. Completion of mechanical installation.
  - e. Completion of electrical installation.
  - f. Substantial Completion.
- D. Milestones: Include milestones indicated in the Contract Documents in schedule, including, but not limited to, the Notice to Proceed, Substantial Completion of each phase, final completion, commissioning and building flush out.
- E. Computer Scheduling Software: Prepare schedules using current version Primavera P6 version 6.7 or later.
- 2.2 CONTRACTOR'S CONSTRUCTION SCHEDULE (CPM SCHEDULE)
- A. CPM Schedule: Prepare Contractor's construction schedule using a time-scaled CPM network analysis diagram for the Work.
- 1. Develop CPM schedule so it can be accepted for use no later than 90 days after date established for the Notice to Proceed.
    - a. Failure to include any work item required for performance of this Contract shall not excuse Contractor from completing all work within applicable completion dates, regardless of Owner's Project Manager's approval of the schedule.
  - 2. Conduct educational workshops to train and inform key Project personnel, including subcontractors' personnel, in proper methods of providing data and using CPM schedule information.
  - 3. Establish procedures for monitoring and updating CPM schedule and for reporting progress. Coordinate procedures with progress meeting and payment request dates.
  - 4. Use "one workday" as the unit of time for individual activities. Indicate nonworking days and holidays incorporated into the schedule in order to correlate with Contract Time.
- B. CPM Schedule Preparation: Prepare a list of all activities required to complete the Work. Using the startup construction schedule, prepare a skeleton network to identify probable critical paths.
- 1. Activities: Indicate the estimated time duration, sequence requirements, and relationship of each activity in relation to other activities. Include estimated time frames for the following activities:
    - a. Preparation and processing of submittals.
    - b. Mobilization and demobilization.
    - c. Delivery.
    - d. Fabrication.
    - e. Utility interruptions.
    - f. Installation.
    - g. Work by Owner that may affect or be affected by Contractor's activities.
    - h. Testing and commissioning.
    - i. Punch list and final completion.

- j. Activities occurring following final completion.
2. Critical Path Activities: Identify critical path activities, including those for interim completion dates. Scheduled start and completion dates shall be consistent with Contract milestone dates.
  3. Processing: Process data to produce output data on a computer-drawn, time-scaled network. Revise data, reorganize activity sequences, and reproduce as often as necessary to produce the CPM schedule within the limitations of the Contract Time.
  4. Cost- Loading of CPM Schedule: Assign cost to construction activities on the CPM schedule. Do not assign costs to submittal activities. Obtain Owner's Project Representatives approval prior to assigning costs to fabrication and delivery activities. Assign costs under main subcontracts for testing and commissioning activities, operation and maintenance manuals, punch list activities, Project record documents, NE-CHPS documentation, and demonstration and training (if applicable), in the amount of 5 percent of the Contract Sum.
    - a. Each activity cost shall reflect an appropriate value subject to approval by Owner's Project Manager.
    - b. Total cost assigned to activities shall equal the total Contract Sum.
- C. Contract Modifications: For each proposed contract modification and concurrent with its submission, prepare a time-impact analysis using a network fragment to demonstrate the effect of the proposed change on the overall project schedule.
- D. Initial Issue of Schedule: Prepare initial network diagram from a sorted activity list indicating straight "early start-total float." Identify critical activities. Prepare tabulated reports showing the following:
1. Contractor or subcontractor and the Work or activity.
  2. Description of activity.
  3. Main events of activity.
  4. Immediately preceding and succeeding activities.
  5. Early and late start dates.
  6. Early and late finish dates.
  7. Activity duration in workdays.
  8. Total float time.
  9. Dollar value of activity (coordinated with the schedule of values).
- E. Schedule Updating: Concurrent with making revisions to schedule, prepare tabulated reports showing the following:
1. Identification of activities that have changed.
  2. Changes in early and late start dates.
  3. Changes in early and late finish dates.
  4. Changes in activity durations in workdays.
  5. Changes in the critical path.
  6. Changes in total float.
  7. Changes in the Contract Time.
- F. When updating the schedule, the Contractor must use the option that retains the logic. In Primavera, this is called "Retained Logic." Any option that overrides the logic and allows activities that have started out-of-sequence to float to the project end date are not permitted. The Contractor agrees to maintain the schedule at all times so that it reflects the intended construction sequences. To comply, all out-of-sequence problems must be correct contemporaneously.



## 2.3 RECOVERY SCHEDULE

- A. Furnish sufficient forces, offices, facilities, and equipment at no cost to the Owner, and work such hours as necessary, within any local restrictions or agreements incorporated into the Contract, to ensure the prosecution of the work in accordance with the current schedule.
- B. When periodic update indicates the Work is 21 or more calendar days behind the current approved schedule, submit a separate recovery schedule indicating means by which Contractor intends to regain compliance with the schedule.
  - 1. Provide revised schedule at no additional cost to Owner, unless the Owner is solely responsible for the event or occurrence which has caused the schedule slippage.
  - 2. Provisions to recover schedule may include increasing hours of work, number of shifts, number of workers or quantity of equipment; or working overtime, Saturdays, Sundays or holidays. Work outside of agreed working hours may be granted, provided the Contractor gives reasonable notice to the Owner.
  - 3. Indicate changes to working hours, working days, crew sizes, and equipment required to achieve compliance, and date by which recovery will be accomplished.
  - 4. Include detailed narrative for remaining work based on most recent schedule.
  - 5. Conform to detailed requirements for the Contractor's construction schedule.
  - 6. Schedule shall represent Contractor's current work sequence plan and shall forecast completion of remaining work within remaining contract duration.

## 2.4 SCHEDULE PROGRESS REPORTS

- A. Two-Week Look Ahead: Prepare list of anticipated tasks to be completed during the next two week period. Identify trade, area of Work, and task duration. Identify issues that may adversely affect task completion.
- B. Look-Ahead Gantt Chart: Show activities extracted from the current CPM Construction Schedule. Display each activity to be performed during the coming month, with one line for each activity and one column for each calendar day.
  - 1. Provide two bars for each activity. Use top bar to show duration and Early Start/Late Start dates as shown in current CPM schedule. Leave bottom bar blank, to be marked up during the course of the month to show actual work completed.
  - 2. Display in red activities which are on the critical path.
  - 3. Prepare and attach written description of the resources and personnel intended to be utilized per day during the period covered, and the percentage completion and total dollar value of each activity to be completed or partially completed up to first day of the following Gantt Chart period.
- C. Look Back Gantt Chart: Show activities extracted from the current approved CPM construction schedule. Display only activities performed during previous month with one line for each activity and one column for each calendar day.
  - 1. Provide 2 bars for each activity. Use top bar to show the duration and Early Start/Late Start dates as shown in current approved CPM schedule. Mark up bottom bar to show actual achievement for each activity. If an activity is not completed in the period covered by one Gantt Chart, but continues into the next month, include percentage completed at the beginning and at the end of the period covered by each chart.
  - 2. Display in red activities which are on the critical path.
  - 3. Prepare and attach written statement of actual quantity of resources and number of personnel employed per day for the period covered.

## 2.5 REPORTS

- A. Daily Construction Reports: Prepare a daily construction report recording the following information concerning events at Project site:
1. List of subcontractors at Project site.
  2. List of separate contractors at Project site.
  3. Approximate count of personnel at Project site.
  4. Equipment at Project site.
  5. Material deliveries.
  6. High and low temperatures and general weather conditions, including presence of rain or snow.
  7. Accidents.
  8. Meetings.
  9. Unusual events (refer to special reports).
  10. Stoppages, delays, shortages, and losses.
  11. Emergency procedures.
  12. Orders and requests of authorities having jurisdiction.
  13. Construction Change Directives received and implemented.
  14. Services connected and disconnected.
  15. Equipment or system tests and startups.
  16. Partial completions and occupancies.
  17. Substantial Completions authorized.
- B. Site Condition Reports: Immediately on discovery of a difference between field conditions and the Contract Documents prepare and submit a detailed report. Submit with a Request for Information. Include a detailed description of the differing conditions, together with recommendations for changing the Contract Documents.

## 2.6 SPECIAL REPORTS

- A. General: Submit special reports directly to Owner's Project Representative within one day of an occurrence. Distribute copies of report to parties affected by the occurrence.
- B. Reporting Unusual Events: When an event of an unusual and significant nature occurs at Project site, whether or not related directly to the Work, prepare, and submit a special report. List chain of events, persons participating, response by Contractor's personnel, evaluation of results or effects, and similar pertinent information. Advise Owner in advance when these events are known or predictable.

## PART 3 - EXECUTION

### 3.1 CONTRACTOR'S CONSTRUCTION SCHEDULE

- A. Utilization of Float Time: Float time is to be expended judiciously, for the benefit of the Project as a whole, and not for the convenience of the Contractor or the Owner. Neither the Contractor nor the Owner "owns" the project float time; the float time belongs to the Project.
1. Begin each activity promptly upon the completion of previous activities on which it depends. If Contractor completes activity on the scheduled "early finish date" or sooner, the Contractor shall not expend the "float time" for that activity (if any) but rather reserve it as a safeguard against possible impediments or delays which may occur later in the progress of the Work.
- B. Contractor's Construction Schedule Updating: At monthly intervals, update schedule to reflect actual construction progress and activities. Issue schedule one week before each regularly scheduled progress meeting.

1. Revise schedule immediately after each meeting or other activity where revisions have been recognized or made. Issue updated schedule concurrently with the report of each such meeting.
  2. Include a report with updated schedule that indicates every change, including, but not limited to, changes in logic, durations, actual starts and finishes, and activity durations.
  3. As the Work progresses, indicate final completion percentage for each activity.
- C. Distribution: Distribute copies of approved schedule to Architect, Owner, and Owner's Project Manager, separate contractors, testing and inspecting agencies, and other parties identified by Contractor with a need-to-know schedule responsibility.
1. Post copies in Project meeting rooms and temporary field offices.
  2. When revisions are made, distribute updated schedules to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in performance of construction activities.

END OF SECTION 01 32 00

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**SECTION 01 32 33 - PHOTOGRAPHIC DOCUMENTATION****PART PART 1 - GENERAL****1.1 RELATED DOCUMENTS**

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

**1.2 SUMMARY**

- A. Section includes administrative and procedural requirements for the following:
  - 1. Periodic photographic documentation of progress of construction.
- B. Related Requirements:
  - 1. Section 013300 "Submittal Procedures" for submitting photographic documentation.
  - 2. Section 017700 "Closeout Procedures" for submitting photographic documentation as project record documents at Project closeout.

**1.3 INFORMATIONAL SUBMITTALS**

- A. Qualification Data: For firms and persons specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names, and addresses of architects and owners, and other information specified.
- B. Key Plan: Submit key plan of Project site and building with notation of vantage points marked for location and direction of each photograph. Indicate elevation or story of construction. Include same information as corresponding photographic documentation.
- C. Construction Photographs: Submit three prints of each photographic view within seven days of taking photographs.
  - 1. Format: 8-by-10-inch (203-by-254-mm) smooth-surface matte prints on single-weight, commercial-grade photographic paper; enclosed back-to-back in clear plastic sleeves that are punched for standard three-ring binder.
  - 2. Identification: On back of each print, provide an applied label or rubber-stamped impression with the following information:
    - a. Name of Project.
    - b. Name and contact information for photographer.
    - c. Name of Architect.
    - d. Name of Contractor.
    - e. Date photograph was taken if not date stamped by camera.
    - f. Description of vantage point, indicating location, direction (by compass point), and elevation or story of construction.

3. Digital Images: Submit a complete set of digital image electronic files with each submittal of prints. Identify electronic media with date photographs were taken. Submit images that have the same aspect ratio as the sensor, uncropped.
  - a. Disk: Submit a digital (Jpeg) format copy of the photographs on a CD ROM, along with the prints to the Owner.

#### 1.4 QUALITY ASSURANCE

- A. Photographer Qualifications: An individual who has been regularly engaged as a professional photographer of construction projects for not less than three years.

#### 1.5 PHOTOGRAPHY SCHEDULE

- A. Furnish photographs of site and construction throughout progress of the Work.
- B. Deliver photographs monthly with Application for Payment.
- C. Take photographs on last working day of each week, each month during construction, and upon completion of the Work.
- D. In addition, take photographs at the beginning and completion of:
  1. Prior to the start of any work item.
  2. Selective demolition.
  3. Building exterior roof work items.
  4. Building interior architectural, mechanical, and electrical work items.

#### 1.6 COORDINATION

- A. Auxiliary Services: Cooperate with photographer and provide auxiliary services requested, including access to Project site and use of temporary facilities including temporary lighting.

### PART 2 - PRODUCTS

#### 2.1 PHOTOGRAPHIC MEDIA

- A. Digital Images: Provide images in JPG format, produced by a digital camera with minimum sensor size of 8 megapixels, and at an image resolution of not less than 3200 by 2400 pixels.

### PART 3 - EXECUTION

#### 3.1 CONSTRUCTION PHOTOGRAPHS

- A. Photographer: Engage a qualified photographer to take construction photographs.
- B. General: Take photographs using the maximum range of depth of field, and that are in focus, to clearly show the Work. Photographs with blurry or out-of-focus areas will not be accepted.

1. Maintain key plan with each set of construction photographs that identifies each photographic location.
- C. Digital Images: Submit digital images exactly as originally recorded in the digital camera, without alteration, manipulation, editing, or modifications using image-editing software.
1. Date and Time: Include date and time in file name for each image.
  2. Field Office Images: Maintain one set of images accessible in the field office at Project site, available at all times for reference. Identify images in the same manner as those submitted to Architect.
- D. Preconstruction Photographs: Before starting construction, take photographs of Project work areas and surrounding areas adjacent to the work areas, including existing items to remain during construction, from different vantage points, as directed by Architect.
1. Take 4 photographs to show existing conditions at work areas before starting the work.
  2. Take 4 photographs of existing conditions adjacent to work areas or at adjoining areas to accurately record physical conditions at start of construction.
- E. Periodic Construction Photographs: Take four color photographs weekly, with timing each month adjusted to coincide with the cutoff date associated with each Application for Payment. Select vantage points to show status of construction and progress since last photographs were taken.
- F. Architect-Directed Construction Photographs: From time to time, Architect will instruct photographer about number and frequency of photographs and general directions on vantage points. Select actual vantage points and take photographs to show the status of construction and progress since last photographs were taken.
- G. Time-Lapse Sequence Construction Photographs: Take five color photographs as indicated, to show status of construction and progress since last photographs were taken.
1. Frequency: Take photographs weekly, with timing each month adjusted to coincide with the cutoff date associated with each Application for Payment.
  2. Vantage Points: Following suggestions by Architect, Owner's Project Manager and Contractor, photographer to select vantage points. During each of the following construction phases, take not less than two of the required shots from same vantage point each time to create a time-lapse sequence as follows:
    - a. Commencement of the Work, through completion of construction.
    - b. Interior Work, through date of Substantial Completion.
- H. Final Completion Construction Photographs: Take eight color photographs after date of Substantial Completion for submission as project record documents. Architect and Owner's Project Manager will inform photographer of desired vantage points.
1. Do not include date stamp.
- I. Additional Photographs: Architect or Owner's Project Manager may request photographs in addition to periodic photographs specified. Additional photographs will be paid for by Change Order and are not included in the Contract Sum.
1. Three days' notice will be given, where feasible.
  2. In emergency situations, take additional photographs within 24 hours of request.
  3. Circumstances that could require additional photographs include, but are not limited to, the following:
    - a. Special events planned at Project site.

- b. Immediate follow-up when on-site events result in construction damage or losses.
- c. Photographs to be taken at fabrication locations away from Project site. These photographs are not subject to unit prices or unit-cost allowances.
- d. Substantial Completion of a major phase or component of the Work.
- e. Extra record photographs at time of final acceptance.
- f. Owner's request for special publicity photographs.

END OF SECTION 01 32 33

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## SECTION 01 33 00 - SUBMITTAL PROCEDURES

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section includes requirements for the submittal schedule and administrative and procedural requirements for submitting Shop Drawings, Product Data, Samples, and other submittals.
- B. Related Requirements:
  - 1. Section 013100 "Project Management and Coordination" for submitting Contractor's construction schedule.
  - 2. Section 017900 "Demonstration and Training" for submitting video recordings of demonstration of equipment and training of Owner's personnel.

#### 1.2 DEFINITIONS

- A. Action Submittals: Written and graphic information and physical samples that require Architect's responsive action.
- B. Informational Submittals: Written and graphic information and physical samples that do not require Architect's responsive action. Submittals may be rejected for not complying with requirements.
- C. File Transfer Protocol (FTP): Communications protocol that enables transfer of files to and from another computer over a network and that serves as the basis for standard Internet protocols. An FTP site is a portion of a network located outside of network firewalls within which internal and external users are able to access files.
- D. Portable Document Format (PDF): An open standard file format licensed by Adobe Systems used for representing documents in a device-independent and display resolution-independent fixed-layout document format.

#### 1.3 ACTION SUBMITTALS

- A. Submittal Schedule: Submit a schedule of submittals, arranged in chronological order by dates required by construction schedule. Include time required for review, ordering, manufacturing, fabrication, and delivery when establishing dates. Include additional time required for making corrections or revisions to submittals noted by Architect and additional time for handling and reviewing submittals required by those corrections.
  - 1. Coordinate submittal schedule with list of subcontracts, the schedule of values, and Contractor's construction schedule.
  - 2. Initial Submittal: Submit concurrently with startup construction schedule. Include submittals required during the first 20 days of construction. List those submittals required to maintain orderly progress of the Work and those required early because of long lead time for manufacture or fabrication.
  - 3. Final Submittal: Submit concurrently with the first complete submittal of Contractor's construction schedule.



- a. Submit revised submittal schedule to reflect changes in current status and timing for submittals.
4. Format: Arrange the following information in a tabular format:
- a. Scheduled date for first submittal.
  - b. Specification Section number and title.
  - c. Submittal category: Action; informational.
  - d. Name of subcontractor.
  - e. Description of the Work covered.
  - f. Scheduled date for Architect's final release or approval.
  - g. Scheduled date of fabrication.
  - h. Scheduled dates for purchasing.
  - i. Scheduled dates for installation.
  - j. Activity or event number.

- B. Contractor must submit Initial Submittal Schedule to Architect and Owner's Project Representative for review within ten (10) days of the notice to proceed.

#### 1.4 SUBMITTAL ADMINISTRATIVE REQUIREMENTS

- A. Architect's Digital Data Files: Electronic copies of digital data files of the Contract Drawings will not be provided by Architect for Contractor's use in preparing submittals.
- B. Architect will not process or review submittals that have not been reviewed by the Contractor or that do not have the Contractor's review / approval stamp on them.
- C. Submittals received by Architect after 1:00 p.m. will be considered as received the following working day.
- D. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.
  - 1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
  - 2. Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination.
    - a. Architect reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.
- E. Processing Time: Allow time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Architect's receipt of submittal. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.
  - 1. Initial Review: Allow 7 days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. Architect will advise Contractor when a submittal being processed must be delayed for coordination.
    - a. Allow additional 7 days for review of each submittal where it is necessary for review by Architect or Owner's Project Manager consultant.
  - 2. Intermediate Review: If intermediate submittal is necessary, process it in same manner as initial submittal.

3. Resubmittal Review: Allow 7 days for review of each resubmittal.
  - a. Allow additional 7 days for review of each submittal where it is necessary for review by Architect or Owner's Project Manager consultant.
- F. Paper Submittals(if necessary): Place a permanent label or title block on each submittal item for identification.
  1. Indicate name of firm or entity that prepared each submittal on label or title block.
  2. Provide a space approximately 6 by 8 inches (150 by 200 mm) on label or beside title block to record Contractor's review and approval markings and action taken by Architect.
  3. Include the following information for processing and recording action taken:
    - a. Project name.
    - b. Date.
    - c. Name of Architect.
    - d. Name of Engineer when it is appropriate.
    - e. Name of Contractor.
    - f. Name of subcontractor.
    - g. Name of supplier.
    - h. Name of manufacturer.
    - i. Submittal number or other unique identifier, including revision identifier.
      - 1) Submittal number shall use Specification Section number followed by a decimal point and then a sequential number (e.g., 061000.01). Resubmittals shall include an alph numeric suffix (e.g., 061000.01R1).
    - j. Number and title of appropriate Specification Section.
    - k. Drawing number and detail references, as appropriate.
    - l. Location(s) where product is to be installed, as appropriate.
    - m. Other necessary identification.
  4. Additional Paper Copies: Unless additional copies are required for final submittal, and unless Architect observes noncompliance with provisions in the Contract Documents, initial submittal may serve as final submittal.
  5. Transmittal for Paper Submittals: Assemble each submittal individually and appropriately for transmittal and handling. Transmit each submittal using a transmittal form. Architect will discard submittals received from sources other than Contractor.
    - a. Transmittal Form for Paper Submittals: Use AIA Document G810.
    - b. Transmittal Form for Paper Submittals: Provide locations on form for the following information:
      - 1) Project name.
      - 2) Date.
      - 3) Destination (To:).
      - 4) Source (From:).
      - 5) Name and address of Architect.
      - 6) Name of Engineer when appropriate.
      - 7) Name of Contractor.
      - 8) Name of firm or entity that prepared submittal.
      - 9) Names of subcontractor, manufacturer, and supplier.
      - 10) Category and type of submittal.
      - 11) Submittal purpose and description.
      - 12) Specification Section number and title.
      - 13) Specification paragraph number or drawing designation and generic name for each of multiple items.

- 14) Drawing number and detail references, as appropriate.
  - 15) Indication of full or partial submittal.
  - 16) Transmittal number numbered consecutively.
  - 17) Submittal and transmittal distribution record.
  - 18) Remarks.
  - 19) Signature of transmitter.
- G. Options: Identify options requiring selection by Architect.
- H. Deviations: Identify deviations from the Contract Documents on submittals.
- I. Resubmittals: Make resubmittals in same form and number of copies as initial submittal.
1. Note date and content of previous submittal.
  2. Note date and content of revision in label or title block and clearly indicate extent of revision.
  3. Resubmit submittals until they are marked with approval notation from Architect's action stamp.
- J. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.
- K. Use for Construction: Retain complete copies of submittals on Project site. Use only final action submittals that are marked with approval notation from Architect's action stamp.

## PART 2 - PRODUCTS

### 2.1 SUBMITTAL PROCEDURES

- A. General Submittal Procedure Requirements:
1. Action Submittals: Submit digital copy of each submittal unless otherwise indicated. Architect will return digital copy.
  2. Informational Submittals: Submit digital copy of each submittal unless otherwise indicated. Architect will return digital copy.
  3. Certificates and Certifications Submittals: Provide a statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity.
    - a. Provide a notarized statement on original paper copy certificates and certifications where indicated.
- B. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.
1. If information must be specially prepared for submittal because standard published data are not suitable for use, submit as Shop Drawings, not as Product Data.
  2. Mark each copy of each submittal to show which products and options are applicable.
  3. Include the following information, as applicable:
    - a. Manufacturer's catalog cuts.
    - b. Manufacturer's product specifications.
    - c. Standard color charts.
    - d. Statement of compliance with specified referenced standards.

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- e. Testing by recognized testing agency.
  - f. Application of testing agency labels and seals.
  - g. Notation of coordination requirements.
  - h. Availability and delivery time information.
4. For equipment, include the following in addition to the above, as applicable:
    - a. Wiring diagrams showing factory-installed wiring.
    - b. Printed performance curves.
    - c. Operational range diagrams.
    - d. Clearances required to other construction, if not indicated on accompanying Shop Drawings.
  5. Submit Product Data before or concurrent with Samples.
  6. Submit Product Data in the following format:
    - a. Digital copy of Product Data unless otherwise indicated. Architect will return digital copy.
- C. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data.
1. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:
    - a. Identification of products.
    - b. Schedules.
    - c. Compliance with specified standards.
    - d. Notation of coordination requirements.
    - e. Notation of dimensions established by field measurement.
    - f. Relationship and attachment to adjoining construction clearly indicated.
    - g. Seal and signature of professional engineer if specified.
  2. Sheet Size: Except for templates, patterns, and similar full-size drawings, submit Shop Drawings on sheets at least 8-1/2 by 11 inches (215 by 280 mm), but no larger than 30 by 42 inches (750 by 1067 mm).
  3. Submit Shop Drawings in the following format:
    - a. Digital copy of each submittal. Architect will retain digital copy
- D. Samples: Submit Samples for review of kind, color, pattern, and texture for a check of these characteristics with other elements and for a comparison of these characteristics between submittal and actual component as delivered and installed.
1. Transmit Samples that contain multiple, related components such as accessories together in one submittal package.
  2. Identification: Attach label on unexposed side of Samples that includes the following:
    - a. Generic description of Sample.
    - b. Product name and name of manufacturer.
    - c. Sample source.
    - d. Number and title of applicable Specification Section.
  3. Disposition: Maintain sets of approved Samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.

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- a. Samples that may be incorporated into the Work are indicated in individual Specification Sections. Such Samples must be in an undamaged condition at time of use.
  - b. Samples not incorporated into the Work, or otherwise designated as Owner's property, are the property of Contractor.
4. Samples for Initial Selection: Submit manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available.
    - a. Number of Samples: Submit two full set(s) of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. Architect will return submittal with options selected.
  5. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from same material to be used for the Work, cured, and finished in manner specified, and physically identical with material or product proposed for use, and that show full range of color and texture variations expected. Samples include, but are not limited to, the following: partial sections of manufactured or fabricated components; small cuts or containers of materials; complete units of repetitively used materials; swatches showing color, texture, and pattern; color range sets; and components used for independent testing and inspection.
    - a. Number of Samples: Submit three sets of Samples. Architect will retain two Sample sets; remainder will be returned. Mark up and retain one returned Sample set as a project record sample.
      - 1) If variation in color, pattern, texture, or other characteristic is inherent in material or product represented by a Sample, submit at least three sets of paired units that show approximate limits of variations.
- E. Product Schedule: As required in individual Specification Sections, prepare a written summary indicating types of products required for the Work and their intended location. Include the following information in tabular form:
    1. Submit product schedule in the following format:
      - a. One digital copy and five paper copies of product schedule or list unless otherwise indicated. Architect will return two copies.
- F. Coordination Drawings Submittals: Comply with requirements specified in Division 01 Section "Project Management and Coordination."
  - G. Contractor's Construction Schedule: Comply with requirements specified in Division 01 Section "Project Management and Coordination."
  - H. Application for Payment and Schedule of Values: Comply with requirements specified in Division 01 Section "Summary."
  - I. Test and Inspection Reports and Schedule of Tests and Inspections Submittals: Comply with requirements specified in Division 01 Section "Quality Requirements."
  - J. Closeout Submittals and Maintenance Material Submittals: Comply with requirements specified in Division 01 Section "Closeout Procedures."
  - K. Maintenance Data: Comply with requirements specified in Division 01 Section "Operation and Maintenance Data."

- L. Qualification Data: Prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, contact information of Architect's and Owner's representatives, and other information specified.
- M. Welding Certificates: Prepare written certification that welding procedures and personnel comply with requirements in the Contract Documents. Submit record of Welding Procedure Specification and Procedure Qualification Record on AWS forms. Include names of firms and personnel certified.
- N. Installer Certificates: Submit written statements on manufacturer's letterhead certifying that Installer complies with requirements in the Contract Documents and, where required, is authorized by manufacturer for this specific Project.
- O. Manufacturer Certificates: Submit written statements on manufacturer's letterhead certifying that manufacturer complies with requirements in the Contract Documents. Include evidence of manufacturing experience where required.
- P. Product Certificates: Submit written statements on manufacturer's letterhead certifying that product complies with requirements in the Contract Documents.
- Q. Material Certificates: Submit written statements on manufacturer's letterhead certifying that material complies with requirements in the Contract Documents.
- R. Material Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements in the Contract Documents.
- S. Product Test Reports: Submit written reports indicating that current product produced by manufacturer complies with requirements in the Contract Documents. Base reports on evaluation of tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.
- T. Research Reports: Submit written evidence, from a model code organization acceptable to authorities having jurisdiction, that product complies with building code in effect for Project.
- U. Schedule of Tests and Inspections: Comply with requirements specified in Division 01 Section "Quality Requirements."
- V. Preconstruction Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of tests performed before installation of product, for compliance with performance requirements in the Contract Documents.
- W. Compatibility Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of compatibility tests performed before installation of product. Include written recommendations for primers and substrate preparation needed for adhesion.
- X. Field Test Reports: Submit written reports indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements in the Contract Documents.

## 2.2 DELEGATED-DESIGN SERVICES

- A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.

1. If criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to Architect.
- B. Delegated-Design Services Certification: In addition to Shop Drawings, Product Data, and other required submittals, submit digitally signed PDF electronic file and five paper copies of certificate, signed, and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional.
  1. Indicate that products and systems comply with performance and design criteria in the Contract Documents. Include list of codes, loads, and other factors used in performing these services.

## PART 3 - EXECUTION

### 3.1 CONTRACTOR'S REVIEW

- A. Action and Informational Submittals: Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Architect.
  1. Contractor shall clearly identify "any" and "all" deviations from the contract documents.
  2. Contractor shall clearly identify items which need clarification with other trades than the trade submitting the submittal.
  3. Contractor shall clearly identify "any" and "all" modifications to the contract documents required by the submittal.
- B. Resubmittals shall have "all" changes, modifications, etc. clearly identified. Failure to identify changes, modifications, etc. shall be justification for returning the submittal without A/E review.
- C. Project Closeout and Maintenance Material Submittals: See requirements in Division 01 Section "Closeout Procedures."
- D. Approval Stamp: Stamp each submittal with a uniform, approval stamp. Include Project name and location, submittal number, Specification Section title and number, name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.
- E. Failure of Contractor to properly review or stamp submittal shall be justification for returning the submittal without A/E review.
- F. Contractor shall submit documents required by authorities having jurisdiction and obtain their approvals prior to submission to the Architect.

### 3.2 ARCHITECT'S ACTION

- A. General: Architect will not review submittals that do not bear Contractor's approval stamp and will return them without action.
- B. Action Submittals: Architect will review each submittal, make marks to indicate corrections or revisions required, and return it. Architect will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action.
- C. Informational Submittals: Architect will review each submittal and will not return it or will return it if it does not comply with requirements. Architect will forward each submittal to appropriate party.

- D. Incomplete submittals are unacceptable, will be considered nonresponsive, and will be returned for resubmittal without review.
- E. Submittals not required by the Contract Documents may not be reviewed and may be discarded.

END OF SECTION 01 33 00



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**SECTION 01 33 29 – SUSTAINABLE DESIGN REPORTING****PART 1 – GENERAL****1.1 GENERAL PROVISIONS**

- A. Attention is directed to the Contract and General Conditions and all Sections within Division 1 – General Requirements which are hereby made a part of this section of the specifications.

**1.2 DESCRIPTION OF WORK**

- A. This section specifies administrative and procedural requirements for submittals required to achieve the specified NE CHPS Certification.

**1.3 RELATED WORK**

- A. Examine Contract Documents for requirements that affect the work of the sections. Other Specification Sections that relate directly to work of the sections include, but are not limited to:

1. Sections 013300 “Submittal Procedures” for General submittal requirements.
2. Section 017700 “Closeout Procedures” for Closeout submittals.

**1.5 SUBMITTAL REQUIREMENTS FOR COMMISSIONING****A. Normal Submittals:**

1. The Commissioning Authority will receive a copy of the approved submittals for equipment to be commissioned:
2. The Commissioning Authority will review approved submittals applicable to systems being commissioned for compliance with commissioning needs.

**B. Data for Commissioning:**

1. The Commissioning Authority may request documentation necessary for the commissioning process.
2. This may include detailed manufacturer installation and start-up, operating, Troubleshooting and maintenance procedures, full details of any owner-contracted tests, fan and pump curves, full factory testing reports, if any, and full warranty information including all responsibilities of the Owner to keep the warranty in force clearly identified. The actual field checkout sheet forms to be used by the factory technicians shall be provided to the Commissioning Authority.

- C Contractor’s responsibility for the deviations in submittals from requirements of the Contract Documents is not relieved by the Commissioning Authority’s review.

**PART 2 – PRODUCTS (Not Used)****PART 3 – EXECUTION (Not Used)**

END OF SECTION 01 33 29

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**SECTION 01 40 00 - QUALITY REQUIREMENTS****PART 1 - GENERAL****1.1 RELATED DOCUMENTS**

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

**1.2 SUMMARY**

- A. This Section includes administrative and procedural requirements for quality assurance and quality control.
- B. Testing and inspecting services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.
  - 1. Specific quality-assurance and -control requirements for individual construction activities are specified in the Sections that specify those activities. Requirements in those Sections may also cover production of standard products.
  - 2. Specified tests, inspections, and related actions do not limit Contractor's other quality-assurance and -control procedures that facilitate compliance with the Contract Document requirements.
  - 3. Requirements for Contractor to provide quality-assurance and -control services required by Architect, Owner, or authorities having jurisdiction are not limited by provisions of this Section.
- C. The Contractor is responsible for the overall quality of all its own work and the work performed by the subcontractors working under this contract. The quality of any part of the work installed must not be less than that required by the contract documents. If the Architect or Owner determines that the quality of work does not conform to the applicable specifications and drawings, the contractor will be advised in writing of the areas of nonconformance and within 24 hours the contractor must correct the deficiencies and advise the Civil Engineer and Owner in writing of the corrective action taken.
- D. Related Sections include the following:
  - 1. Sections 02 through 26 for specific test and inspection requirements.

**1.3 DEFINITIONS**

- A. **Quality-Assurance Services:** Activities, actions, and procedures performed before and during execution of the Work to guard against defects and deficiencies and substantiate that proposed construction will comply with requirements.
- B. **Quality-Control Services:** Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate those actual products incorporated into the Work and completed construction comply with requirements. Services do not include contract enforcement activities performed by Architect.

- C. Preconstruction Testing: Tests and inspections performed specifically for Project before products and materials are incorporated into the Work, to verify performance or compliance with specified criteria.
- D. Product Testing: Tests and inspections that are performed by an NRTL, an NVLAP, or a testing agency qualified to conduct product testing and acceptable to authorities having jurisdiction, to establish product performance and compliance with industry standards.
- E. Source Quality-Control Testing: Tests and inspections that are performed at the source, i.e., plant, mill, factory, or shop.
- F. Field Quality-Control Testing: Tests and inspections that are performed on-site for installation of the Work and for completed Work.
- G. Testing Agency: An entity engaged to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency.
- H. Installer/Applicator/Erector: Contractor or another entity engaged by Contractor as an employee, Subcontractor, or Sub-subcontractor, to perform a particular construction operation, including installation, erection, application, and similar operations.
  - 1. Using a term such as "carpentry" does not 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 tradespeople of the corresponding generic name.
- I. Experienced: When used with an entity or individual, "experienced" means having successfully completed a minimum of five previous projects similar in nature, size, and extent to this Project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction. If individual specification sections require a higher minimum experience requirement that requirement shall supersede this subparagraph.

#### 1.4 CONFLICTING REQUIREMENTS

- A. General: If compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer uncertainties and requirements that are different, but apparently equal, to Architect for a decision before proceeding.
- B. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to Architect for a decision before proceeding.

#### 1.5 ACTION SUBMITTALS

- A. Shop Drawings: For integrated exterior mockups, provide plans, sections, and elevations, indicating materials and size of mockup construction.
  - 1. Indicate manufacturer and model number of individual components.
  - 2. Provide axonometric drawings for conditions difficult to illustrate in two dimensions.

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## 1.6 INFORMATIONAL SUBMITTALS

- A. Contractor's Quality-Control Plan: For quality-assurance and quality-control activities and responsibilities.
- B. Qualification Data : For Contractor's quality-control personnel.
- C. Contractor's Statement of Responsibility: When required by applicable building code, authorities having jurisdiction, or the contract documents submit copy of written statement of responsibility sent to authorities having jurisdiction before starting work on the following systems:
  - 1. Seismic-force-resisting system, designated seismic system, or component listed in the designated seismic system quality-assurance plan prepared by Architect.
  - 2. Main wind-force-resisting system or a wind-resisting component listed in the wind-force-resisting system quality-assurance plan prepared by Architect.
- D. Testing Agency Qualifications: For testing agencies specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include proof of qualifications in the form of a recent report on the inspection of the testing agency by a recognized authority.
- E. Schedule of Tests and Inspections: Prepare in tabular form and include the following:
  - 1. Specification Section number and title.
  - 2. Entity responsible for performing tests and inspections.
  - 3. Description of test and inspection.
  - 4. Identification of applicable standards.
  - 5. Identification of test and inspection methods.
  - 6. Number of tests and inspections required.
  - 7. Time schedule or time span for tests and inspections.
  - 8. Requirements for obtaining samples.
  - 9. Unique characteristics of each quality-control service.
- F. Reports: Prepare and submit certified written reports that include the following:
  - 1. Date of issue.
  - 2. Project title and number.
  - 3. Name, address, and telephone number of testing agency.
  - 4. Dates and locations of samples and tests or inspections.
  - 5. Names of individuals making tests and inspections.
  - 6. Description of the Work and test and inspection method.
  - 7. Identification of product and Specification Section.
  - 8. Complete test or inspection data.
  - 9. Test and inspection results and an interpretation of test results.
  - 10. Record of temperature and weather conditions at time of sample taking and testing and inspecting.
  - 11. Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements.
  - 12. Name and signature of laboratory inspector.
  - 13. Recommendations on retesting and reinspecting.
- G. Permits, Licenses, and Certificates: For Owner's records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents, established for compliance with standards and regulations bearing on performance of the Work.

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## 1.7 QUALITY ASSURANCE

- A. General: Qualifications paragraphs in this Article establish the minimum qualification levels required; individual Specification Sections specify additional requirements.
- B. Installer Qualifications: A firm or individual experienced in installing, erecting, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.
- C. Manufacturer Qualifications: A firm experienced in manufacturing products or systems similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
- D. Fabricator Qualifications: A firm experienced in producing products similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
- E. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of the system, assembly, or product that is similar to those indicated for this Project in material, design, and extent.
- F. Specialists: Certain sections of the Specifications require that specific construction activities shall be performed by entities who are recognized experts in those operations. Specialists shall satisfy qualification requirements indicated and shall be engaged for the activities indicated.
  - 1. Requirement for specialists shall not supersede building codes and regulations governing the Work.
- G. Testing Agency Qualifications: An NRTL, an NVLAP, or an independent agency with the experience and capability to conduct testing and inspecting indicated, as documented according to ASTM E 548; and with additional qualifications specified in individual Sections; and where required by authorities having jurisdiction, that is acceptable to authorities.
  - 1. NRTL: A nationally recognized testing laboratory according to 29 CFR 1910.7.
  - 2. NVLAP: A testing agency accredited according to NIST's National Voluntary Laboratory Accreditation Program.
- H. Factory-Authorized Service Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.
- I. Preconstruction Testing: Where testing agency is indicated to perform preconstruction testing for compliance with specified requirements for performance and test methods, comply with the following:
  - 1. Contractor responsibilities include the following:
    - a. Provide test specimens representative of proposed products and construction.
    - b. Submit specimens in a timely manner with sufficient time for testing and analyzing results to prevent delaying the Work.
    - c. Provide sizes and configurations of test assemblies, mockups, and laboratory mockups to adequately demonstrate capability of products to comply with performance requirements.
    - d. Build site-assembled test assemblies and mockups using installers who will perform same tasks for Project.

- e. Build laboratory mockups at testing facility using personnel, products, and methods of construction indicated for the completed Work.
  - f. When testing is complete, remove test specimens, assemblies, mockups, and laboratory mockups; do not reuse products on Project.
2. Testing Agency Responsibilities: Submit a certified written report of each test, inspection, and similar quality-assurance service to Civil Engineer, with copy to Contractor. Interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from the Contract Documents.
- J. Integrated Exterior Mockups: Construct integrated exterior mockup as indicated on Drawings. Coordinate installation of exterior envelope materials and products for which mockups are required in individual Specification Sections, along with supporting materials.

## 1.8 QUALITY CONTROL

- A. Special Tests and Inspections: Owner will engage a qualified testing agency and special inspector to conduct special tests and inspections per the requirements of Chapter 17 of the Rhode Island State Building Code as the responsibility of the Owner to this Section and as follows:
1. Verifying that manufacturer maintains detailed fabrication and quality-control procedures and reviewing the completeness and adequacy of those procedures to perform the Work.
  2. Notifying Civil Engineer and Contractor promptly of irregularities and deficiencies observed in the Work during performance of its services.
  3. Submitting a certified written report of each test, inspection, and similar quality-control service to Civil Engineer with copy to Contractor and to authorities having jurisdiction.
  4. Submitting a final report of special tests and inspections at Substantial Completion, which includes a list of unresolved deficiencies.
  5. Interpreting tests and inspections and stating in each report whether tested and inspected work complies with or deviates from the Contract Documents.
  6. Retesting and reinspecting corrected work. Costs for retesting and reinspecting construction that replaces or is necessitated by work that failed to comply with the Contract Documents will be charged to Contractor.
- B. Owner will furnish Contractor with names, addresses, and telephone numbers of testing agencies engaged and a description of types of testing and inspecting they are engaged to perform.
- C. Tests and inspections not explicitly assigned to Owner are Contractor's responsibility. Unless otherwise indicated, provide quality-control services specified and those required by authorities having jurisdiction. Perform quality-control services required of Contractor by authorities having jurisdiction, whether specified or not.
1. Where services are indicated as Contractor's responsibility, engage a qualified testing agency to perform these quality-control services.
    - a. Contractor shall not employ same entity engaged by Owner, unless agreed to in writing by Owner.
  2. Notify testing agencies at least 24 hours in advance of time when work that requires testing or inspecting will be performed.
  3. Where quality-control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality-control service.
  4. Testing and inspecting requested by Contractor and not required by the Contract Documents are Contractor's responsibility.

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5. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.
- D. **Manufacturer's Field Services:** Where indicated, engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including service connections. Report results in writing as specified in Division 1 Section "Submittal Procedures."
  - E. **Retesting/Reinspecting:** Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including retesting and reinspecting, for construction that replaced Work that failed to comply with the Contract Documents.
    1. All costs associated with retesting shall be the responsibility of the Contractor.
  - F. **Testing Agency Responsibilities:** Cooperate with Architect and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.
    1. Notify Architect and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
    2. Determine the location from which test samples will be taken and in which in-situ tests are conducted.
    3. Conduct and interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from requirements.
    4. Submit a certified written report, in duplicate, of each test, inspection, and similar quality-control service through Contractor.
    5. Do not release, revoke, alter, or increase the Contract Document requirements or approve or accept any portion of the Work.
    6. Do not perform any duties of Contractor.
  - G. **Associated Services:** Cooperate with Owner's special inspector, testing agency and other agencies performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:
    1. Access to the Work.
    2. Incidental labor and facilities necessary to facilitate tests and inspections.
    3. Adequate quantities of representative samples of materials that require testing and inspecting. Assist agency in obtaining samples.
    4. Facilities for storage and field curing of test samples.
    5. Delivery of samples to testing agencies.
    6. Preliminary design mix proposed for use for material mixes that require control by testing agency.
    7. Security and protection for samples and for testing and inspecting equipment at Project site.
  - H. **Coordination:** Coordinate sequence of activities to accommodate required quality-assurance and -control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.
    1. Schedule times for tests, inspections, obtaining samples, and similar activities.

## PART 2 - PRODUCTS (Not Used)

## PART 3 - EXECUTION

## 3.1 TEST AND INSPECTION LOG

- A. Prepare a record of tests and inspections. Include the following:
  - 1. Date test or inspection was conducted.
  - 2. Description of the Work tested or inspected.
  - 3. Date test or inspection results were transmitted to Civil Engineer.
  - 4. Identification of testing agency or special inspector conducting test or inspection.
- B. Maintain log at Project site. Post changes and modifications as they occur. Provide access to test and inspection log for Architect's and Owner's Project Manager reference during normal working hours.

## 3.2 REPAIR AND PROTECTION

- A. General: On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes.
  - 1. Provide materials and comply with installation requirements specified in other Specification Sections. Restore patched areas and extend restoration into adjoining areas with durable seams that are as invisible as possible.
  - 2. Comply with the Contract Document requirements for cutting and patching in Division 01 Section "Execution."
- B. Protect construction exposed by or for quality-control service activities.
- C. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.

END OF SECTION 01 40 00



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**SECTION 01 42 00 - REFERENCES****PART 1 - GENERAL****1.1 RELATED DOCUMENTS**

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

**1.2 DEFINITIONS**

- A. General: Basic Contract definitions are included in the Conditions of the Contract.
- B. "Approved": When used to convey Architect's action on Contractor's submittals, applications, and requests, "approved" is limited to Architect's duties and responsibilities as stated in the Conditions of the Contract.
- C. "Directed": A command or instruction by Architect. Other terms including "requested," "authorized," "selected," "required," and "permitted" have the same meaning as "directed."
- D. "Indicated": Requirements expressed by graphic representations or in written form on Drawings, in Specifications, and in other Contract Documents. Other terms including "shown," "noted," "scheduled," and "specified" have the same meaning as "indicated."
- E. "Regulations": Laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, and rules, conventions, and agreements within the construction industry that control performance of the Work.
- F. "Furnish": Supply and deliver to Project site, ready for unloading, unpacking, assembly, installation, and similar operations.
- G. "Install": Operations at Project site including unloading, temporarily storing, unpacking, assembling, erecting, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations.
- H. "Provide": Furnish and install, complete and ready for the intended use.
- I. "Project Site": Space available for performing construction activities. The extent of Project site is shown on Drawings and may or may not be identical with the description of the land on which Project is to be built.

**1.3 INDUSTRY STANDARDS**

- A. Applicability of Standards: Unless the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.
- B. Publication Dates: Comply with standards in effect as of date of the Contract Documents unless otherwise indicated.

- C. Copies of Standards: Each entity engaged in construction on Project should be familiar with industry standards applicable to its construction activity. Copies of applicable standards are not bound with the Contract Documents.
1. Where copies of standards are needed to perform a required construction activity, obtain copies directly from publication source.

#### 1.4 ABBREVIATIONS AND ACRONYMS

- A. Industry Organizations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities indicated in Thomson Gale's "Encyclopedia of Associations" or in Columbia Books' "National Trade & Professional Associations of the U.S."
- B. Industry Organizations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. Names, telephone numbers, and Web sites are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents

AA	Aluminum Association (The) www.aluminum.org	(703) 358-2960
AABC	Associated Air Balance Council www.aabchq.com	(202) 737-0202
AAMA	American Architectural Manufacturers Association www.aamanet.org	(847) 303-5664
AASHTO	American Association of State Highway and Transportation Officials www.transportation.org	(202) 624-5800
AATCC	American Association of Textile Chemists and Colorists www.aatcc.org	(919) 549-8141
ABAA	Air Barrier Association of America www.airbarrier.org	(866) 956-5888
ABMA	American Bearing Manufacturers Association www.abma-dc.org	(202) 367-1155
ACI	American Concrete Institute www.concrete.org	(248) 848-3700
ACPA	American Concrete Pipe Association www.concrete-pipe.org	(972) 506-7216
AEIC	Association of Edison Illuminating Companies, Inc. (The) www.aeic.org	(205) 257-2530
AF&PA	American Forest & Paper Association www.afandpa.org	(800) 878-8878 (202) 463-2700
AGA	American Gas Association www.aga.org	(202) 824-7000

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AHAM	Association of Home Appliance Manufacturers www.aham.org	(202) 872-5955
AHRI	Air-Conditioning, Heating, and Refrigeration Institute, The www.ahrinet.org	(703) 524-8800
AI	Asphalt Institute www.asphaltinstitute.org	(859) 288-4960
AIA	American Institute of Architects (The) www.aia.org	(800) 242-3837 (202) 626-7300
AISC	American Institute of Steel Construction www.aisc.org	(800) 644-2400 (312) 670-2400
AISI	American Iron and Steel Institute www.steel.org	(202) 452-7100
AITC	American Institute of Timber Construction www.aitc-glulam.org	(303) 792-9559
ALSC	American Lumber Standard Committee, Incorporated www.alsc.org	(301) 972-1700
AMCA	Air Movement and Control Association International, Inc. www.amca.org	(847) 394-0150
ANSI	American National Standards Institute www.ansi.org	(202) 293-8020
AOSA	Association of Official Seed Analysts, Inc. www.aosaseed.com	(405) 780-7372
APA	APA - The Engineered Wood Association www.apawood.org	(253) 565-6600
APA	Architectural Precast Association www.archprecast.org	(239) 454-6989
API	American Petroleum Institute www.api.org	(202) 682-8000
ARI	Air-Conditioning & Refrigeration Institute www.ari.org	(703) 524-8800
ARMA	Asphalt Roofing Manufacturers Association www.asphaltroofing.org	(202) 207-0917
ASCE	American Society of Civil Engineers www.asce.org	(800) 548-2723 (703) 295-6300
ASCE/SEI	American Society of Civil Engineers/Structural Engineering Institute (See ASCE)	
ASHRAE	American Society of Heating, Refrigerating and Air-	(800) 527-4723

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	Conditioning Engineers www.ashrae.org	(404) 636-8400
ASME	ASME International (American Society of Mechanical Engineers International) www.asme.org	(800) 843-2763 (973) 882-1170
ASSE	American Society of Sanitary Engineering www.asse-plumbing.org	(440) 835-3040
ASTM	ASTM International (American Society for Testing and Materials International) www.astm.org	(610) 832-9500
ATIS	Alliance for Telecommunications Industry Solutions www.atis.org	(202) 628-6380
AWCMA	American Window Covering Manufacturers Association (Now WCMA)	
AWCI	Association of the Wall and Ceiling Industry www.awci.org	(703) 534-8300
AWI	Architectural Woodwork Institute www.awinet.org	(571) 323-3636
AWPA	American Wood Protection Association (Formerly: American Wood Preservers' Association) www.awpa.com	(205) 733-4077
AWS	American Welding Society www.aws.org	(800) 443-9353 (305) 443-9353
AWWA	American Water Works Association www.awwa.org	(800) 926-7337 (303) 794-7711
BHMA	Builders Hardware Manufacturers Association www.buildershardware.com	(212) 297-2122
BIA	Brick Industry Association (The) www.bia.org	(703) 620-0010
BICSI	BICSI, Inc. www.bicsi.org	(800) 242-7405 (813) 979-1991
BIFMA	BIFMA International (Business and Institutional Furniture Manufacturer's Association International) www.bifma.com	(616) 285-3963
BISSC	Baking Industry Sanitation Standards Committee www.bissc.org	(866) 342-4772
CCC	Carpet Cushion Council www.carpetcushion.org	(610) 527-3880
CDA	Copper Development Association	(800) 232-3282

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	www.copper.org	(212) 251-7200
CEA	Canadian Electricity Association www.canelect.ca	(613) 230-9263
CEA	Consumer Electronics Association www.ce.org	(866) 858-1555 (703) 907-7600
CFFA	Chemical Fabrics & Film Association, Inc. www.chemicalfabricsandfilm.com	(216) 241-7333
CGA	Compressed Gas Association www.cganet.com	(703) 788-2700
CIMA	Cellulose Insulation Manufacturers Association www.cellulose.org	(888) 881-2462 (937) 222-2462
CISCA	Ceilings & Interior Systems Construction Association www.cisca.org	(630) 584-1919
CISPI	Cast Iron Soil Pipe Institute www.cispi.org	(423) 892-0137
CLFMI	Chain Link Fence Manufacturers Institute www.chainlinkinfo.org	(301) 596-2583
CPA	Composite Panel Association www.pbmdf.com	(703) 724-1128
CRI	Carpet and Rug Institute (The) www.carpet-rug.com	(800) 882-8846 (706) 278-3176
CRRC	Cool Roof Rating Council www.coolroofs.org	(866) 465-2523 (510) 485-7175
CRSI	Concrete Reinforcing Steel Institute www.crsi.org	(847) 517-1200 (800) 328-6306
CRRC	Cool Roof Rating Council www.coolroofs.org	(866) 465-2523 (510) 485-7175
CSA	Canadian Standards Association www.csa.ca	(800) 463-6727 (416) 747-4000
CSA	CSA International (Formerly: IAS - International Approval Services) www.csa-international.org	(866) 797-4272 (416) 747-4000
CSI	Construction Specifications Institute (The) www.csinet.org	(800) 689-2900 (703) 684-0300
CSSB	Cedar Shake & Shingle Bureau www.cedarbureau.org	(604) 820-7700
CTI	Cooling Technology Institute (Formerly: Cooling Tower Institute) www.cti.org	(281) 583-4087

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DHI	Door and Hardware Institute www.dhi.org	(703) 222-2010
ECA	Electrical Components Association www.ec-central.org	(703)907-8024
EIA	Electronic Industries Alliance www.eia.org	(703) 907-7500
EIMA	EIFS Industry Members Association www.eima.com	(800) 294-3462 (770) 968-7945
EJCDC	Engineers Joint Contract Documents Committee <a href="http://content.asce.org/ejcdc/">http://content.asce.org/ejcdc/</a>	(703) 295-6000
EJMA	Expansion Joint Manufacturers Association, Inc. www.ejma.org	(914) 332-0040
ESD	ESD Association (Electrostatic Discharge Association) www.esda.org	(315) 339-6937
ETL SEMCO	Intertek ETL SEMCO (Formerly: ITS - Intertek Testing Service NA) www.intertek-etlsemko.com	(800) 967-5352
FIBA	Federation Internationale de Basketball (The International Basketball Federation) www.fiba.com	41 22 545 00 00
FIVB	Federation Internationale de Volleyball (The International Volleyball Federation) www.fivb.ch	41 21 345 35 35
FM Approvals	FM Approvals LLC www.fmglobal.com	(781) 762-4300
FM Global	FM Global (Formerly: FMG - FM Global) www.fmglobal.com	(401) 275-3000
FRSA	Florida Roofing, Sheet Metal & Air Conditioning Contractors Association, Inc. www.floridarroof.com	(407) 671-3772
FSA	Fluid Sealing Association www.fluidsealing.com	(610) 971-4850
FSC	Forest Stewardship Council www.fsc.org	49 228 367 66 0
GA	Gypsum Association www.gypsum.org	(301) 277-8686
GANA	Glass Association of North America www.glasswebsite.com	(785) 271-0208

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GRI	(Part of GSI)	
GS	Green Seal <a href="http://www.greenseal.org">www.greenseal.org</a>	(202) 872-6400
GSI	Geosynthetic Institute <a href="http://www.geosynthetic-institute.org">www.geosynthetic-institute.org</a>	(610) 522-8440
HI	Hydronics Institute <a href="http://www.gamanet.org">www.gamanet.org</a>	(908) 464-8200
HI/GAMA	Hydronics Institute/Gas Appliance Manufacturers Association Division of Air-Conditioning, Heating, and Refrigeration Institute (AHRI) <a href="http://www.ahrinet.org">www.ahrinet.org</a>	(908) 464-8200
HMMA	Hollow Metal Manufacturers Association (Part of NAAMM)	
HPVA	Hardwood Plywood & Veneer Association <a href="http://www.hpva.org">www.hpva.org</a>	(703) 435-2900
HPW	H. P. White Laboratory, Inc. <a href="http://www.hpwhite.com">www.hpwhite.com</a>	(410) 838-6550
IAPSC	International Association of Professional Security Consultants <a href="http://www.iapsc.org">www.iapsc.org</a>	(515) 282-8192
ICBO	International Conference of Building Officials <a href="http://www.iccsafe.org">www.iccsafe.org</a>	(888) 422-7233
ICEA	Insulated Cable Engineers Association, Inc. <a href="http://www.icea.net">www.icea.net</a>	(770) 830-0369
ICRI	International Concrete Repair Institute, Inc. <a href="http://www.icri.org">www.icri.org</a>	(847) 827-0830
ICPA	International Cast Polymer Association <a href="http://www.icpa-hq.org">www.icpa-hq.org</a>	(703) 525-0320
IEC	International Electrotechnical Commission <a href="http://www.iec.ch">www.iec.ch</a>	41 22 919 02 11
IEEE	Institute of Electrical and Electronics Engineers, Inc. (The) <a href="http://www.ieee.org">www.ieee.org</a>	(212) 419-7900
IES	Illuminating Engineering Society of North America <a href="http://www.iesna.org">www.iesna.org</a>	(703) 525-0320
IEST	Institute of Environmental Sciences and Technology <a href="http://www.iest.org">www.iest.org</a>	(847) 255-1561
IGMA	Insulating Glass Manufacturers Alliance <a href="http://www.igmaonline.org">www.igmaonline.org</a>	(613) 233-1510
ILI	Indiana Limestone Institute of America, Inc.	(812) 275-4426

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	www.iliai.com	
ISA	Instrumentation, Systems, and Automation Society, The www.isa.org	(919) 549-8411
ISO	International Organization for Standardization www.iso.ch	41 22 749 01 11
ISSFA	International Solid Surface Fabricators Association www.issfa.net	(877) 464-7732 (801) 341-7360
ITS	Intertek Testing Service NA (Now ETL SEMCO)	
ITU	International Telecommunication Union www.itu.int/home	41 22 730 51 11
KCMA	Kitchen Cabinet Manufacturers Association www.kcma.org	(703) 264-1690
LGSEA	Light Gauge Steel Engineers Association www.arcat.com	(202) 263-4488
LMA	Laminating Materials Association (Now part of CPA)	
LPI	Lightning Protection Institute www.lightning.org	(800) 488-6864
MBMA	Metal Building Manufacturers Association www.mbma.com	(216) 241-7333
MCA	Metal Construction Association www.metalconstruction.org	(847) 375-4718
MFMA	Maple Flooring Manufacturers Association, Inc. www.maplefloor.org	(888) 480-9138
MFMA	Metal Framing Manufacturers Association, Inc. www.metalframingmfg.org	(312) 644-6610
MH	Material Handling (Now MHIA)	
MHIA	Material Handling Industry of America www.mhia.org	(800) 345-1815 (704) 676-1190
MIA	Marble Institute of America www.marble-institute.com	(440) 250-9222
MPI	Master Painters Institute www.paintinfo.com	(888) 674-8937 (604) 298-7578
MSS	Manufacturers Standardization Society of The Valve and Fittings Industry Inc. www.mss-hq.com	(703) 281-6613



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NAAMM	National Association of Architectural Metal Manufacturers www.naamm.org	(630) 942-6591
NACE	NACE International (National Association of Corrosion Engineers International) www.nace.org	(800) 797-6223 (281) 228-6200
NADCA	National Air Duct Cleaners Association www.nadca.com	(202) 737-2926
NAGWS	National Association for Girls and Women in Sport  www.aahperd.org/nagws/	(800) 213-7193, ext. 453
NAIMA	North American Insulation Manufacturers Association www.naima.org	(703) 684-0084
NBGQA	National Building Granite Quarries Association, Inc. www.nbgqa.com	(800) 557-2848
NCAA	National Collegiate Athletic Association (The) www.ncaa.org	(317) 917-6222
NCMA	National Concrete Masonry Association www.ncma.org	(703) 713-1900
NCTA	National Cable & Telecommunications Association www.ncta.com	(202) 222-2300
NEBB	National Environmental Balancing Bureau www.nebb.org	(301) 977-3698
NECA	National Electrical Contractors Association www.necanet.org	(301) 657-3110
NeLMA	Northeastern Lumber Manufacturers' Association www.nelma.org	(207) 829-6901
NEMA	National Electrical Manufacturers Association www.nema.org	(703) 841-3200
NETA	InterNational Electrical Testing Association www.netaworld.org	(888) 300-6382 (269) 488-6382
NFHS	National Federation of State High School Associations www.nfhs.org	(317) 972-6900
NFPA	NFPA (National Fire Protection Association) www.nfpa.org	(800) 344-3555 (617) 770-3000
NFRC	National Fenestration Rating Council www.nfrc.org	(301) 589-1776
NGA	National Glass Association www.glass.org	(866) 342-5642 (703) 442-4890

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NHLA	National Hardwood Lumber Association <a href="http://www.natlhardwood.org">www.natlhardwood.org</a>	(800) 933-0318 (901) 377-1818
NLGA	National Lumber Grades Authority <a href="http://www.nlga.org">www.nlga.org</a>	(604) 524-2393
NOFMA	NOFMA: The Wood Flooring Manufacturers Association (Formerly: National Oak Flooring Manufacturers Association) <a href="http://www.nofma.org">www.nofma.org</a>	(901) 526-5016
NOMMA	National Ornamental & Miscellaneous Metals Association <a href="http://www.nomma.org">www.nomma.org</a>	(888) 516-8585
NRCA	National Roofing Contractors Association <a href="http://www.nrca.net">www.nrca.net</a>	(800) 323-9545 (847) 299-9070
NRMCA	National Ready Mixed Concrete Association <a href="http://www.nrmca.org">www.nrmca.org</a>	(888) 846-7622 (301) 587-1400
NSF	NSF International (National Sanitation Foundation International) <a href="http://www.nsf.org">www.nsf.org</a>	(800) 673-6275 (734) 769-8010
NSSGA	National Stone, Sand & Gravel Association <a href="http://www.nssga.org">www.nssga.org</a>	(800) 342-1415 (703) 525-8788
NTMA	National Terrazzo & Mosaic Association, Inc. (The) <a href="http://www.ntma.com">www.ntma.com</a>	(800) 323-9736 (540) 751-0930
NWFA	National Wood Flooring Association <a href="http://www.nwfa.org">www.nwfa.org</a>	(800) 422-4556 (636) 519-9663
PCI	Precast/Prestressed Concrete Institute <a href="http://www.pci.org">www.pci.org</a>	(312) 786-0300
PDI	Plumbing & Drainage Institute <a href="http://www.pdionline.org">www.pdionline.org</a>	(800) 589-8956 (978) 557-0720
PGI	PVC Geomembrane Institute <a href="http://pgi-tp.cee.uiuc.edu">http://pgi-tp.cee.uiuc.edu</a>	(217) 333-3929
PTI	Post-Tensioning Institute <a href="http://www.post-tensioning.org">www.post-tensioning.org</a>	(248) 848-3180
RCSC	Research Council on Structural Connections <a href="http://www.boltcouncil.org">www.boltcouncil.org</a>	
RFCI	Resilient Floor Covering Institute <a href="http://www.rfci.com">www.rfci.com</a>	(706) 882-3833
RIS	Redwood Inspection Service <a href="http://www.redwoodinspection.com">www.redwoodinspection.com</a>	(925) 935-1499
SAE	SAE International <a href="http://www.sae.org">www.sae.org</a>	(877) 606-7323 (724) 776-4841
SCAQMD	South Coast Air Quality Management District	(909) 396-2000

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	www.aqmd.com	
SCTE	Society of Cable Telecommunications Engineers www.scte.org	(800) 542-5040 (610) 363-6888
SDI	Steel Deck Institute www.sdi.org	(847) 458-4647
SDI	Steel Door Institute www.steeldoor.org	(440) 899-0010
SEFA	Scientific Equipment and Furniture Association www.sefalabs.com	(877) 294-5424 (516) 294-5424
SEI/ASCE	Structural Engineering Institute/American Society of Civil Engineers (See ASCE)	
SIA	Security Industry Association www.siaonline.org	(866) 817-8888 (703) 683-2075
SJI	Steel Joist Institute www.steeljoist.org	(843) 626-1995
SMA	Screen Manufacturers Association www.smacentral.org	(561) 533-0991
SMACNA	Sheet Metal and Air Conditioning Contractors' National Association www.smacna.org	(703) 803-2980
SMPTE	Society of Motion Picture and Television Engineers www.smpte.org	(914) 761-1100
SPFA	Spray Polyurethane Foam Alliance (Formerly: SPI/SPFD - The Society of the Plastics Industry, Inc.; Spray Polyurethane Foam Division) www.sprayfoam.org	(800) 523-6154
SPIB	Southern Pine Inspection Bureau (The) www.spib.org	(850) 434-2611
SPRI	Single Ply Roofing Industry www.spri.org	(781) 647-7026
SSINA	Specialty Steel Industry of North America www.ssina.com	(800) 982-0355 (202) 342-8630
SSPC	SSPC: The Society for Protective Coatings www.sspc.org	(877) 281-7772 (412) 281-2331
STI	Steel Tank Institute www.steeltank.com	(847) 438-8265
SWI	Steel Window Institute www.steelwindows.com	(216) 241-7333

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SWPA	Submersible Wastewater Pump Association www.swpa.org	(847) 681-1868
TCA	Tilt-Up Concrete Association www.tilt-up.org	(319) 895-6911
TCNA	Tile Council of North America, Inc. www.tileusa.com	(864) 646-8453
TEMA	Tubular Exchanger Manufacturers Association www.tema.org	(914) 332-0040
TIA/EIA	Telecommunications Industry Association/Electronic Industries Alliance www.tiaonline.org	(703) 907-7700
TMS	The Masonry Society www.masonrysociety.org	(303) 939-9700
TPI	Truss Plate Institute, Inc. www.tpinst.org	(703) 683-1010
TPI	Turfgrass Producers International www.turfgrasssod.org	(800) 405-8873 (847) 649-5555
TRI	Tile Roofing Institute www.tilerroofing.org	(312) 670-4177
UL	Underwriters Laboratories Inc. www.ul.com	(877) 854-3577 (847) 272-8800
UNI	Uni-Bell PVC Pipe Association www.uni-bell.org	(972) 243-3902
USAV	USA Volleyball www.usavolleyball.org	(888) 786-5539 (719) 228-6800
USGBC	U.S. Green Building Council www.usgbc.org	(800) 795-1747
USITT	United States Institute for Theatre Technology, Inc. www.usitt.org	(800) 938-7488 (315) 463-6463
WASTEC	Waste Equipment Technology Association www.wastec.org	(800) 424-2869 (202) 244-4700
WCLIB	West Coast Lumber Inspection Bureau www.wclib.org	(800) 283-1486 (503) 639-0651
WCMA	Window Covering Manufacturers Association www.wcmanet.org	(212) 297-2122
WDMA	Window & Door Manufacturers Association (Formerly: NWWDA - National Wood Window and Door Association) www.wdma.com	(800) 223-2301 (312) 321-6802

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WI	Woodwork Institute (Formerly: WIC - Woodwork Institute of California) www.wicnet.org	(916) 372-9943
WMMPA	Wood Moulding & Millwork Producers Association www.wmmpa.com	(800) 550-7889 (530) 661-9591
WSRCA	Western States Roofing Contractors Association www.wsrca.com	(800) 725-0333 (650) 570-5441
WWPA	Western Wood Products Association www.wwpa.org	(503) 224-3930

C. Code Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. Names, telephone numbers, and Web sites are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents

DIN	Deutsches Institut fur Normung e.V. www.din.de	49 30 2601-0
IAPMO	International Association of Plumbing and Mechanical Officials www.iapmo.org	(909) 472-4100
ICC	International Code Council www.iccsafe.org	(888) 422-7233
ICC-ES	ICC Evaluation Service, Inc. www.icc-es.org	(800) 423-6587 (562) 699-0543

D. Standards and Regulations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the standards and regulations in the following list. Names, telephone numbers, and Web sites are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.

ADAAG	Americans with Disabilities Act (ADA) Architectural Barriers Act (ABA) Accessibility Guidelines for Buildings and Facilities Available from U.S. Access Board www.access-board.gov	(800) 872-2253 (202) 272-0080
CFR	Code of Federal Regulations Available from Government Printing Office www.gpoaccess.gov/cfr/index.html	(866) 512-1800 (202) 512-1800
FS	Federal Specification Available from Department of Defense Single Stock Point http://dodssp.daps.dla.mil/ Available from Defense Standardization Program	(215) 697-2664

[www.dsp.dla.mil](http://www.dsp.dla.mil)

Available from General Services Administration

(202) 619-  
8925

[www.gsa.gov](http://www.gsa.gov)

Available from National Institute of Building Sciences

(202) 289-  
7800

[www.wbdg.org/ccb](http://www.wbdg.org/ccb)

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 42 00

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**SECTION 01 50 00 - TEMPORARY FACILITIES AND CONTROLS****PART 1 - GENERAL****1.1 RELATED DOCUMENTS**

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

**1.2 SUMMARY**

- A. Section includes requirements for temporary utilities, support facilities, and security and protection facilities.

- 1. All utilities shall be listed in the Contractor's name for the duration of the Contract or until such time Substantial Completion is reached and approved by the Owner.

- A. Temporary utilities include, but are not limited to, the following:

- 1. Water service and distribution
  - 2. Temporary electric power and light
  - 3. Temporary heat
  - 4. Ventilation
  - 5. Telephone service
  - 6. Sanitary facilities, including drinking water

- B. Support facilities include, but are not limited to, the following:

- 1. Field offices and storage sheds
  - 2. Temporary furniture storage containers
  - 3. Dewatering facilities and drains
  - 4. Temporary enclosures
  - 5. Hoisting
  - 6. Temporary project identification signs and bulletin boards
  - 7. Waste disposal services
  - 8. Rodent and pest control
  - 9. Construction aids and miscellaneous services and facilities

- C. Security and protection facilities include, but are not limited to, the following:

- 1. Temporary fire protection
  - 2. Barricades, warning signs, and lights
  - 3. Enclosure fence for the site
  - 4. Environmental protection
  - 5. Security

- D. Removal of all temporary utilities, facilities, and controls.

**1.3 DEFINITIONS**

- A. Permanent Enclosure: As determined by Architect, permanent or temporary roofing is complete, insulated, and weather tight; exterior walls are insulated and weather tight; and all openings are closed with permanent construction or substantial temporary closures.

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#### 1.4 USE CHARGES

- A. General: Installation and removal of and use charges for temporary facilities and construction shall be included in the Contract Sum unless otherwise indicated. Allow other entities to use temporary services and facilities without cost, including, but not limited to Owner, Architect, testing agencies, and authorities having jurisdiction.
- B. Sewer Service: Contractor shall provide temporary sanitary facilities. Coordinate location with Owner.
- C. Water Service: Owner will provide water-service used by all entities for construction operations as long use is limited. Should charges be considered, the Owner will notify the Contractor in writing. The Contractor shall provide their own drinking water.
- D. Electric Power Service: Owner shall pay electric-power-service use charges for electricity used by all entities for construction operations as long as use is limited. The Owner reserves the right to charge the Contractor for excessive use. Should charges be considered, the Owner will notify the Contractor in writing.
- E. Rubbish: The Contractor shall supply adequate covered waste receptacles in accordance with Section 017419 "Construction Waste Management & Disposal" for waste, debris, and rubbish. All waste receptacles must be immediately removed from the site when full. The grounds in the area of the waste receptacles must be cleaned daily and prior to moving the receptacles to another location on the project. Disposal shall be off-site in a legal dump intended for that use.

#### 1.5 INFORMATIONAL SUBMITTALS

- A. Site Plan: Show temporary facilities, utility hookups, staging areas, and parking areas for construction personnel.
- B. Fire-Safety Program: Show compliance with requirements of NFPA 241 and authorities having jurisdiction. Indicate Contractor personnel responsible for management of fire-prevention program.
- C. Moisture-Protection Plan: Describe procedures and controls for protecting materials and construction from water absorption and damage.
  - 1. Describe delivery, handling, and storage provisions for materials subject to water absorption or water damage.
  - 2. Indicate procedures for discarding water-damaged materials, protocols for mitigating water intrusion into completed Work, and replacing water-damaged Work.
  - 3. Indicate sequencing of work that requires water and describe plans for dealing with water from these operations. Show procedures for verifying that wet construction has dried sufficiently to permit installation of finish materials.
- D. Dust, Noise and HVAC-Control Plan: Submit coordination drawing and narrative that indicates the dust, noise and HVAC-control measures proposed for use, proposed locations, and proposed time frame for their operation. Identify further options if proposed measures are later determined to be inadequate. Include the following:
  - 1. Locations of dust-control partitions at each phase of work.
  - 2. HVAC system isolation schematic drawing.
  - 3. Location of proposed air-filtration system discharge.
  - 4. Waste handling procedures.
  - 5. Other dust-control measures.
  - 6. Noise control plan and coordination of noise producing activities with Owner's facility operations.



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## 1.6 QUALITY ASSURANCE

- A. Electric Service: Comply with NECA, NEMA, and UL standards and regulations for temporary electric service. Install service to comply with NFPA 70.
- B. Tests and Inspections: Arrange for authorities having jurisdiction to test and inspect each temporary utility before use. Obtain required certifications and permits.
- C. Accessible Temporary Egress: Comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines and Regulations.
- D. Regulations: Contractor shall comply with industry standards and with applicable laws and regulations of authorities having jurisdiction including, but not limited to, the following:
  - 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.
- E. Standards: Each contractor shall comply with NFPA 241 "Standard for Safeguarding Construction, Alterations, and Demolition Operations," and ANSI-A10 Series standards for "Safety Requirements for Construction and Demolition."
- F. Inspections: Arrange for authorities having jurisdiction to inspect and test each temporary utility before use. Obtain required certifications and permits.

## 1.7 PERSONNEL SECURITY

- A. Bureau of Criminal Identification (Employee Record Checks)
  - 1. The Contractor shall ensure that all parties involved in the Project are made aware of this condition of employment as there will be NO EXCEPTION to this policy.
  - 2. The Contractor shall initialize, perform (by authorized agency) the CORI check, and pay for all cost of the actual background checks.
  - 3. In projects of this scope, it has been established by the Owner, in conjunction with the advice of all local security agencies involved in Homeland Security that it is in the best interest of all parties involved in the project that everyone is subject to Bureau Criminal Identification (BCI) checks otherwise known as an Employee Record Check.
  - 4. The Contractor, all Sub-Contractors, Sub-Sub-Contractors, Vendors, Materials Suppliers, Consultants, Testing Firms, and other personnel conducting business at the project site shall provide their full name, maiden name, date of birth, and a photocopy of their valid driver's license on forms that are approved by the Owner for a BCI check on all personnel involved in the project scope. Copies of these forms will be provided to the Owner. These forms shall be fully executed by the aforementioned parties including obtaining the signature of the person (applicant) a clear copy of their driver's license and appropriate witness by a Notary Public.
  - 5. The Contractor shall provide "COMPLETED" BCI check information to the Owner for all persons involved in the project prior to mobilization on the site and will continue to submit these forms on a continuous basis (a minimum of three (3) business days before an employee is scheduled to work) throughout the project to accommodate trades and services as they mobilize during the various phases of the project. No individual will be permitted to work on site until the completed BCI form has been submitted and the employee is approved by the owner for access.
  - 6. The Contractor shall maintain a list of ALL personnel which has been submitted to the Owner for this Work every two (2) weeks, or more frequently as may be requested by the Architect and Owner.

7. It is the intent of this record check to protect the interest of all parties involved in the Project and ultimately the end user group that will occupy the Police and Fire Headquarters against possible threats of terrorism, and/or direct threats to those persons involved in the project or those that will occupy the Police and Fire Headquarters once completed. The BCI check is not intended to forbid or disqualify persons from work that have records that are minor in nature but will identify those persons that may have been involved in criminal activities that are of concern to the owner from a security overview perspective.
8. As such, only those persons approved by the owner will be allowed on site to perform work during the Project. The owner will keep all information confidential and will not disclose any information to other than the parties directly involved in the process. The lists of those employees approved will be maintained separately from those that have not.

#### 1.8 PROJECT WORK SITE SECURITY

- A. The Contractor shall protect the Work, the existing premises, and/or the Owner's operations from theft, vandalism, and unauthorized entry during the entire course of the Project.
- B. The Contractor shall initiate the program in conjunction with the Owner's program at the mobilization of the Project.
- C. The Contractor shall maintain the program throughout the construction period until Owner occupancy and appropriate transfer of Insurance has been completed.
- D. Entry Control:
  1. The Contractor shall restrict the entrance of persons and vehicles into the Project site, in accordance with the approved list of personnel.
  2. The Contractor shall allow entrance on the site only to authorized persons with the proper identification that are on the approved list.
  3. The Contractor shall maintain a log of workers and visitors, which will be available to the Owner upon request.
  4. Coordinate the access of the Architect's, Owner's personnel to the site in coordination with the Contractor's security forces.

#### 1.9 VEHICULAR ACCESS

- A. Existing locations as approved by the Owner.
- B. The Contractor shall provide unimpeded access for emergency vehicles. The Contractor shall maintain at provide minimum 20-foot width driveways with sufficient turning space between and around combustible materials.
- C. The Contractor shall provide and maintain full access to fire hydrants and maintain control valves free of any obstructions.
- D. The Contractor shall remove mud from all construction vehicle wheels before entering streets and cleanup dirt, rocks, and debris that fall on the street from construction vehicles daily. The Contractor is encouraged to clearly bring this requirement to the attention of all sub-contractors involved in the Project. The Contractor shall continuously maintain and assure that all areas of the temporary walkways, vehicle ways (sally port), and emergency egress ways that cross construction access ways are always free from dirt, mud, gravel, water, ice etc.
- E. Any vehicle or piece of equipment that is leaking oil and/or any other fluids shall promptly be repaired or otherwise removed from the site upon discovery of same. Any fluids being discharged shall be collected and legally disposed of from the time of discovery and the actual repair. Discharge into the soil, drainage systems, or stockpiled materials shall not be permitted. The Contractor shall promptly notify the proper authorities of any such discharge and shall be

responsible for the legal cleanup, abatement, and disposal that may be required as a result of the discharge.

#### 1.10 PARKING

- A. The Contractor shall park only within areas as approved by the Owner.
- B. When site space is not adequate, the Contractor shall make arrangements with the Owner for additional off-site parking as may be required to accommodate the Construction Staff. These sites may or may not be adjacent to the project construction work site. Contractor will be responsible for transporting personnel from off-site areas to work site.
  - 1. All costs for off-site parking shall be the responsibility of the Contractor and be in the base bid.
- C. Use of existing off-site streets, parking areas, and driveways is not permitted for construction traffic. Tracked vehicles are not allowed on paved areas.
- D. The Contractor shall not allow heavy vehicles or construction equipment in existing parking areas at any time.
- E. The Contractor shall designate four (4) parking spaces adjacent to construction offices for exclusive use by the Owner/Architect.
- F. Permanent Pavements and Parking Facilities:
  - 1. The Contractor shall avoid loading existing and new surfaces including, but not limited to, concrete walks, pavements, gravel lots, etc. beyond the paving design capacity. Tracked vehicles are not allowed on these surfaces.
  - 2. At no time shall the Contractor block any access route, parking area or drive through route that could endanger persons utilizing the existing facility and parking areas.

#### 1.11 MAINTENANCE OF VEHICULAR ACCESS AND PARKING AREAS:

- A. The Contractor shall maintain the traffic and parking areas in a sound condition free of excavated material, construction equipment, products, mud, snow, and ice.
- B. The Contractor shall maintain existing and permanent paved areas used for construction and promptly repair breaks, potholes, low areas, standing water, and other deficiencies to maintain the paving and drainage in the original or specified condition.

#### 1.12 PROJECT CONDITIONS

- A. Temporary Use of Permanent Facilities: Engage Installer of each permanent service to assume responsibility for operation, maintenance, and protection of each permanent service during its use as a construction facility before Owner's acceptance, regardless of previously assigned responsibilities.
- B. Weather Protection:
  - 1. Submit weather protection plan to the Architect for review. Any changes to approved plan must be approved by the Architect.
  - 2. Provide protection for all work areas affected by moisture and cold, such as building floor areas, masonry scaffolds and fabrication areas by covering, enclosing and/or heating to maintain a relatively dry work area with a minimum temperature of 40 degrees F at the working surface so as to permit a normal progression of construction work. Weather protection is not required for site work, excavation, pile driving, steel erection, roofing, and similar operations normally done in the open.

3. Provide accurate Fahrenheit thermometers for every 2,000 square feet of floor space, located as directed by the Architect.
- C. Conditions of Use: Keep temporary services and facilities clean and neat in appearance. Operate in a safe and efficient manner. Relocate temporary services and facilities as the Work progresses. Do not overload facilities or permit them to interfere with progress. Take necessary fire-prevention measures. Do not allow hazardous, dangerous, or unsanitary conditions, or public nuisances to develop or persist on-site.

## PART 2 - PRODUCTS

### 2.1 MATERIALS

- A. Portable Chain-Link Fencing: Minimum 2-inch (50-mm), 0.148-inch- (3.8-mm-) thick, galvanized-steel, chain-link fabric fencing; minimum 6 feet (1.8 m) high with galvanized-steel pipe posts; minimum 2-3/8-inch- (60-mm-) OD line posts and 2-7/8-inch- (73-mm-) OD corner and pull posts, with 1-5/8-inch- (42-mm-) OD top and bottom rails. Provide concrete bases for supporting posts.
- B. Lumber and Plywood: Comply with requirements in Division 6 Section "Rough Carpentry".
- C. Gypsum Board: Minimum **1/2 inch (12.7 mm)** thick by **48 inches (1219 mm)** wide by maximum available lengths; regular-type panels with tapered edges. Provide fire rated panels where required by code or contract documents.
- D. Steel studs shall meet the requirements of Division 9.
- E. Insulation: Unfaced mineral-fiber blanket, manufactured from glass, slag wool, or rock wool; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively.
- F. Paint: Comply with requirements in Division 9 painting Sections.

### 2.2 TEMPORARY FACILITIES

- A. Contractor's Field Office: Owner will provide space within the existing building of sufficient size to accommodate needs of Owner, Architect, Owner's Project Manager, and construction personnel office activities and to accommodate Project meetings specified in other Division 01 Sections. Keep office clean and orderly. Contractor to furnish and equip offices as follows:
  1. Furniture required for Project-site documents including file cabinets, plan tables, plan racks, and bookcases.
  2. Conference room of sufficient size to accommodate meetings of 10 individuals. Provide electrical power service and 120-V ac duplex receptacles, with no less than one receptacle on each wall. Furnish room with conference table, chairs, and 4-foot- (1.2-m-) square tack and marker boards.
  3. Drinking water.
- B. Storage and Fabrication Sheds: Provide sheds sized, furnished, and equipped to accommodate materials and equipment for construction operations.
  1. Store combustible materials apart from building.

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## 2.3 EQUIPMENT

- A. Fire Extinguishers: Portable, UL rated; with class and extinguishing agent as required by locations and classes of fire exposures.
- B. Air-Filtration Units: Primary and secondary HEPA-filter-equipped portable units with four-stage filtration. Provide single switch for emergency shutoff. Configure to run continuously.

## PART 3 - EXECUTION

### 3.1 INSTALLATION, GENERAL

- A. Locate facilities where they will serve Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required by progress of the Work.
- B. Provide each facility ready for use when needed to avoid delay. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.

### 3.2 TEMPORARY UTILITY INSTALLATION

- A. General: Install temporary service or connect to existing service.
  - 1. Arrange with utility company, Owner, and existing users for time when service can be interrupted, if necessary, to make connections for temporary services.
- B. Water Service: Connect to Owner's existing water service facilities. Clean and maintain water service facilities in a condition acceptable to Owner. At Substantial Completion, restore these facilities to condition existing before initial use.
- C. Sanitary Facilities: Provide temporary toilets, wash facilities, and drinking water for use of construction personnel. Comply with requirements of authorities having jurisdiction for type, number, location, operation, and maintenance of fixtures and facilities.
- D. Installation of Weather Protection facilities shall comply with all safety regulations including provisions for adequate ventilation and fire protection. All fabric materials used for temporary enclosure or other temporary facilities shall be fire retardant material.
- E. Ventilation and Humidity Control: Provide temporary ventilation required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of high humidity. Select equipment that will not have a harmful effect on completed installations or elements being installed. Coordinate ventilation requirements to produce ambient condition required and minimize energy consumption.
  - 1. Provide dehumidification systems when required to reduce substrate moisture levels to level required to allow installation or application of finishes.
- F. Electric Power Service: Connect to Owner's existing electric power service. Maintain equipment in a condition acceptable to Owner.
- G. Telephone Service: Provide temporary telephone service in common-use facilities for use by all construction personnel. Install two telephone line(s) for each field office.
  - 1. Provide additional telephone lines for the following:

- a. Provide a dedicated telephone line for each copy machine in each field office.
  2. At each field office telephone, post a list of important telephone numbers.
    - a. Police and fire departments.
    - b. Ambulance service.
    - c. Contractor's home office.
    - d. Contractor's emergency after-hours telephone number.
    - e. Architect's office.
    - f. Owner's office.
    - g. Principal subcontractors' field and home offices.
  3. Provide superintendent with cellular telephone or portable two-way radio for use when away from field office.
- H. Electronic Communication Service: Provide and maintain electronic communications (computer data service). Provide the following for the General Contractor field office:
1. Printer: "All-in-one" unit equipped with printer server, combining color printing, photocopying, scanning, and faxing, or separate units for each of these three functions.
  2. Internet Service: Broadband modem, router, and ISP, equipped with hardware firewall, providing minimum 15 MPS upload and 3 Mbps download speeds.

### 3.3 SUPPORT FACILITIES INSTALLATION

- A. General: Comply with the following:
1. Provide construction for temporary offices, shops, and sheds located within construction area or within 30 feet (9 m) of building lines that is noncombustible according to ASTM E 136. Comply with NFPA 241.
  2. Maintain support facilities until Architect schedules Substantial Completion inspection. Remove before Substantial Completion. Personnel remaining after Substantial Completion will be permitted to use permanent facilities, under conditions acceptable to Owner.
  3. Provide dust-control treatment that is nonpolluting and nontracking. Reapply treatment as required to minimize dust.
- B. Traffic Controls: Comply with requirements of authorities having jurisdiction.
1. Protect existing site improvements to remain including curbs, pavement, and utilities.
  2. Maintain access for fire-fighting equipment and access to fire hydrants and building standpipes.
- C. Parking: Onsite parking will be limited, use of designated areas of Owner's existing parking
- E. Project Identification and Temporary Signs: Provide Project identification and other signs. Install signs where indicated to inform public and individuals seeking entrance to Project. No other signs are permitted, except those that are required by law.
1. Provide temporary, directional signs for owner's employees and visitors going to the facility.
  2. Provide temporary, directional signs for construction personnel and visitors.
  3. Maintain and touchup signs so they are legible at all times.
- F. Waste Disposal Facilities: Comply with requirements specified in Section 017419 "Construction Waste Management and Disposal."

- G. Waste Disposal Facilities: Provide waste-collection containers in sizes adequate to handle waste from construction operations. Comply with requirements of authorities having jurisdiction. Comply with progress cleaning requirements in Section 017300 "Execution."
- H. Lifts and Hoists: Provide facilities necessary for hoisting materials and personnel.
1. Truck cranes and similar devices used for hoisting materials are considered "tools and equipment" and not temporary facilities.
- I. Hoisting Facilities
1. Provide hoisting facilities as required for the vertical movement of all materials.
  2. Comply with OSHA for all hoists, conveyers, and elevators and maintain the facilities in compliance with the law.
- J. Scaffolding and Staging
1. Contractor shall furnish erect and maintain exterior staging and scaffolding for use during construction of building. Each subcontractor shall furnish, erect, and maintain staging, and scaffolding required in work under his subcontract. Staging shall conform to federal, state, and local requirements. On completion of his work, each subcontractor shall dismantle and remove his staging and scaffolding.
    - a. Temporary Protection: At each area to be worked on; provide "RAM Board" 46 mil thick floor protection for worker circulation areas; at all scaffolding locations provide 1/2" inch thick plywood sheathing on top of "Ram Board" 46 mil thick; and at all fixed bookcases/furniture/equipment locations provide commercial grade canvas drop cloths. Reuse temporary protection products as work progresses along to other areas of the building.

### 3.4 SECURITY AND PROTECTION FACILITIES INSTALLATION

- A. Protection of Existing Facilities: Protect existing vegetation, equipment, structures, utilities, and other improvements at Project site and on adjacent properties, except those indicated to be removed or altered. Repair damage to existing facilities.
- B. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction as required to comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects.
1. Comply with work restrictions specified in Section 011000 "Summary."
- C. Tree and Plant Protection: Install temporary fencing located as indicated or outside the drip line of trees to protect vegetation from damage from construction operations. Protect tree root systems from damage, flooding, and erosion.
- D. Pest Control: Engage pest-control service to recommend practices to minimize attraction and harboring of rodents, roaches, and other pests and to perform extermination and control procedures at regular intervals so Project will be free of pests and their residues at Substantial Completion. Perform control operations lawfully, using environmentally safe materials.
- E. Site Enclosure Fence: Before construction operations begin, furnish, and install site enclosure fence in a manner that will prevent people and animals from easily entering site except by entrance gates.

1. Extent of Fence: As required to enclose entire Project site or portion determined sufficient to accommodate construction operations as indicated on the site work plan drawing included as part of the Construction Document drawing set.
  2. Maintain security by limiting number of keys and restricting distribution to authorized personnel. Furnish one set of keys to Owner.
- F. Security Enclosure and Lockup: Install temporary enclosure around partially completed areas of construction. Provide lockable entrances to prevent unauthorized entrance, vandalism, theft, and similar violations of security. Lock entrances at end of each workday.
- G. Barricades, Warning Signs, and Lights: Comply with requirements of authorities having jurisdiction for erecting structurally adequate barricades, including warning signs and lighting.
- H. Temporary Egress: Maintain temporary egress from existing occupied facilities as required by authorities having jurisdiction.
- I. Temporary Enclosures: Provide temporary enclosures for protection of construction, in progress and completed, from exposure, foul weather, other construction operations, and similar activities. Provide temporary weathertight enclosure for building exterior.
- J. Temporary Partitions: Provide floor-to-ceiling dustproof partitions to limit dust and dirt migration and to separate areas occupied by Owner and tenants from fumes and noise.
1. Construct dustproof partitions with gypsum wallboard with joints taped on occupied side, and fire-retardant-treated plywood on construction operations side.
  2. Construct dustproof partitions with two layers of 6-mil (0.14-mm) polyethylene sheet on each side. Cover floor with two layers of 6-mil (0.14-mm) polyethylene sheet, extending sheets 18 inches (460 mm) up the sidewalls. Overlap and tape full length of joints. Cover floor with fire-retardant-treated plywood.
    - a. Construct vestibule and airlock at each entrance through temporary partition with not less than 48 inches (1219 mm) between doors. Maintain water-dampened foot mats in vestibule.
  3. Where fire-resistance-rated temporary partitions are indicated or are required by authorities having jurisdiction, construct partitions according to the rated assemblies.
  4. Insulate partitions to control noise transmission to occupied areas.
  5. Seal joints and perimeter. Equip partitions with gasketed dustproof doors and security locks where openings are required.
  6. Protect air-handling equipment.
  7. Provide walk-off mats at each entrance through temporary partition.
- K. Temporary Fire Protection: Install and maintain temporary fire-protection facilities of types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 241; manage fire-prevention program.
1. Prohibit smoking on all areas of the North Kingstown High School site.
  2. Supervise welding operations, combustion-type temporary heating units, and similar sources of fire ignition according to requirements of authorities having jurisdiction.
  3. Develop and supervise an overall fire-prevention and -protection program for personnel at Project site. Review needs with local fire department and establish procedures to be followed. Instruct personnel in methods and procedures. Post warnings and information.

### 3.5 MOISTURE AND MOLD CONTROL

- A. Contractor's Moisture-Protection Plan: Avoid trapping water in finished work. Document visible signs of mold that may appear during construction.



- B. Exposed Construction Phase: Before installation of weather barriers, when materials are subject to wetting and exposure and to airborne mold spores, protect as follows:
1. Protect porous materials from water damage.
  2. Protect stored and installed material from flowing or standing water.
  3. Keep porous and organic materials from coming into prolonged contact with concrete.
  4. Remove standing water from decks.
  5. Keep deck openings covered or dammed.
- C. Controlled Construction Phase of Construction: After completing and sealing of the building enclosure but prior to the full operation of permanent HVAC systems, maintain as follows:
1. Control moisture and humidity inside building by maintaining effective dry-in conditions.
  2. Use permanent HVAC system to control humidity.
  3. Comply with manufacturer's written instructions for temperature, relative humidity, and exposure to water limits.
    - a. Hygroscopic materials that may support mold growth, including wood and gypsum-based products, that become wet during the course of construction and remain wet for 48 hours are considered defective.
    - b. Measure moisture content of materials that have been exposed to moisture during construction operations or after installation. Record readings beginning at time of exposure and continuing daily for 48 hours. Identify materials containing moisture levels higher than allowed. Report findings in writing to Architect.
    - c. Remove materials that cannot be completely restored to their manufactured moisture level within 48 hours.

### 3.6 OPERATION, TERMINATION, AND REMOVAL

- A. Supervision: Enforce strict discipline in use of temporary facilities. To minimize waste and abuse, limit availability of temporary facilities to essential and intended uses.
- B. Maintenance: Maintain facilities in good operating condition until removal.
- C. Temporary Facility Changeover: Do not change over from using temporary security and protection facilities to permanent facilities until Substantial Completion.
- D. Termination and Removal: Remove each temporary facility when need for its service has ended, when it has been replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.
1. Materials and facilities that constitute temporary facilities are property of Contractor. Owner reserves right to take possession of Project identification signs.
  2. At Substantial Completion, repair, renovate, and clean permanent facilities used during construction period. Comply with final cleaning requirements specified in Section 017700 "Closeout Procedures."

END OF SECTION 01 50 00

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**SECTION 01 56 00 – WEATHER PROTECTION AND MATERIALS STORAGE****PART 1 - GENERAL****1.1 GENERAL**

- A. The Contractor shall take the necessary precautions and provide all equipment, materials and labor necessary to adequately protect the Contract Area, previous construction, the building and its contents and occupants and surrounding landscape area from damage due to the construction or inclement weather during construction
- B. The Contractor shall provide all access to the work. Staging and other access shall be provided until new work has been accepted by the Owner.

**1.2 WEATHER PROTECTION**

- A. Weather protection shall mean the temporary protection of that work adversely affected by moisture, wind, heat and cold by covering patching, sealing, enclosing, ventilating, cooling and/or heating. This protection shall be provided for all work areas, the building and its contents, trafficked adjacent areas, and all construction materials and accessories.
- B. Installation of weather protection shall comply with all safety regulations, including provisions for adequate ventilation and fire protection devices.

**1.3 MATERIAL STORAGE**

- A. On-site material storage shall be in enclosed, well-ventilated trailers. Trailers shall not be used for storage of flammable substances. All flammable substances shall be brought to the site daily and unused materials and any empty containers shall be removed at the end of the workday. All trailers shall be located on-site, and locations shall be accepted by the Owner.
- B. In the event that materials are exposed to the elements, they shall be marked as unacceptable and immediately removed for the site. They may not be used.
- C. On-site storage of materials is the responsibility of the Contractor. The Owner is not responsible for Contractor's losses due to damage or vandalism.

**1.4 MANUFACTURER'S INFORMATION**

- A. The manufacturers of all the materials shall supply written instructions concerning the storage and handling of all supplied materials, including sealants and accessories. The manufacturer shall also provide information concerning storage and handling of flammable or volatile materials.
- B. Storage facilities shall be acceptable to the manufacturer and conform to his written requirements concerning temperature, humidity, ventilation and the like.
- C. The "shelf-life" of materials shall be provided with the date of manufacture of all perishables, including volatiles, caulking and mastics.
- D. The Contractor shall supply a copy of all manufacturers' written instructions to the Owner and Architect as outlined in Section 013300 – Submittal Procedures. The Contractor shall comply with all storage and handling requests and instructions of the manufacturer.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 56 00

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**SECTION 01 60 00 - PRODUCT REQUIREMENTS****PART 1 - GENERAL****1.1 RELATED DOCUMENTS**

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

**1.2 SUMMARY**

- A. Section includes administrative and procedural requirements for selection of products for use in Project; product delivery, storage, and handling; manufacturers' standard warranties on products; special warranties; comparable products and substitutions.
- B. Related Requirements:
  - 1. Section 012500 "Substitution Procedures" for requests for substitutions.
  - 2. Section 014200 "References" for applicable industry standards for products specified.

**1.3 DEFINITIONS**

- A. Products: Items obtained for incorporating into the Work, whether purchased for Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.
  - 1. Named Products: Items identified by manufacturer's product name, including make or model number or other designation shown or listed in manufacturer's published product literature, which is current as of date of the Contract Documents.
  - 2. New Products: Items that have not previously been incorporated into another project or facility. Products salvaged or recycled from other projects are not considered new products.
  - 3. Comparable Product: Product that is demonstrated and approved through submittal process to have the indicated qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics that equal or exceed those of specified product.
- B. Basis-of-Design Product Specification: A specification in which a specific manufacturer's product is named and accompanied by the words "basis-of-design product," including make or model number or other designation, to establish the significant qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics for purposes of evaluating comparable products of additional manufacturers named in the specification.
- C. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by Contractor.
  - 1. Substitutions for Cause: Changes proposed by Contractor that are required due to changed Project conditions, such as unavailability of product, regulatory changes, or unavailability of required warranty terms.
  - 2. Substitutions for Convenience: Changes proposed by Contractor or Owner that are not required in order to meet other Project requirements but may offer advantage to Contractor or Owner.

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#### 1.4 ACTION SUBMITTALS

- A. Comparable Product Requests: Submit request for consideration of each comparable product. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
1. Include data to indicate compliance with the requirements specified in "Comparable Products" Article.
  2. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within one week of receipt of a comparable product request. Architect will notify Contractor of approval or rejection of proposed comparable product request within 15 days of receipt of request, or seven days of receipt of additional information or documentation, whichever is later.
    - a. Form of Approval: As specified in Division 01 Section "Submittal Procedures."
    - b. Use product specified if Architect does not issue a decision on use of a comparable product request within time allocated.
- B. Basis-of-Design Product Specification Submittal: Comply with requirements in Division 01 Section "Submittal Procedures." Show compliance with requirements.
- C. Substitution Requests: Submit three copies of each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
1. Substitution Request Form: Use CSI Form 13.1A or another form that is acceptable to the Architect.
  2. Form shall be sent to Architect in both hardcopy and electronic file form so that Architect may respond back to Contractor electronically.
  3. Documentation: Show compliance with requirements for substitutions and the following, as applicable:
    - a. Statement indicating why specified product or fabrication, or installation cannot be provided, if applicable.
    - b. Coordination information, including a list of changes or revisions needed to other parts of the Work and to construction performed by Owner and separate contractors that will be necessary to accommodate proposed substitution.
    - c. Detailed comparison of significant qualities of proposed substitution with those of the Work specified. Include annotated copy of applicable Specification Section. Significant qualities may include attributes such as performance, weight, size, durability, visual effect, sustainable design characteristics, warranties, and specific features and requirements indicated. Indicate deviations, if any, from the Work specified.
    - d. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
    - e. Samples, where applicable or requested.
    - f. Certificates and qualification data, where applicable or requested.
    - g. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners.
    - h. Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.
    - i. Research reports evidencing compliance with building code in effect for Project, from ICC-ES.
    - j. Detailed comparison of Contractor's construction schedule using proposed substitution with products specified for the Work, including effect on the overall Contract Time. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's

- letterhead, stating date of receipt of purchase order, lack of availability, or delays in delivery.
- k. Cost information, including a proposal of change, if any, in the Contract Sum.
  - l. Contractor's certification that proposed substitution complies with requirements in the Contract Documents except as indicated in substitution request, is compatible with related materials, and is appropriate for applications indicated.
  - m. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.
4. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within seven days of receipt of a request for substitution. Architect will notify Contractor of acceptance or rejection of proposed substitution within 15 days of receipt of request, or seven days of receipt of additional information or documentation, whichever is later.
- a. Forms of Acceptance: Change Order, Construction Change Directive, or Architect's Supplemental Instructions for minor changes in the Work.
  - b. Use product specified if Architect does not issue a decision on use of a proposed substitution within time allocated.

#### 1.5 QUALITY ASSURANCE

- A. Compatibility of Options: If Contractor is given option of selecting between two or more products for use on Project, select product compatible with products previously selected, even if previously selected products were also options.
- 1. Each contractor is responsible for providing products and construction methods compatible with products and construction methods of other contractors.
  - 2. If a dispute arises between contractors over concurrently selectable but incompatible products, Architect will determine which products shall be used.

#### 1.6 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, and handle products using means and methods that will prevent damage, deterioration, and loss, including theft and vandalism. Comply with manufacturer's written instructions.
- B. Delivery and Handling:
- 1. Schedule delivery to minimize long-term storage at Project site and to prevent overcrowding of construction spaces.
  - 2. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
  - 3. Deliver products to Project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
  - 4. Inspect products on delivery to determine compliance with the Contract Documents and to determine that products are undamaged and properly protected.
- C. Storage:
- 1. Store products to allow for inspection and measurement of quantity or counting of units.
  - 2. Store materials in a manner that will not endanger Project structure.

3. Store products that are subject to damage by the elements, under cover in a weathertight enclosure above ground, with ventilation adequate to prevent condensation.
4. Protect foam plastic from exposure to sunlight, except to extent necessary for period of installation and concealment.
5. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.
6. Protect stored products from damage and liquids from freezing.
7. Provide a secure location and enclosure at Project site for storage of materials and equipment by Owner's construction forces. Coordinate location with Owner.

## 1.7 PRODUCT WARRANTIES

- A. Warranties specified in other Sections shall be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.
  1. Manufacturer's Warranty: Written warranty furnished by individual manufacturer for a particular product and specifically endorsed by manufacturer to Owner.
  2. Special Warranty: Written warranty required by the Contract Documents to provide specific rights for Owner.
- B. Special Warranties: Prepare a written document that contains appropriate terms and identification, ready for execution.
  1. Manufacturer's Standard Form: Modified to include Project-specific information and properly executed.
  2. Specified Form: When specified forms are included with the Specifications, prepare a written document using indicated form properly executed.
  3. See Sections 02 through 33 Sections for specific content requirements and particular requirements for submitting special warranties.
- C. Submittal Time: Comply with requirements in Section 017700 "Closeout Procedures."

## 1.8 SUBSTITUTIONS

- A. Limitations on substitutions:
  1. During Bidding period, Instructions to Bidders govern times for submitting requests for substitutions under requirements specified in this Section.
  2. Substitutions will not be considered when indicated on shop drawings or product data submittals without separate formal request, when requested directly by subcontractor or supplier, or when acceptance will require substantial revision of Contract Documents.
  3. Substitute products shall not be ordered or installed without written acceptance.
  4. Only one request for substitution for each product will be considered. When substitution is not accepted, provide specified product.
  5. Architect has sole right of determination of acceptability of substitutions.
  6. A contractor or subcontractor who carries the cost of a substitute in his bid without prior review by the Architect, does so at his own risk. The Owner is no way obligated to review nor allow that a speculative substitution be furnished.

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**PART 2 - PRODUCTS****2.1 PRODUCT SELECTION PROCEDURES**

- A. General Product Requirements: Provide products that comply with the Contract Documents, are undamaged and, unless otherwise indicated, are new at time of installation.
1. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.
  2. Standard Products: If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.
  3. Owner reserves the right to limit selection to products with warranties not in conflict with requirements of the Contract Documents.
  4. Where products are accompanied by the term "as selected," Architect will make selection.
  5. Descriptive, performance, and reference standard requirements in the Specifications establish salient characteristics of products.
  6. Or Equal: For products specified by name and accompanied by the term "or equal," or "or approved equal," or "or approved," comply with requirements in "Comparable Products" Article to obtain approval for use of an unnamed product.
- B. Product Selection Procedures:
1. Product: Where Specifications name a single manufacturer and product, provide the named product that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.
  2. Manufacturer/Source: Where Specifications name a single manufacturer or source, provide a product by the named manufacturer or source that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.
  3. Products:
    - a. Where Specifications include a list of names of both manufacturers and products, provide one of the products listed that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered unless otherwise indicated.
  4. Manufacturers:
    - a. Restricted List: Where Specifications include a list of manufacturers' names, provide a product by one of the manufacturers listed that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered unless otherwise indicated.
  5. Basis-of-Design Product: Where Specifications name a product, or refer to a product indicated on Drawings, and include a list of manufacturers, provide the specified or indicated product or a comparable product by one of the other named manufacturers. Drawings and Specifications indicate sizes, profiles, dimensions, and other characteristics that are based on the product named. Comply with requirements in "Comparable Products" Article for consideration of an unnamed product by one of the other named manufacturers.
- C. Visual Matching Specification: Where Specifications require "match Architect's sample", provide a product that complies with requirements and matches Architect's sample. Architect's decision will be final on whether a proposed product matches.



1. If no product available within specified category matches and complies with other specified requirements, comply with requirements in Division 01 Section "Substitution Procedures" for proposal of product.

- D. Visual Selection Specification: Where Specifications include the phrase "as selected by Architect from manufacturer's full range" or similar phrase, select a product that complies with requirements. Architect will select color, gloss, pattern, density, or texture from manufacturer's product line that includes both standard and premium items.

## 2.2 COMPARABLE PRODUCTS

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

## 2.3 SUBSTITUTIONS

- A. Substitutions for Cause: Submit requests for substitution immediately on discovery of need for change, but not later than 15 days prior to time required for preparation and review of related submittals.
1. Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:
    - a. Requested substitution is consistent with the Contract Documents and will produce indicated results.
    - b. Requested substitution provides sustainable design characteristics that specified product provided.
    - c. Substitution request is fully documented and properly submitted.
    - d. Requested substitution will not adversely affect Contractor's construction schedule.
    - e. Requested substitution has received necessary approvals of authorities having jurisdiction.
    - f. Requested substitution is compatible with other portions of the Work.
    - g. Requested substitution has been coordinated with other portions of the Work.
    - h. Requested substitution provides specified warranty.
    - i. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.
- B. Substitutions for Convenience: Architect will consider requests for substitution if received within 30 days after the Notice of Award. Requests received after that time may be considered or rejected at discretion of Architect.

1. Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:
  - a. Requested substitution offers Owner a substantial advantage in cost, time, energy conservation, or other considerations, after deducting additional responsibilities Owner must assume. Owner's additional responsibilities may include compensation to Architect for redesign and evaluation services, increased cost of other construction by Owner, and similar considerations.
  - b. Requested substitution does not require extensive revisions to the Contract Documents.
  - c. Requested substitution is consistent with the Contract Documents and will produce indicated results.
  - d. Requested substitution provides sustainable design characteristics that specified product provided.
  - e. Substitution request is fully documented and properly submitted.
  - f. Requested substitution will not adversely affect Contractor's construction schedule.
  - g. Requested substitution has received necessary approvals of authorities having jurisdiction.
  - h. Requested substitution is compatible with other portions of the Work.
  - i. Requested substitution has been coordinated with other portions of the Work.
  - j. Requested substitution provides specified warranty.
  - k. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.

#### 2.4 MANUFACTURER'S INSTRUCTIONS

- A. When contract documents require installation of work to comply with manufacturer's printed instructions, obtain and distribute copies of such instructions to parties involved in the installation, including two copies to the Owner's Representative. Maintain one copy of the instructions at the job site until project completion.
- B. Should project conditions, drawings or specification requirements conflict with manufacturer's instructions the Contractor shall advise the Architect for further instructions, prior to commencement of the work.
- C. Perform all work in accordance with manufacturer's instructions. Do not omit any preparatory step or installation procedure. If there are any conflicts with the contract documents notify the Architect prior to proceeding with the work.

#### PART 3 - EXECUTION (Not Used)

END OF SECTION 01 60 00

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**SECTION 01 73 00 - EXECUTION****PART 1 - GENERAL****1.1 RELATED DOCUMENTS**

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

**1.2 SUMMARY**

- A. Section includes general administrative and procedural requirements governing execution of the Work including, but not limited to, the following:
  - 1. Construction layout.
  - 2. Field engineering and surveying.
  - 3. Installation of the Work.
  - 4. Cutting and patching.
  - 5. Coordination of Owner-installed products.
  - 6. Progress cleaning.
  - 7. Starting and adjusting.
  - 8. Protection of installed construction.
- B. Related Requirements:
  - 1. Section 011000 "Summary" for limits on use of Project site.
  - 2. Section 013300 "Submittal Procedures" for submitting surveys.
  - 3. Section 017700 "Closeout Procedures" for submitting final property survey with Project Record Documents, recording of Owner-accepted deviations from indicated lines and levels, and final cleaning.

**1.3 DEFINITIONS**

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

**1.4 INFORMATIONAL SUBMITTALS**

- A. Qualification Data: For land surveyor and professional engineer.
- B. Certificates: Submit certificate signed by land surveyor or professional engineer certifying that location and elevation of improvements comply with requirements.
- C. Cutting and Patching Plan: Submit plan describing procedures at least 10 days prior to the time cutting and patching will be performed. Include the following information:
  - 1. Extent: Describe reason for and extent of each occurrence of cutting and patching.

2. Changes to In-Place Construction: Describe anticipated results. Include changes to structural elements and operating components as well as changes in building appearance and other significant visual elements.
3. Products: List products to be used for patching and firms or entities that will perform patching work.
4. Dates: Indicate when cutting and patching will be performed.
5. Utilities and Mechanical and Electrical Systems: List services and systems that cutting and patching procedures will disturb or affect. List services and systems that will be relocated and those that will be temporarily out of service. Indicate length of time permanent services and systems will be disrupted.
  - a. Include description of provisions for temporary services and systems during interruption of permanent services and systems.

- D. Landfill Receipts: Submit copy of receipts issued by a landfill facility, licensed to accept hazardous materials, for hazardous waste disposal.

## 1.5 QUALITY ASSURANCE

- A. Cutting and Patching: Comply with requirements for and limitations on cutting and patching of construction elements.
1. Structural Elements: When cutting and patching structural elements, notify Architect of locations and details of cutting and await directions from Architect before proceeding. Shore, brace, and support structural elements during cutting and patching. Do not cut and patch structural elements in a manner that could change their load-carrying capacity or increase deflection.
  2. Operational Elements: Do not cut and patch operating elements and related components in a manner that results in reducing their capacity to perform as intended or those results in increased maintenance or decreased operational life or safety.
    - a. Primary operational systems and equipment.
    - b. Fire separation assemblies.
    - c. Air or smoke barriers.
    - d. Fire-suppression systems.
    - e. Mechanical systems piping and ducts.
    - f. Control systems.
    - g. Communication systems.
    - h. Fire-detection and -alarm systems.
    - i. Conveying systems.
    - j. Electrical wiring systems.
    - k. Operating systems of special construction.
  3. Other Construction Elements: Do not cut and patch other construction elements or components in a manner that could change their load-carrying capacity, that results in reducing their capacity to perform as intended, or those results in increased maintenance or decreased operational life or safety.
    - a. Water, moisture, or vapor barriers.
    - b. Membranes and flashings.
    - c. Equipment supports.
    - d. Piping, ductwork, vessels, and equipment.
    - e. Noise- and vibration-control elements and systems.
  4. Visual Elements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch exposed construction in a manner that would, in Architect's opinion, reduce the building's aesthetic qualities.

Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.

- B. Cutting and Patching Conference: Before proceeding, meet at Project 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.
- C. Manufacturer's Installation Instructions: Obtain and maintain on-site manufacturer's written recommendations and instructions for installation of products and equipment.

## PART 2 - PRODUCTS

### 2.1 MATERIALS

- A. In-Place Materials: Use materials for patching identical to in-place materials. For exposed surfaces, use materials that visually match in-place adjacent surfaces to the fullest extent possible.
  - 1. If identical materials are unavailable or cannot be used, use materials that, when installed, will provide a match acceptable to Architect for the visual and functional performance of in-place materials.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Existing Conditions: The existence and location of site improvements, utilities, and other construction indicated as existing are not guaranteed. Before beginning work, investigate and verify the existence and location of mechanical and electrical systems and other construction affecting the Work.
  - 1. Before construction, verify the location and points of connection of utility services.
- B. Existing Utilities: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning work, investigate and verify the existence and location of underground utilities and other construction affecting the Work.
- C. Examination and Acceptance of Conditions: Before proceeding with each component of the Work, examine substrates, areas, and conditions, with Installer or Applicator present where indicated, for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.
  - 1. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.
  - 2. Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.
  - 3. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
- D. Written Report: Where a written report listing conditions detrimental to performance of the Work is required by other Sections, include the following:
  - 1. Description of the Work.

2. List of detrimental conditions, including substrates.
  3. List of unacceptable installation tolerances.
  4. Recommended corrections.
- E. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

### 3.2 PREPARATION

- A. Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
- B. Space Requirements:
1. Verify space requirements and dimensions of items shown diagrammatically on Drawings.
- C. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents caused by differing field conditions outside the control of Contractor, submit a request for information to Architect according to requirements in Division 01 Section "Project Management and Coordination."

### 3.3 CONSTRUCTION LAYOUT

- A. Verification: Before proceeding to lay out the Work, verify layout information shown on Drawings. If discrepancies are discovered, notify Architect promptly.

### 3.4 INSTALLATION

- A. General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.
1. Make vertical work plumb and make horizontal work level.
  2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
  3. Conceal pipes, ducts, and wiring in finished areas unless otherwise indicated.
- B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.
- C. Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Substantial Completion.
- D. Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.
- E. Sequence the Work and allow adequate clearances to accommodate movement of construction items on site and placement in permanent locations.
- F. Tools and Equipment: Do not use tools or equipment that produce harmful noise levels.

- G. Templates: Obtain and distribute to the parties involved templates for work specified to be factory prepared and field installed. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing products to comply with indicated requirements.
- H. Attachment: Provide blocking and attachment plates and anchors and fasteners of adequate size and number to securely anchor each component in place, accurately located and aligned with other portions of the Work. Where size and type of attachments are not indicated, verify size and type required for load conditions.
  - 1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Architect.
  - 2. Allow for building movement, including thermal expansion and contraction.
  - 3. Coordinate installation of anchorages. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.
- I. Joints: Make joints of uniform width. Where joint locations in exposed work are not indicated, arrange joints for the best visual effect. Fit exposed connections together to form hairline joints.
- J. Hazardous Materials: Use products, cleaners, and installation materials that are not considered hazardous.

### 3.5 CUTTING AND PATCHING

- A. Cutting and Patching, General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.
  - 1. Cut in-place construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.
- B. Temporary Support: Provide temporary support of work to be cut.
- C. Protection: Protect in-place construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.
- D. Existing Utility Services and Mechanical/Electrical Systems: Where existing services/systems are required to be removed, relocated, or abandoned, bypass such services/systems before cutting to minimize interruption to occupied areas.
- E. Cutting: Cut in-place construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.
  - 1. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots neatly to minimum size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
  - 2. Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
  - 3. Concrete and Masonry: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
  - 4. Mechanical and Electrical Services: Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting.

5. Proceed with patching after construction operations requiring cutting are complete.
- F. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other work. Patch with durable seams that are as invisible as practicable. Provide materials and comply with installation requirements specified in other Sections, where applicable.
1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate physical integrity of installation.
  2. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will minimize evidence of patching and refinishing.
    - a. Clean piping, conduit, and similar features before applying paint or other finishing materials.
    - b. Restore damaged pipe covering to its original condition.
  3. Ceilings: Patch, repair, or rehang in-place ceilings as necessary to provide an even-plane surface of uniform appearance.
  4. Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weathertight condition and ensures thermal and moisture integrity of building enclosure.
- G. Cleaning: Clean areas and spaces where cutting and patching are performed. Remove paint, mortar, oils, putty, and similar materials from adjacent finished surfaces.

### 3.6 OWNER-INSTALLED PRODUCTS

- A. Site Access: Provide access to Project site for Owner's construction personnel.
- B. Coordination: Coordinate construction and operations of the Work with work performed by Owner's construction personnel.
1. Construction Schedule: Inform Owner of Contractor's preferred construction schedule for Owner's portion of the Work. Adjust construction schedule based on a mutually agreeable timetable. Notify Owner if changes to schedule are required due to differences in actual construction progress.
  2. Preinstallation Conferences: Include Owner's construction personnel at preinstallation conferences covering portions of the Work that are to receive Owner's work. Attend preinstallation conferences conducted by Owner's construction personnel if portions of the Work depend on Owner's construction.

### 3.7 PROGRESS CLEANING

- A. General: Clean Project site and work areas daily, including common areas. Enforce requirements strictly. Dispose of materials lawfully.
1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
  2. Do not hold waste materials more than seven days during normal weather or three days if the temperature is expected to rise above 80 deg F (27 deg C).
  3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.
    - a. Use containers intended for holding waste materials of type to be stored.



4. Coordinate progress cleaning for joint-use areas where Contractor and other contractors are working concurrently.
- B. Site: Maintain Project site free of waste materials and debris.
- C. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.
  1. Remove liquid spills promptly.
  2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.
- D. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.
- E. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.
- F. Exposed Surfaces in Finished Areas: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.
- G. Waste Disposal: Do not bury or burn waste materials on-site. Do not wash waste materials down sewers or into waterways. Comply with waste disposal requirements in Division 01 Section "Construction Waste Management and Disposal."
- H. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.
- I. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.
- J. Limiting Exposures: Supervise construction operations to assure that no part of the construction completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

### 3.8 STARTING AND ADJUSTING

- A. Coordinate startup and adjusting of equipment and operating components with requirements in Division 01 Sections.
- B. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.
- C. Adjust equipment for proper operation. Adjust operating components for proper operation without binding.
- D. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- E. Manufacturer's Field Service: Comply with qualification requirements in Division 01 Section "Quality Requirements."

**3.9 PROTECTION OF INSTALLED CONSTRUCTION**

- A. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Substantial Completion.
- B. Comply with manufacturer's written instructions for temperature and relative humidity.
- C. Protect the existing adjacent construction and provide special protection where specified in the individual Specification Sections.
- D. Repair adjacent construction damaged by the construction operations to the original condition to the satisfaction of the Owner per the requirements of the Contract Documents.
- E. Prohibit unnecessary traffic from the existing and completed building areas and landscaped areas.
- F. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Substantial Completion.

END OF SECTION 01 73 00

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**SECTION 01 74 19 - CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL****PART 1 - GENERAL****1.1 RELATED DOCUMENTS**

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

**1.2 SUMMARY**

- A. Section includes administrative and procedural requirements for the following:
  - 1. Salvaging nonhazardous demolition and construction waste.
  - 2. Recycling nonhazardous demolition and construction waste.
  - 3. Disposing of nonhazardous demolition and construction waste.

**1.3 DEFINITIONS**

- A. Construction Waste: Site improvement materials and other solid waste resulting from construction, remodeling, renovation, or repair operations. Construction waste includes packaging.
- B. Disposal: Removal off-site of demolition and construction waste and subsequent sale, recycling, reuse, or deposit in landfill or incinerator acceptable to authorities having jurisdiction.
- C. Recycle: Recovery of demolition or construction waste for subsequent processing in preparation for reuse.
- D. Salvage: Recovery of demolition or construction waste and subsequent sale or reuse in another site area.

**1.4 PERFORMANCE REQUIREMENTS**

- A. General: Achieve end-of-Project rates for salvage/recycling of 50 percent by weight of total non-hazardous solid waste generated by the Work. Practice efficient waste management in the use of materials in the course of the Work. Use all reasonable means to divert construction and demolition waste from landfills and incinerators. Facilitate recycling and salvage of materials, including the following:
  - 1. Construction Waste:
    - a. Metals.
    - b. Packaging: Regardless of salvage/recycle goal indicated in "General" Paragraph above, salvage or recycle 100 percent of the following uncontaminated packaging materials:
      - 1) Paper.
      - 2) Cardboard.
      - 3) Boxes.
      - 4) Plastic sheet and film.

- 5) Polystyrene packaging.
- 6) Wood crates.
- 7) Plastic pails.

## 1.5 ACTION SUBMITTALS

- A. Waste Management Plan: Submit plan within 7 days of date established for the Notice of Award.

## 1.6 INFORMATIONAL SUBMITTALS

- A. Waste Reduction Progress Reports: Concurrent with each Application for Payment, submit report. Use Form CWM-7 for construction waste and Form CWM-8 for demolition waste. Include the following information:
  1. Material category.
  2. Generation points of waste.
  3. Total quantity of waste in tons (tonnes).
  4. Quantity of waste salvaged, both estimated and actual in tons (tonnes).
  5. Quantity of waste recycled, both estimated and actual in tons (tonnes).
  6. Total quantity of waste recovered (salvaged plus recycled) in tons (tonnes).
  7. Total quantity of waste recovered (salvaged plus recycled) as a percentage of total waste.
- B. Waste Reduction Calculations: Before request for Substantial Completion, submit calculated end-of-Project rates for salvage, recycling, and disposal as a percentage of total waste generated by the Work.
- C. Records of Donations: Indicate receipt and acceptance of salvageable waste donated to individuals and organizations. Indicate whether organization is tax exempt.
- D. Records of Sales: Indicate receipt and acceptance of salvageable waste sold to individuals and organizations. Indicate whether organization is tax exempt.
- E. Recycling and Processing Facility Records: Indicate receipt and acceptance of recyclable waste by recycling and processing facilities licensed to accept them. Include manifests, weight tickets, receipts, and invoices.
- F. Landfill and Incinerator Disposal Records: Indicate receipt and acceptance of waste by landfills and incinerator facilities licensed to accept them. Include manifests, weight tickets, receipts, and invoices.

## 1.7 QUALITY ASSURANCE

- A. Waste Management Coordinator Qualifications: Experienced firm, with a record of successful waste management coordination of projects with similar requirements, that employs a LEED-Accredited Professional, certified by the USGBC, as waste management coordinator.
- B. Regulatory Requirements: Comply with hauling and disposal regulations of authorities having jurisdiction.
- C. Waste Management Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination." Review methods and procedures related to waste management including, but not limited to, the following:

1. Review and discuss waste.
2. Review requirements for documenting quantities of each type of waste and its disposition.
3. Review and finalize procedures for materials separation and verify availability of containers and bins needed to avoid delays.
4. Review procedures for periodic waste collection and transportation to recycling and disposal facilities.
5. Review waste management requirements for each trade.

## 1.8 WASTE MANAGEMENT PLAN

- A. General: Develop a waste management plan according to ASTM E 1609 and requirements in this Section. Plan shall consist of waste identification, waste reduction work plan, and cost/revenue analysis. Distinguish between demolition and construction waste. Indicate quantities by weight or volume but use same units of measure throughout waste management plan.
- B. Waste Identification: Indicate anticipated types and quantities of site-preparation and construction waste generated by the Work. Use Form CWM-1 for construction waste and Form CWM-2 for site preparation waste. Include estimated quantities and assumptions for estimates.
- C. Waste Reduction Work Plan: List each type of waste and whether it will be salvaged, recycled, or disposed of in landfill or incinerator. Use Form CWM-3 for construction waste and Form CWM-4 for site preparation waste. Include points of waste generation, total quantity of each type of waste, quantity for each means of recovery, and handling and transportation procedures.
1. Salvaged Materials for Sale: For materials that will be sold to individuals and organizations, include list of their names, addresses, and telephone numbers.
  2. Salvaged Materials for Donation: For materials that will be donated to individuals and organizations, include list of their names, addresses, and telephone numbers.
  3. Recycled Materials: Include list of local receivers and processors and type of recycled materials each will accept. Include names, addresses, and telephone numbers.
  4. Disposed Materials: Indicate how and where materials will be disposed of. Include name, address, and telephone number of each landfill and incinerator facility.
  5. Handling and Transportation Procedures: Include method that will be used for separating recyclable waste including sizes of containers, container labeling, and designated location where materials separation will be performed.
- D. Cost/Revenue Analysis: Indicate total cost of waste disposal as if there was no waste management plan and net additional cost or net savings resulting from implementing waste management plan. Use Form CWM-5 for construction waste and Form CWM-6 for site preparation waste. Include the following:
1. Total quantity of waste.
  2. Estimated cost of disposal (cost per unit). Include hauling and tipping fees and cost of collection containers for each type of waste.
  3. Total cost of disposal (with no waste management).
  4. Revenue from salvaged materials.
  5. Revenue from recycled materials.
  6. Savings in hauling and tipping fees by donating materials.
  7. Savings in hauling and tipping fees that are avoided.
  8. Handling and transportation costs. Include cost of collection containers for each type of waste.
  9. Net additional cost or net savings from waste management plan.

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**PART 2 - PRODUCTS (Not Used)****PART 3 - EXECUTION****3.1 PLAN IMPLEMENTATION**

- A. General: Implement approved waste management plan. Provide handling, containers, storage, signage, transportation, and other items as required to implement waste management plan during the entire duration of the Contract.
  - 1. Comply with operation, termination, and removal requirements in Division 01 Section "Temporary Facilities and Controls."
- B. Waste Management Coordinator: This can be the contractor's project manager, superintendent or other qualified individual acceptable to the Architect. Waste management coordinator shall be responsible for implementing, monitoring, and reporting status of waste management work plan.
- C. Training: Train workers, subcontractors, and suppliers on proper waste management procedures, as appropriate for the Work.
  - 1. Distribute waste management plan to everyone concerned within three days of submittal return.
  - 2. Distribute waste management plan to entities when they first begin work on-site. Review plan procedures and locations established for salvage, recycling, and disposal.
- D. Site Access and Temporary Controls: Conduct waste management operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
  - 1. Designate and label specific areas on Project site necessary for separating materials that are to be salvaged, recycled, reused, donated, and sold.
  - 2. Comply with Division 01 Section "Temporary Facilities and Controls" for controlling dust and dirt, environmental protection, and noise control.

**3.2 SALVAGING DEMOLITION WASTE**

- A. Salvaged Items for Sale and Donation: Not permitted on Project site.

**3.3 RECYCLING WASTE, GENERAL**

- A. General: Recycle paper and beverage containers used by on-site workers.
- B. Recycling Incentives: Revenues, savings, rebates, tax credits, and other incentives received for recycling waste materials shall accrue to Contractor.
- C. Preparation of Waste: Prepare and maintain recyclable waste materials according to recycling or reuse facility requirements. Maintain materials free of dirt, adhesives, solvents, petroleum contamination, and other substances deleterious to the recycling process.
- D. Procedures: Separate recyclable waste from other waste materials, trash, and debris. Separate recyclable waste by type at Project site to the maximum extent practical according to approved construction waste management plan.

1. Contractor's Option: As this construction site is very limited in area the use of co-mingled collection system with off site separation is acceptable.
2. Provide appropriately marked containers or bins for controlling recyclable waste until removed from Project site. Include list of acceptable and unacceptable materials at each container and bin.
  - a. Inspect containers and bins for contamination and remove contaminated materials if found.
3. Stockpile processed materials on-site without intermixing with other materials. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.
4. Stockpile materials away from construction area. Do not store within drip line of remaining trees.
5. Store components off the ground and protect from the weather.
6. Remove recyclable waste from Owner's property and transport to recycling receiver or processor.

### 3.4 RECYCLING CONSTRUCTION WASTE

#### A. Packaging:

1. Cardboard and Boxes: Break down packaging into flat sheets. Bundle and store in a dry location.
2. Polystyrene Packaging: Separate and bag materials.
3. Pallets: As much as possible, require deliveries using pallets to remove pallets from Project site. For pallets that remain on-site, break down pallets into component wood pieces and comply with requirements for recycling wood.
4. Crates: Break down crates into component wood pieces and comply with requirements for recycling wood.

#### B. Wood Materials:

1. Clean Cut-Offs of Lumber: Grind or chip into small pieces.
2. Clean Sawdust: Bag sawdust that does not contain painted or treated wood.

### 3.5 DISPOSAL OF WASTE

#### A. General: Except for items or materials to be salvaged, recycled, or otherwise reused, remove waste materials from Project site and legally dispose of them in a landfill or incinerator acceptable to authorities having jurisdiction.

1. Except as otherwise specified, do not allow waste materials that are to be disposed of accumulate on-site.
2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.

#### B. Burning: Do not burn waste materials.

#### C. Disposal: Remove waste materials from Owner's property and legally dispose of them.

### 3.6 ATTACHMENTS

- A. Form CWM-1 for construction waste identification.
- B. Form CWM-2 for demolition waste identification.

- C. Form CWM-3 for construction waste reduction work plan.
- D. Form CWM-4 for demolition waste reduction work plan.
- E. Form CWM-5 cost/revenue analysis of construction waste reduction work plan.
- F. Form CWM-6 cost/revenue analysis of demolition waste reduction work plan.
- G. Form CWM-7 for construction waste
- H. Form CWM-8 for demolition waste.

END OF SECTION 01 74 19



**FORM CWM-1: CONSTRUCTION WASTE IDENTIFICATION**

MATERIAL CATEGORY	GENERATION POINT	EST. QUANTITY OF MATERIALS RECEIVED* (A)	EST. WASTE - % (B)	TOTAL EST. QUANTITY OF WASTE* (C = A x B)	EST. VOLUME CY (CM)	EST. WEIGHT TONS (TONNES)	REMARKS AND ASSUMPTIONS
Packaging: Cardboard							
Packaging: Boxes							
Packaging: Plastic Sheet or Film							
Packaging: Polystyrene							
Packaging: Pallets or Skids							
Packaging: Crates							
Packaging: Paint Cans							
Packaging: Plastic Pails							
Site-Clearing Waste							
Masonry or CMU							
Lumber: Cut-Offs							
Lumber: Warped Pieces							
Plywood or OSB (scraps)							
Wood Forms							
Wood Waste Chutes							
Wood Trim (cut-offs)							
Metals							
Insulation							
Roofing							
Joint Sealant Tubes							
Gypsum Board (scraps)							
Carpet and Pad (scraps)							
Piping							
Electrical Conduit							
Other:							

\* Insert units of measure.

**FORM CWM-2: DEMOLITION WASTE IDENTIFICATION**

MATERIAL DESCRIPTION	EST. QUANTITY	EST. VOLUME CY (CM)	EST. WEIGHT TONS (TONNES)	REMARKS AND ASSUMPTIONS
Asphaltic Concrete Paving				
Concrete				
Brick				
CMU				
Lumber				
Plywood and OSB				
Wood Paneling				
Wood Trim				
Miscellaneous Metals				
Structural Steel				
Rough Hardware				
Insulation				
Roofing				
Doors and Frames				
Door Hardware				
Windows				
Glazing				
Acoustical Tile				
Carpet				
Carpet Pad				
Demountable Partitions				
Equipment				
Cabinets				
Plumbing Fixtures				
Piping				
Piping Supports and Hangers				
Valves				
Sprinklers				
Mechanical Equipment				
Electrical Conduit				
Copper Wiring				
Light Fixtures				
Lamps				
Lighting Ballasts				
Electrical Devices				
Switchgear and Panelboards				
Transformers				
Other:				

**FORM CWM-3: CONSTRUCTION WASTE REDUCTION WORK PLAN**

MATERIAL CATEGORY	GENERATION POINT	TOTAL EST. QUANTITY OF WASTE TONS (TONNES)	DISPOSAL METHOD AND QUANTITY			HANDLING AND TRANSPORTION PROCEDURES
			EST. AMOUNT SALVAGED TONS (TONNES)	EST. AMOUNT RECYCLED TONS (TONNES)	EST. AMOUNT DISPOSED TO LANDFILL TONS (TONNES)	
Packaging: Cardboard						
Packaging: Boxes						
Packaging: Plastic Sheet or Film						
Packaging: Polystyrene						
Packaging: Pallets or Skids						
Packaging: Crates						
Packaging: Paint Cans						
Packaging: Plastic Pails						
Site-Clearing Waste						
Masonry or CMU						
Lumber: Cut-Offs						
Lumber: Warped Pieces						
Plywood or OSB (scraps)						
Wood Forms						
Wood Waste Chutes						
Wood Trim (cut-offs)						
Metals						
Insulation						
Roofing						
Joint Sealant Tubes						
Gypsum Board (scraps)						
Carpet and Pad (scraps)						
Piping						
Electrical Conduit						
Other:						

**FORM CWM-4: DEMOLITION WASTE REDUCTION WORK PLAN**

MATERIAL CATEGORY	GENERATION POINT	TOTAL EST. QUANTITY OF WASTE TONS (TONNES)	DISPOSAL METHOD AND QUANTITY			HANDLING AND TRANSPORTION PROCEDURES
			EST. AMOUNT SALVAGED TONS (TONNES)	EST. AMOUNT RECYCLED TONS (TONNES)	EST. AMOUNT DISPOSED TO LANDFILL TONS (TONNES)	
Asphaltic Concrete Paving						
Concrete						
Brick						
CMU						
Lumber						
Plywood and OSB						
Wood Paneling						
Wood Trim						
Miscellaneous Metals						
Structural Steel						
Rough Hardware						
Insulation						
Roofing						
Doors and Frames						
Door Hardware						
Windows						
Glazing						
Acoustical Tile						
Carpet						
Carpet Pad						
Demountable Partitions						
Equipment						
Cabinets						
Plumbing Fixtures						
Piping						
Supports and Hangers						
Valves						
Sprinklers						
Mechanical Equipment						
Electrical Conduit						
Copper Wiring						
Light Fixtures						
Lamps						
Lighting Ballasts						
Electrical Devices						
Switchgear and Panelboards						
Transformers						
Other:						

**FORM CWM-5: COST/REVENUE ANALYSIS OF CONSTRUCTION WASTE REDUCTION WORK PLAN**

MATERIALS	TOTAL QUANTITY OF MATERIALS (VOL. OR WEIGHT) (A)	EST. COST OF DISPOSAL (B)	TOTAL EST. COST OF DISPOSAL (C = A x B)	REVENUE FROM SALVAGED MATERIALS (D)	REVENUE FROM RECYCLED MATERIALS (E)	LANDFILL TIPPING FEES AVOIDED (F)	HANDLING AND TRANSPORTATION COSTS AVOIDED (G)	NET COST SAVINGS OF WORK PLAN (H = D+E+F+G)
Packaging: Cardboard								
Packaging: Boxes								
Packaging: Plastic Sheet or Film								
Packaging: Polystyrene								
Packaging: Pallets or Skids								
Packaging: Crates								
Packaging: Paint Cans								
Packaging: Plastic Pails								
Site-Clearing Waste								
Masonry or CMU								
Lumber: Cut-Offs								
Lumber: Warped Pieces								
Plywood or OSB (scraps)								
Wood Forms								
Wood Waste Chutes								
Wood Trim (cut-offs)								
Metals								
Insulation								
Roofing								
Joint Sealant Tubes								
Gypsum Board (scraps)								
Carpet and Pad (scraps)								
Piping								
Electrical Conduit								
Other:								

**FORM CWM-6: COST/REVENUE ANALYSIS OF DEMOLITION WASTE REDUCTION WORK PLAN**

MATERIALS	TOTAL QUANTITY OF MATERIALS (VOL. OR WEIGHT) (A)	EST. COST OF DISPOSAL (B)	TOTAL EST. COST OF DISPOSAL (C = A x B)	REVENUE FROM SALVAGED MATERIALS (D)	REVENUE FROM RECYCLED MATERIALS (E)	LANDFILL TIPPING FEES AVOIDED (F)	HANDLING AND TRANSPORTATION COSTS AVOIDED (G)	NET COST SAVINGS OF WORK PLAN (H = D+E+F+G)
Asphaltic Concrete Paving								
Concrete								
Brick								
CMU								
Lumber								
Plywood and OSB								
Wood Paneling								
Wood Trim								
Miscellaneous Metals								
Structural Steel								
Rough Hardware								
Insulation								
Roofing								
Doors and Frames								
Door Hardware								
Windows								
Glazing								
Acoustical Tile								
Carpet								
Carpet Pad								
Demountable Partitions								
Equipment								
Cabinets								
Plumbing Fixtures								
Piping								
Supports and Hangers								
Valves								
Sprinklers								
Mech. Equipment								
Electrical Conduit								
Copper Wiring								
Light Fixtures								
Lamps								
Lighting Ballasts								
Electrical Devices								
Switchgear and Panelboards								
Transformers								
Other:								

**FORM CWM-7: CONSTRUCTION WASTE REDUCTION PROGRESS REPORT**

MATERIAL CATEGORY	GENERATION POINT	TOTAL QUANTITY OF WASTE TONS (A)	QUANTITY OF WASTE SALVAGED		QUANTITY OF WASTE RECYCLED		TOTAL QUANTITY OF WASTE RECOVERED TONS (TONNES) (D = B + C)	TOTAL QUANTITY OF WASTE RECOVERED % (D / A x 100)
			ESTIMATED TONS (TONNES)	ACTUAL TONS (TONNES) (B)	ESTIMATED TONS (TONNES)	ACTUAL TONS (TONNES) (C)		
Packaging: Cardboard								
Packaging: Boxes								
Packaging: Plastic Sheet or Film								
Packaging: Polystyrene								
Packaging: Pallets or Skids								
Packaging: Crates								
Packaging: Paint Cans								
Packaging: Plastic Pails								
Site-Clearing Waste								
Masonry or CMU								
Lumber: Cut-Offs								
Lumber: Warped Pieces								
Plywood or OSB (scraps)								
Wood Forms								
Wood Waste Chutes								
Wood Trim (cut-offs)								
Metals								
Insulation								
Roofing								
Joint Sealant Tubes								
Gypsum Board (scraps)								
Carpet and Pad (scraps)								
Piping								
Electrical Conduit								
Other:								

**FORM CWM-7: CONSTRUCTION WASTE REDUCTION PROGRESS REPORT**

MATERIAL CATEGORY	GENERATION POINT	TOTAL QUANTITY OF WASTE TONS (TONNES) (A)	QUANTITY OF WASTE SALVAGED		QUANTITY OF WASTE RECYCLED		TOTAL QUANTITY OF WASTE RECOVERED TONS (TONNES) (D = B + C)	TOTAL QUANTITY OF WASTE RECOVERED % (D / A x 100)
			ESTIMATED TONS (TONNES)	ACTUAL TONS (TONNES) (B)	ESTIMATED TONS (TONNES)	ACTUAL TONS (TONNES) (C)		
Packaging: Cardboard								
Packaging: Boxes								
Packaging: Plastic Sheet or Film								
Packaging: Polystyrene								
Packaging: Pallets or Skids								
Packaging: Crates								
Packaging: Paint Cans								
Packaging: Plastic Pails								
Site-Clearing Waste								
Masonry or CMU								
Lumber: Cut-Offs								
Lumber: Warped Pieces								
Plywood or OSB (scraps)								
Wood Forms								
Wood Waste Chutes								
Wood Trim (cut-offs)								
Metals								
Insulation								
Roofing								
Joint Sealant Tubes								
Gypsum Board (scraps)								
Carpet and Pad (scraps)								
Piping								
Electrical Conduit								
Other:								



**FORM CWM-8: DEMOLITION WASTE REDUCTION PROGRESS REPORT**

MATERIAL CATEGORY	GENERATION POINT	TOTAL QUANTITY OF WASTE TONS (TONNES) (A)	QUANTITY OF WASTE SALVAGED		QUANTITY OF WASTE RECYCLED		TOTAL QUANTITY OF WASTE RECOVERED TONS (TONNES) (D = B + C)	TOTAL QUANTITY OF WASTE RECOVERED % (D / A x 100)
			ESTIMATED TONS (TONNES)	ACTUAL TONS (TONNES) (B)	ESTIMATED TONS (TONNES)	ACTUAL TONS (TONNES) (C)		
Asphaltic Concrete Paving								
Concrete								
Brick								
CMU								
Lumber								
Plywood and OSB								
Wood Paneling								
Wood Trim								
Miscellaneous Metals								
Structural Steel								
Rough Hardware								
Insulation								
Roofing								
Doors and Frames								
Door Hardware								
Windows								
Glazing								
Acoustical Tile								
Carpet								
Carpet Pad								
Demountable Partitions								
Equipment								
Cabinets								
Plumbing Fixtures								
Piping								
Supports and Hangers								
Valves								
Sprinklers								
Mechanical Equipment								
Electrical Conduit								
Copper Wiring								
Light Fixtures								
Lamps								
Lighting Ballasts								
Electrical Devices								
Switchgear and Panelboards								
Transformers								
Other:								

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**SECTION 01 77 00 - CLOSEOUT PROCEDURES****PART 1 - GENERAL****1.1 RELATED DOCUMENTS**

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

**1.2 SUMMARY**

- A. Section includes administrative and procedural requirements for contract closeout, including, but not limited to, the following:
  - 1. Substantial Completion procedures.
  - 2. Final completion procedures.
  - 3. Warranties.
  - 4. Final cleaning.
  - 5. Repair of the Work.
- B. Related Requirements:
  - 1. Section 017300 "Execution" for progress cleaning of Project site.
  - 2. Section 017823 "Operation and Maintenance Data" for operation and maintenance manual requirements.
  - 3. Section 017839 "Project Record Documents" for submitting record Drawings, record Specifications, and record Product Data.
  - 4. Section 017900 "Demonstration and Training" for requirements for instructing Owner's personnel.
  - 5. Sections 02 through 26 for specific closeout and special cleaning requirements for the Work in those Sections.

**1.3 ACTION SUBMITTALS**

- A. Product Data: For cleaning agents.
- B. Contractor's List of Incomplete Items: Initial submittal at Substantial Completion.
- C. Certified List of Incomplete Items: Final submittal at Final Completion.

**1.4 CLOSEOUT SUBMITTALS**

- A. Certificates of Release: From authorities having jurisdiction.
- B. Certificate of Insurance: For continuing coverage.
- C. Field Report: For pest control inspection.
- D. Certificate of Occupancy from the authorities having jurisdiction.

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## 1.5 MAINTENANCE MATERIAL SUBMITTALS

- A. Schedule of Maintenance Material Items: For maintenance material submittal items specified in other Sections.

## 1.6 SUBSTANTIAL COMPLETION PROCEDURES

- A. Contractor's List of Incomplete Items: Prepare and submit a list of items to be completed and corrected (Contractor's punch list), indicating the value of each item on the list and reasons why the Work is incomplete.
- B. Submittals Prior to Substantial Completion: Complete the following a minimum of 21 days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.
1. Certificates of Release: Obtain and submit releases from authorities having jurisdiction permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
  2. Submit closeout submittals specified in other Division 01 Sections, including project record documents, operation and maintenance manuals, damage or settlement surveys, property surveys, and similar final record information.
  3. Submit closeout submittals specified in individual Divisions 02 through 26 Sections, including specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
  4. Submit maintenance material submittals specified in individual Divisions 02 through 26 Sections, including tools, spare parts, extra materials, and similar items, and deliver to location designated by Architect. Label with manufacturer's name and model number where applicable.
    - a. Schedule of Maintenance Material Items: Prepare and submit schedule of maintenance material submittal items, including name and quantity of each item and name and number of related Specification Section. Obtain Architect's signature for receipt of submittals.
  5. Submit test/adjust/balance records.
  6. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.
- C. Procedures Prior to Substantial Completion: Complete the following a minimum of 21 days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.
1. Advise Owner of pending insurance changeover requirements.
  2. Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions.
  3. Complete startup and testing of systems and equipment.
  4. Perform preventive maintenance on equipment used prior to Substantial Completion.
  5. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems.
  6. Advise Owner of changeover in heat and other utilities.
  7. Participate with Owner in conducting inspection and walkthrough with local emergency responders.
  8. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
  9. Complete final cleaning requirements, including touchup painting.
  10. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.

- D. Inspection: Submit a written request for inspection to determine Substantial Completion a minimum of 21 days prior to date the work will be completed and ready for final inspection and tests. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by Architect, that must be completed or corrected before certificate will be issued.
1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.
  2. Results of completed inspection will form the basis of requirements for final completion.

## 1.7 FINAL COMPLETION PROCEDURES

- A. Submittals Prior to Final Completion: Before requesting final inspection for determining final completion, complete the following:
1. Submit a final Application for Payment according to Division 01 Section "Payment Procedures."
  2. Certified List of Incomplete Items: Submit certified copy of Architect's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Architect. Certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
  3. Certificate of Insurance: Submit evidence of final, continuing insurance coverage complying with insurance requirements.
  4. Submit pest-control final inspection report.
- B. Inspection: Submit a written request for final inspection to determine acceptance a minimum of 14 days prior to date the work will be completed and ready for final inspection and tests. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare a final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.
1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.

## 1.8 LIST OF INCOMPLETE ITEMS (PUNCH LIST)

- A. Organization of List: Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction. Use CSI Form 14.1A.
1. Organize list of spaces in sequential order, starting with exterior areas first and proceeding from lowest floor to highest floor.
  2. Organize items applying to each space by major element, including categories for ceiling, individual walls, floors, equipment, and building systems.
  3. Include the following information at the top of each page:
    - a. Project name.
    - b. Date.
    - c. Name of Architect.
    - d. Name of Contractor.
    - e. Page number.
  4. Submit list of incomplete items in the following format:

- a. MS Excel electronic file. Architect will return annotated file.
- b. PDF electronic file. This file is for record purposes.

## 1.9 SUBMITTAL OF PROJECT WARRANTIES

- A. Time of Submittal: Submit written warranties on request of Architect for designated portions of the Work where commencement of warranties other than date of Substantial Completion is indicated, or when delay in submittal of warranties might limit Owner's rights under warranty.
- B. Organize warranty documents into an orderly sequence based on the table of contents of Project Manual.
  1. Bind warranties and bonds in heavy-duty, three-ring, vinyl-covered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2-by-11-inch (215-by-280-mm) paper.
  2. Provide heavy paper dividers with plastic-covered tabs for each separate warranty. Mark tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product and the name, address, and telephone number of Installer.
  3. Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project name, and name of Contractor.
  4. Warranty Electronic File: Scan warranties and bonds and assemble complete warranty and bond submittal package into a single indexed electronic PDF file with links enabling navigation to each item. Provide bookmarked table of contents at beginning of document.
- C. Provide additional copies of each warranty to include in operation and maintenance manuals.

## 1.10 RE-INSPECTION FEES

- A. Should Architect perform re-inspections due to failure of the work to comply with the claims or status of completion made by the Contractor:
  1. Owner will compensate the Architect for such additional services.

## PART 2 - PRODUCTS

### 2.1 MATERIALS

- A. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.
  1. Use cleaning products that comply with Green Seal's GS-37, or if GS-37 is not applicable, use products that comply with the California Code of Regulations maximum allowable VOC levels.

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**PART 3 - EXECUTION****3.1 FINAL CLEANING**

- A. General: Perform final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.
- B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.
1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a designated portion of Project:
    - a. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.
    - b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
    - c. Rake grounds that are neither planted nor paved to a smooth, even-textured surface.
    - d. Remove tools, construction equipment, machinery, and surplus material from Project site.
    - e. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
    - f. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
    - g. Vacuum carpet and similar soft surfaces, removing debris and excess nap; clean according to manufacturer's recommendations if visible soil or stains remain.
    - h. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other noticeable, vision-obscuring materials. Polish mirrors and glass, taking care not to scratch surfaces.
    - i. Remove labels that are not permanent.
    - j. Wipe surfaces of mechanical and electrical equipment, and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
    - k. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.
    - l. Clean ducts, blowers, and coils if units were operated without filters during construction or that display contamination with particulate matter on inspection.
      - 1) Clean HVAC system in compliance with NADCA Standard 1992-01. Provide written report on completion of cleaning.
    - m. Clean light fixtures, lamps, globes, and reflectors to function with full efficiency.
    - n. Leave Project clean and ready for occupancy.
- C. Pest Control: Comply with pest control requirements in Division 01 Section "Temporary Facilities and Controls." Prepare written report.
- D. Construction Waste Disposal: Comply with waste disposal requirements in Division 01 Section "Construction Waste Management and Disposal."

### 3.2 REPAIR OF THE WORK

- A. Complete repair and restoration operations before requesting inspection for determination of Substantial Completion.
- B. Repair or remove and replace defective construction. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment. Where damaged or worn items cannot be repaired or restored, provide replacements. Remove and replace operating components that cannot be repaired. Restore damaged construction and permanent facilities used during construction to specified condition.
  - 1. Remove and replace chipped, scratched, and broken glass, reflective surfaces, and other damaged transparent materials.
  - 2. Touch up and otherwise repair and restore marred or exposed finishes and surfaces. Replace finishes and surfaces that that already show evidence of repair or restoration.
    - a. Do not paint over "UL" and other required labels and identification, including mechanical and electrical nameplates. Remove paint applied to required labels and identification.
  - 3. Replace parts subject to operating conditions during construction that may impede operation or reduce longevity.
  - 4. Replace burned-out bulbs, bulbs noticeably dimmed by hours of use, and defective and noisy starters in fluorescent and mercury vapor fixtures to comply with requirements for new fixtures.

END OF SECTION 01 77 00

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**SECTION 01 78 23 - OPERATION AND MAINTENANCE DATA****PART 1 - GENERAL****1.1 RELATED DOCUMENTS**

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

**1.2 SUMMARY**

- A. Section includes administrative and procedural requirements for preparing operation and maintenance manuals, including the following:
  - 1. Operation and maintenance documentation directory.
  - 2. Emergency manuals.
  - 3. Operation manuals for carpeting systems.
  - 4. Product maintenance manuals.
  - 5. Systems maintenance manuals.
- B. Related Requirements:
  - 1. Section 013300 "Submittal Procedures" for submitting copies of submittals for operation and maintenance manuals.
  - 2. Section 019113 "General Commissioning Requirements" for verification and compilation of data into operation and maintenance manuals.
  - 3. Sections 02 through 26 for specific operation and maintenance manual requirements for the Work in those Sections.

**1.3 DEFINITIONS**

- A. System: An organized collection of parts, equipment, or subsystems united by regular interaction.
- B. Subsystem: A portion of a system with characteristics similar to a system.

**1.4 CLOSEOUT SUBMITTALS**

- A. Manual Content: Operations and maintenance manual content is specified in individual Specification Sections to be reviewed at the time of Section submittals. Submit reviewed manual content formatted and organized as required by this Section.
  - 1. Architect will comment on whether content of operations and maintenance submittals are acceptable.
  - 2. Where applicable, clarify and update reviewed manual content to correspond to revisions and field conditions.
- B. Format: Submit operations and maintenance manuals in the following format:
  - 1. PDF electronic file. Assemble each manual into a composite electronically indexed file. Submit on digital media acceptable to Architect.



- a. Name each indexed document file in composite electronic index with applicable item name. Include a complete electronically linked operation and maintenance directory.
  - b. Enable inserted reviewer comments on draft submittals.
2. After PDF copies have been approved, submit three paper copies of the PDF files and one CD containing the PDF files. Include a complete operation and maintenance directory. Enclose title pages and directories in clear plastic sleeves. Deliver copies to Owner.
- C. Initial Manual Submittal: Submit draft copy of each manual at least 30 days before commencing demonstration and training. Architect will comment on whether general scope and content of manual are acceptable.
1. Correct or revise each manual to comply with Architect's comments. Submit copies of each corrected manual within 15 days of receipt of Architect's and Commissioning Authority's comments and prior to commencing demonstration and training.
- D. Final Manual Submittal: Submit each manual in final form prior to requesting inspection for Substantial Completion and at least 15 days before commencing demonstration and training. Architect will return copy with comments.
1. Correct or revise each manual to comply with Architect's comments. Submit copies of each corrected manual within 15 days of receipt of Architect's comments and prior to commencing demonstration and training.

## PART 2 - PRODUCTS

### 2.1 OPERATION AND MAINTENANCE DOCUMENTATION DIRECTORY

- A. Directory: Prepare a single, comprehensive directory of emergency, operation, and maintenance data and materials, listing items and their location to facilitate ready access to desired information. Include a section in the directory for each of the following:
1. List of documents.
  2. List of systems.
  3. Table of contents.
- B. List of Systems: List systems alphabetically. Include references to operation and maintenance manuals that contain information about each system.
- C. List of Equipment: List equipment for each system, organized alphabetically by system. For pieces of equipment not part of system, list alphabetically in separate list.
- D. Tables of Contents: Include a table of contents for each emergency, operation, and maintenance manual.
- E. Identification: In the documentation directory and in each operation and maintenance manual, identify each system, subsystem, and piece of equipment with same designation used in the Contract Documents. If no designation exists, assign a designation according to ASHRAE Guideline 4, "Preparation of Operating and Maintenance Documentation for Building Systems."

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## 2.2 REQUIREMENTS FOR EMERGENCY, OPERATION, AND MAINTENANCE MANUALS

- A. Organization: Unless otherwise indicated, organize each manual into a separate section for each system and subsystem, and a separate section for each piece of equipment not part of a system. Each manual shall contain the following materials, in the order listed:
1. Title page.
  2. Table of contents.
  3. Manual contents.
- B. Title Page: Include the following information:
1. Subject matter included in manual.
  2. Name and address of Project.
  3. Name and address of Owner.
  4. Date of submittal.
  5. Name and contact information for Contractor.
  6. Name and contact information for Engineer.
  7. Name and contact information for Architect.
  8. Cross-reference to related systems in other operation and maintenance manuals.
- C. Table of Contents: List each product included in manual, identified by product name, indexed to the content of the volume, and cross-referenced to Specification Section number in Project Manual.
1. If operation or maintenance documentation requires more than one volume to accommodate data, include comprehensive table of contents for all volumes in each volume of the set.
- D. Manual Contents: Organize into sets of manageable size. Arrange contents alphabetically by system, subsystem, and equipment. If possible, assemble instructions for subsystems, equipment, and components of one system into a single binder.
- E. Manuals, Electronic Files: Submit manuals in the form of a multiple file composite electronic PDF file for each manual type required.
1. Electronic Files: Use electronic files prepared by manufacturer where available. Where scanning of paper documents is required, configure scanned file for minimum readable file size.
  2. File Names and Bookmarks: Enable bookmarking of individual documents based on file names. Name document files to correspond to system, subsystem, and equipment names used in manual directory and table of contents. Group documents for each system and subsystem into individual composite bookmarked files, then create composite manual, so that resulting bookmarks reflect the system, subsystem, and equipment names in a readily navigated file tree. Configure electronic manual to display bookmark panel on opening file.
- F. Manuals, Paper Copy: Submit manuals in the form of hard copy, bound and labeled volumes.
1. Binders: Heavy-duty, three-ring, vinyl-covered, loose-leaf binders, in thickness necessary to accommodate contents, sized to hold 8-1/2-by-11-inch (215-by-280-mm) paper; with clear plastic sleeve on spine to hold label describing contents and with pockets inside covers to hold folded oversize sheets.
    - a. If two or more binders are necessary to accommodate data of a system, organize data in each binder into groupings by subsystem and related components. Cross-reference other binders, if necessary, to provide essential information for proper operation or maintenance of equipment or system.

- b. Identify each binder on front and spine, with printed title "OPERATION AND MAINTENANCE MANUAL," Project title or name, subject matter of contents, and indicate Specification Section number on bottom of spine. Indicate volume number for multiple-volume sets.
2. Dividers: Heavy-paper dividers with plastic-covered tabs for each section of the manual. Mark each tab to indicate contents. Include typed list of products and major components of equipment included in the section on each divider, cross-referenced to Specification Section number and title of Project Manual.
  3. Protective Plastic Sleeves: Transparent plastic sleeves designed to enclose diagnostic software storage media for computerized electronic equipment.
  4. Supplementary Text: Prepared on 8-1/2-by-11-inch (215-by-280-mm) white bond paper.
  5. Drawings: Attach reinforced, punched binder tabs on drawings and bind with text.
    - a. If oversize drawings are necessary, fold drawings to same size as text pages and use as foldouts.
    - b. If drawings are too large to be used as foldouts, fold, and place drawings in labeled envelopes and bind envelopes in rear of manual. At appropriate locations in manual, insert typewritten pages indicating drawing titles, descriptions of contents, and drawing locations.

## 2.3 EMERGENCY MANUALS

- A. Content: Organize manual into a separate section for each of the following:
  1. Type of emergency.
  2. Emergency instructions.
  3. Emergency procedures.
- B. Type of Emergency: Where applicable for each type of emergency indicated below, include instructions and procedures for each system, subsystem, piece of equipment, and component:
  1. Fire.
  2. Flood.
  3. Gas leak.
  4. Water leak.
  5. Power failure.
  6. Water outage.
  7. System, subsystem, or equipment failure.
  8. Chemical release or spill.
- C. Emergency Instructions: Describe and explain warnings, trouble indications, error messages, and similar codes and signals. Include responsibilities of Owner's operating personnel for notification of Installer, supplier, and manufacturer to maintain warranties.
- D. Emergency Procedures: Include the following, as applicable:
  1. Instructions on stopping.
  2. Shutdown instructions for each type of emergency.
  3. Operating instructions for conditions outside normal operating limits.
  4. Required sequences for electric or electronic systems.
  5. Special operating instructions and procedures.

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## 2.4 OPERATION MANUALS

- A. Content: In addition to requirements in this Section, include operation data required in individual Specification Sections and the following information:
1. System descriptions. Use designations for systems indicated on Contract Documents.
  2. Performance and design criteria if Contractor has delegated design responsibility.
  3. Operating standards.
  4. Operating procedures.
  5. License requirements including inspection and renewal dates.
- B. Descriptions: Include the following:
1. Product name and model number. Use designations for products indicated on Contract Documents.
  2. Manufacturer's name.
  3. Equipment identification with serial number of each component.
  4. Equipment function.
  5. Operating characteristics.
  6. Limiting conditions.
  7. Performance curves.
  8. Engineering data and tests.
  9. Complete nomenclature and number of replacement parts.
- C. Operating Procedures: Include the following, as applicable:
1. Startup procedures.
  2. Equipment or system break-in procedures.
  3. Routine and normal operating instructions.
  4. Regulation and control procedures.
  5. Instructions on stopping.
  6. Normal shutdown instructions.
  7. Seasonal and weekend operating instructions.
  8. Required sequences for electric or electronic systems.
  9. Special operating instructions and procedures.
- D. Systems and Equipment Controls: Describe the sequence of operation, and diagram controls as installed.
- E. Piped Systems: Diagram piping as installed and identify color-coding where required for identification.

## 2.5 PRODUCT MAINTENANCE MANUALS

- A. Content: Organize manual into a separate section for each product, material, and finish. Include source information, product information, maintenance procedures, repair materials and sources, and warranties and bonds, as described below.
- B. Source Information: List each product included in manual, identified by product name, and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual and drawing or schedule designation or identifier where applicable.
- C. Product Information: Include the following, as applicable:

1. Product name and model number.
  2. Manufacturer's name.
  3. Color, pattern, and texture.
  4. Material and chemical composition.
  5. Reordering information for specially manufactured products.
- D. Maintenance Procedures: Include manufacturer's written recommendations and the following:
1. Inspection procedures.
  2. Types of cleaning agents to be used and methods of cleaning.
  3. List of cleaning agents and methods of cleaning detrimental to product.
  4. Schedule for routine cleaning and maintenance.
  5. Repair instructions.
- E. Repair Materials and Sources: Include lists of materials and local sources of materials and related services.
- F. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.
1. Include procedures to follow and required notifications for warranty claims.

## 2.6 SYSTEMS AND EQUIPMENT MAINTENANCE MANUALS

- A. Content: For each system, subsystem, and piece of equipment not part of a system, include source information, manufacturers' maintenance documentation, maintenance procedures, maintenance and service schedules, spare parts list and source information, maintenance service contracts, and warranty and bond information, as described below.
- B. Source Information: List each system, subsystem, and piece of equipment included in manual, identified by product name, and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual and drawing or schedule designation or identifier where applicable.
- C. Manufacturers' Maintenance Documentation: Manufacturers' maintenance documentation including the following information for each component part or piece of equipment:
1. Standard maintenance instructions and bulletins.
  2. Drawings, diagrams, and instructions required for maintenance, including disassembly and component removal, replacement, and assembly.
  3. Identification and nomenclature of parts and components.
  4. List of items recommended to be stocked as spare parts.
- D. Maintenance Procedures: Include the following information and items that detail essential maintenance procedures:
1. Test and inspection instructions.
  2. Troubleshooting guide.
  3. Precautions against improper maintenance.
  4. Disassembly; component removal, repair, and replacement; and reassembly instructions.
  5. Aligning, adjusting, and checking instructions.
  6. Demonstration and training video recording, if available.
- E. Maintenance and Service Schedules: Include service and lubrication requirements, list of required lubricants for equipment, and separate schedules for preventive and routine maintenance and service with standard time allotment.

1. Scheduled Maintenance and Service: Tabulate actions for daily, weekly, monthly, quarterly, semiannual, and annual frequencies.
  2. Maintenance and Service Record: Include manufacturers' forms for recording maintenance.
- F. Spare Parts List and Source Information: Include lists of replacement and repair parts, with parts identified and cross-referenced to manufacturers' maintenance documentation and local sources of maintenance materials and related services.
- G. Maintenance Service Contracts: Include copies of maintenance agreements with name and telephone number of service agent.
- H. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.
1. Include procedures to follow and required notifications for warranty claims.

### PART 3 - EXECUTION

#### 3.1 MANUAL PREPARATION

- A. Emergency Manual: Assemble a complete set of emergency information indicating procedures for use by emergency personnel and by Owner's operating personnel for types of emergencies indicated.
- B. Product Maintenance Manual: Assemble a complete set of maintenance data indicating care and maintenance of each product, material, and finish incorporated into the Work.
- C. Operation and Maintenance Manuals: Assemble a complete set of operation and maintenance data indicating operation and maintenance of each system, subsystem, and piece of equipment not part of a system.
1. Engage a factory-authorized service representative to assemble and prepare information for each system, subsystem, and piece of equipment not part of a system.
  2. Prepare a separate manual for each system and subsystem, in the form of an instructional manual for use by Owner's operating personnel.
- D. Manufacturers' Data: Where manuals contain manufacturers' standard printed data, include only sheets pertinent to product or component installed. Mark each sheet to identify each product or component incorporated into the Work. If data include more than one item in a tabular format, identify each item using appropriate references from the Contract Documents. Identify data applicable to the Work and delete references to information not applicable.
1. Prepare supplementary text if manufacturers' standard printed data are not available and where the information is necessary for proper operation and maintenance of equipment or systems.
- E. Drawings: Prepare drawings supplementing manufacturers' printed data to illustrate the relationship of component parts of equipment and systems and to illustrate control sequence and flow diagrams. Coordinate these drawings with information contained in record Drawings to ensure correct illustration of completed installation.
1. Do not use original project record documents as part of operation and maintenance manuals.
  2. Comply with requirements of newly prepared record Drawings in Division 01 Section "Project Record Documents."

- F. Comply with Section 017700 "Closeout Procedures" for schedule for submitting operation and maintenance documentation.

END OF SECTION 01 78 23

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## SECTION 01 78 39 - PROJECT RECORD DOCUMENTS

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section includes administrative and procedural requirements for project record documents, including the following:
  - 1. Record Drawings.
  - 2. Record Specifications.
  - 3. Record Product Data.
- B. Related Requirements:
  - 1. Section 017823 "Operation and Maintenance Data" for operation and maintenance manual requirements.
  - 2. Sections 02 through 26 for specific requirements for project record documents of the Work in those Sections.

#### 1.2 CLOSEOUT SUBMITTALS

- A. Record Drawings: Comply with the following:
  - 1. Number of Copies: Submit copies of record Drawings as follows:
    - a. Initial Submittal:
      - 1) Submit PDF electronic files of scanned record prints and one set of file prints.
      - 2) Architect will indicate whether general scope of changes, additional information recorded, and quality of drafting are acceptable.
    - b. Final Submittal:
      - 1) Submit PDF electronic files of scanned record prints and two set(s) of prints.
      - 2) Print each drawing, whether or not changes and additional information were recorded.
- B. Record Specifications: Submit annotated PDF electronic files of Project's Specifications, including addenda and contract modifications.
- C. Record Product Data: Submit one paper copy of each submittal.

### PART 2 - PRODUCTS

#### 2.1 RECORD DRAWINGS

- A. Record Prints: Maintain one set of marked-up paper copies of the Contract Drawings and Shop Drawings, incorporating new and revised Drawings as modifications are issued.



1. Preparation: Mark record prints to show the actual installation where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is Installer, subcontractor, or similar entity, to provide information for preparation of corresponding marked-up record prints.
    - a. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later.
    - b. Record data as soon as possible after obtaining it.
    - c. Record and check the markup before enclosing concealed installations.
  2. Mark the Contract Drawings and Shop Drawings completely and accurately. Use personnel proficient at recording graphic information in production of marked-up record prints.
  3. Mark record sets with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at same location.
  4. Note Construction Change Directive numbers, alternate numbers, Change Order numbers, and similar identification, where applicable.
- B. Format: Identify and date each record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location.
1. Record Prints: Organize record prints and newly prepared record Drawings into manageable sets. Bind each set with durable paper cover sheets. Include identification on cover sheets.
  2. Format: Annotated PDF electronic file with comment function enabled.
  3. Identification: As follows:
    - a. Project name.
    - b. Date.
    - c. Designation "PROJECT RECORD DRAWINGS."
    - d. Name of Architect.
    - e. Name of Contractor.

## 2.2 RECORD SPECIFICATIONS

- A. Preparation: Mark Specifications to indicate the actual product installation where installation varies from that indicated in Specifications, addenda, and contract modifications.
1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
  2. Mark copy with the proprietary name and model number of products, materials, and equipment furnished, including substitutions and product options selected.
- B. Format: Submit record Specifications as annotated PDF electronic file.

## 2.3 RECORD PRODUCT DATA

- A. Preparation: Mark Product Data to indicate the actual product installation where installation varies substantially from that indicated in Product Data submittal.
1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
  2. Include significant changes in the product delivered to Project site and changes in manufacturer's written instructions for installation.
- B. Format: Submit record Product Data as annotated PDF electronic file.

## 2.4 MISCELLANEOUS RECORD SUBMITTALS

- A. Assemble miscellaneous records required by other Specification Sections for miscellaneous record keeping and submittal in connection with actual performance of the Work. Bind or file miscellaneous records and identify each, ready for continued use and reference.
- B. Format: Submit miscellaneous record submittals as PDF electronic file.

## PART 3 - EXECUTION

### 3.1 RECORDING AND MAINTENANCE

- A. Recording: Maintain one copy of each submittal during the construction period for project record document purposes. Post changes and revisions to project record documents as they occur; do not wait until end of Project.
- B. Maintenance of Record Documents and Samples: Store record documents and Samples in the field office apart from the Contract Documents used for construction. Do not use project record documents for construction purposes. Maintain record documents in good order and in a clean, dry, legible condition, protected from deterioration and loss. Provide access to project record documents for Architect's reference during normal working hours.

END OF SECTION 01 78 39

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**SECTION 01 79 00 - DEMONSTRATION AND TRAINING****PART 1 - GENERAL****1.1 RELATED DOCUMENTS**

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

**1.2 SUMMARY**

- A. Section includes administrative and procedural requirements for instructing Owner's personnel, including the following:
  - 1. Demonstration of operation of systems, subsystems, and equipment.
  - 2. Training in operation and maintenance of systems, subsystems, and equipment.
- B. Related Requirements:
  - 1. Sections 02 through 26 for specific requirements for demonstration and training for products in those Sections.

**1.3 QUALITY ASSURANCE**

- A. Instructor Qualifications: A factory-authorized service representative, complying with requirements in Division 01 Section "Quality Requirements," experienced in operation and maintenance procedures and training.

**1.4 CLOSEOUT SUBMITTALS**

- A. At completion of training, submit complete training manual(s) for Owner's use in PDF electronic file format on compact disc.

**1.5 COORDINATION**

- A. Coordinate instruction schedule with Owner's operations. Adjust schedule as required to minimize disrupting Owner's operations and to ensure availability of Owner's personnel.
- B. Coordinate instructors, including providing notification of dates, times, length of instruction time, and course content.
- C. Coordinate content of training modules with content of approved emergency, operation, and maintenance manuals.

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**PART 2 - PRODUCTS****2.1 INSTRUCTION PROGRAM**

- A. Program Structure: Develop an instruction program that includes individual training modules for each system, as required by individual Specification Sections.
- B. Training: Include instruction for the following as applicable to the system:
1. Basis of System Design, Operational Requirements, and Criteria: Include the following:
    - a. System descriptions.
    - b. Performance and design criteria if Contractor is delegated design responsibility.
    - c. Operating standards.
    - d. Regulatory requirements.
    - e. Equipment function.
    - f. Operating characteristics.
    - g. Limiting conditions.
    - h. Performance curves.
  2. Documentation: Review the following items in detail:
    - a. Emergency manuals.
    - b. Operations manuals.
    - c. Maintenance manuals.
    - d. Project record documents.
    - e. Identification systems.
    - f. Warranties and bonds.
    - g. Maintenance service agreements and similar continuing commitments.
  3. Emergencies: Include the following, as applicable:
    - a. Instructions on meaning of warnings, trouble indications, and error messages.
    - b. Instructions on stopping.
    - c. Shutdown instructions for each type of emergency.
    - d. Operating instructions for conditions outside of normal operating limits.
    - e. Sequences for electric or electronic systems.
    - f. Special operating instructions and procedures.
  4. Operations: Include the following, as applicable:
    - a. Startup procedures.
    - b. Equipment or system break-in procedures.
    - c. Routine and normal operating instructions.
    - d. Regulation and control procedures.
    - e. Control sequences.
    - f. Safety procedures.
    - g. Instructions on stopping.
    - h. Normal shutdown instructions.
    - i. Operating procedures for emergencies.
    - j. Operating procedures for system, subsystem, or equipment failure.
    - k. Seasonal and weekend operating instructions.
    - l. Required sequences for electric or electronic systems.
    - m. Special operating instructions and procedures.
  5. Adjustments: Include the following:

- a. Alignments.
  - b. Checking adjustments.
  - c. Noise and vibration adjustments.
  - d. Economy and efficiency adjustments.
6. Troubleshooting: Include the following:
- a. Diagnostic instructions.
  - b. Test and inspection procedures.
7. Maintenance: Include the following:
- a. Inspection procedures.
  - b. Types of cleaning agents to be used and methods of cleaning.
  - c. List of cleaning agents and methods of cleaning detrimental to product.
  - d. Procedures for routine cleaning
  - e. Procedures for preventive maintenance.
  - f. Procedures for routine maintenance.
  - g. Instruction on use of special tools.
8. Repairs: Include the following:
- a. Diagnosis instructions.
  - b. Repair instructions.
  - c. Disassembly; component removal, repair, and replacement; and reassembly instructions.
  - d. Instructions for identifying parts and components.
  - e. Review of spare parts needed for operation and maintenance.

## PART 3 - EXECUTION

### 3.1 PREPARATION

- A. Assemble educational materials necessary for instruction, including documentation. Assemble documentation into a training manual organized in coordination with requirements in Division 01 Section "Operations and Maintenance Data."

END OF SECTION 01 79 00

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**SECTION 01 81 13 – NE-CHPS SUSTAINABLE DESIGN REQUIREMENTS****PART 1 - GENERAL****1.1 GENERAL PROVISIONS**

- A. Drawings and general provisions of the Contract, including General Conditions and Division 01 Specification Sections, apply to this Section.
- B. Northeast Collaborative for High Performance Schools (NE-CHPS) New Construction and Renovations Version 4.0 applies to this Section.

**1.2 SUMMARY**

- A. This Section includes general requirements and procedures for achieving NE-CHPS credits.
- B. Sustainable Design Intent: Comply with project requirements intended to achieve NE-CHPS credits, measured and documented according to the NE-CHPS, of the US Green Building Council (USGBC).
  - 1. Refer to Sections 013345, 013346 & 013347 “NE-CHPS Scorecard”.
  - 2. Refer to individual Specification Sections for additional requirements.
- C. Contractor is responsible for compliance with and completion of all required documentation for all the following NE-CHPS Credits:
  - 1. Materials and Resources Credit 2: Construction Waste Management.
  - 2. Materials and Resource Credit 4: Recycled Content.
- D. Additional requirement information is available from:  
The U.S. Green Building Council (USGBC)  
2101 L Street, NW  
Suite 500  
Washington, DC 20037  
Website: [www.usgbc.org](http://www.usgbc.org)

**1.3 RELATED WORK**

- A. Examine Contract Documents for requirements that affect the work of this Section. Other Specification Sections that relate directly to work of this Section include, but not limited to:
  - 1. Section 013329; Sustainable Design Reporting.
  - 2. Section 017419; Construction Waste management and Disposal.
  - 3. Individual Specification Sections identifying sustainable requirements.

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#### 1.4 DEFINITIONS

- A. Agrifiber Products: Composite panel products derived from agricultural fiber.
- B. Biobased Product: As defined in the 2002 Farm Bill, a product determined by the Secretary to be a commercial or industrial product (other than food or feed) that is composed, in whole or in significant part, of biological products or renewable domestic agricultural materials (including plant, animal, and marine materials) or forestry materials.
- C. Biobased Content: The weight of the biobased material divided by the total weight of the product and expressed as a percentage by weight.
- D. Certificates of Chain-of-Custody: Certificates signed by manufacturers certifying that wood-based materials and products have been certified in accordance with the Forest Stewardship Council's (FSC) Principles and criteria. Certificates shall include evidence that mill is certified for chain-of-custody by an FSC-accredited certification body.
- E. Construction and demolition Waste: Includes solid wastes, such as building materials, packaging, rubbish, debris, and rubble resulting from construction, remodeling, repair, and demolition operations. A construction waste management plan is to be provided by the Contractor as defined in Section 017419.
- F. NE-CHPS: Northeast Collaborative for High Performance Schools New Construction and Major Renovations Version 4.0, April 2021.
- G. Recycled Content Materials: Products that contain pre-consumer or post-consumer materials as all or part of their feedstock.
- H. Post-Consumer Recycled Content: The percentage by weight of constituent materials that have been recovered or otherwise diverted from the solid-waste stream after consumer use.
- I. Pre-Consumer Recycled Content: Materials that have been recovered or otherwise diverted from the solid-waste stream during the manufacturing process. Pre-consumer content must be material that would not have otherwise entered the waste stream as per Section 5 of the FTC Act, Part 260 "Guidelines for the Use of Environmental Marketing Claims": [www.ftc.gov/bcp/gmrule/guides980427](http://www.ftc.gov/bcp/gmrule/guides980427).
- J. Regional Materials: Materials that are extracted, harvested, recovered, and manufactured within a radius of 500 miles from the Project site.
- K. Salvaged or Reused Materials: Materials extracted from existing buildings in order to be reused in other buildings without being manufactured.
- L. Sealant: Any material that fills and seals gaps between other materials.

- M. Volatile Organic Compounds (VOC's): Any compound of carbon, excluding carbon monoxide, carbon dioxide, carbon acid, metallic carbides or carbonates, and ammonium carbonate, which participates in atmospheric photochemical reactions. Compounds that have negligible photochemical reactivity, listed in EPA 40 CFR 51.100(s), are also excluded from this regulatory definition.

#### 1.5 SUBMITTALS

- A. General: Additional Sustainable Design submittal requirements are included in other sections of the Specification.
- B. Meet requirements of Section 013329, Sustainable Design Reporting.
- C. Sustainable Design Submittals:
1. Recycled Content: Submittals for all materials with recycled content (excluding MEP systems equipment and components) must include the following documentation:
    - a. Cost of each material or product, excluding cost of labor and equipment for installation.
    - b. Manufacturer's product data, product literature, or a letter from the manufacturer verifying the percentage of post-consumer and pre-consumer recycled content (by weight) of each material or product.
- D. Project Materials Cost data: Provide a spreadsheet in an electronic format indicating the total cost for the Project and the total cost of building materials used for the Project as follows:
1. Not more than 10 days after the Preconstruction Meeting, the Contractor shall provide to the Owner and Architect a preliminary schedule of materials costs for all materials used for the Project organized by specification section. Exclude labor costs and all mechanical, electrical, and plumbing (MEP) systems materials and labor costs, Include the following:
    - a. Identify each reused or salvaged material, its cost, and its replacement value.
    - b. Identify each recycled-content material, its post-consumer and pre-consumer recycled content as a percentage the product's weight, its cost, its combined recycled content value ( defined as the sum of the post-consumer recycled content value plus one-half of the pre-consumer recycled content value), and the total combined recycled content value for all materials as a percentage of total materials costs.
    - c. Identify each regional material, its cost, its manufacturing location, the distance of this location from the Project site, the source location for raw material component of the material, the distance of these extraction locations from the Project site, and the total value of regional materials as a percentage of total materials costs.
    - d. Identify each biobased material, its source, its cost, and the total value of biobased materials as a percentage of total materials costs. Also provide the total value of rapidly renewable materials (materials made from plants that are harvested in less than a 10-year cycle) as a percentage of total materials costs.
    - e. Identify each wood-based material, its cost, the total wood-based materials cost, each FSC Certified wood material, its cost, and the total value of FSC Certified wood as a percentage of total wood-based materials costs.
  2. Provide final versions of the above spreadsheets to the Owner and Architect not more than 14 days after Substantial Completion.



## 1.6 QUALITY ASSURANCE

A. Preconstruction Meeting: After award of Contract and prior to the commencement of the Work, schedule and conduct meeting with Owner, Architect, and all Subcontractors to discuss the Construction Waste Management Plan, and all other Sustainable Design Requirements. The purpose of this meeting is to develop a mutual understanding of the Project's Sustainable Design Requirements and coordination of the Contractor's management of these requirements.

B. Construction Job Conferences: The status of compliance with the Sustainable Design Requirements of these specifications will be an agenda item at all regular job meetings conducted during the course of work at the site.

## 2.0 PRODUCTS (Not Used)

## PART 2 - EXECUTION (Not Used)

END OF SECTION 01 81 13

## Introduction

The Northeast CHPS Verified Program (NE-CHPS) has been designed to provide guidance and verification for new school projects, renovations, and new schools on existing campuses to achieve high performance goals. The tables below summarize the criteria and how they apply to different project types.

Points are available for all criteria. Items marked as a prerequisites must still be pursued by all projects as indicated in the criteria. By assigning points to prerequisites, it allows for a more accurate accounting of the relative importance and level of effort associated with each individual section. For example, prerequisites account for nearly a third of all points in Indoor Environmental Quality. Without assigning points to prerequisites, that section seems relatively less important than it truly is.

Version 4.0 includes updates to standards from IECC 2015 to IECC 2018 and from ASHRAE 62.1 and 90.1 2013 to 2016, certain language alignment with US-CHPS, and the inclusion of a new Zero Energy Capable pathway modeled after NEEP's Massachusetts Energy Zero Code.

New construction projects, including new buildings on existing campuses, must achieve at least 110 points total. This includes points associated with all prerequisites. Major renovations must achieve at least 85 points, although they only need to achieve the prerequisites as outlined in Table II below.

*CHPS Verified Leader™* is a higher level of recognition for school projects that perform well beyond minimum eligibility requirements. CHPS Verified Leaders should be CHPS Verified™, and have inspirational designs that incorporate their high performance features into architectural expression. The school should be an image of environmental and social responsibility, and must be balanced in providing benefits to student health and student performance, resource conservation and the environment. To be eligible for recognition as a CHPS Verified Leader, a new school or building on an existing campus project must earn a minimum of 160 points. A major renovation project must earn a minimum of 135 points to be recognized as CHPS Verified Leader project.

Criteria	Title	Prerequisite	Points
<b>Integration and Innovation</b>			
II 1.0	Integrated Design	P	4
II 1.1	Enhanced Integrated Design		2
II 2.1	District Level Commitment		1
II 3.1	School Master Plan		1
II 4.1	High Performance Transition Plan		1
II 5.0	Educational Display	P	1
II 5.1	Demonstration Area		1
II 6.1	Educational Integration		2
II 7.1	Design for Adaptation		3
II 8.0	Safer Schools By Design	P	3
II 9.1	Innovation		4
II 10.1	Biophilic & Responsive Design		2
		<b>I&amp;I Subtotal</b>	21
<b>Operations &amp; Metrics</b>			
OM 1.0	Facility Staff and Occupant Training	P	4
OM 2.1	Post Occupancy Transition		2
OM 3.0	Performance Benchmarking	P	3
OM 4.0	Systems Maintenance Plan	P	1
OM 4.1	High Performance Operations		3
OM 5.0	Indoor Environmental Management Plan	P	2
OM 6.1	Green Cleaning		2
OM 7.0	Integrated Pest Management	P	1
OM 7.0	Anti-Idling Measures	P	1
OM 8.1	Green Power		2
OM 10.0	ENERGY STAR Equipment and Appliances	P	2
OM 11.1	Computerized Maintenance Management System		1
		<b>O&amp;M Subtotal</b>	23
<b>Indoor Environmental Quality</b>			

EQ 1.0	HVAC Design - ASHRAE 62.1	P	8
EQ 1.1	Enhanced Filtration		2
EQ 1.2	Dedicated Outdoor Air System		3
EQ 2.1	Pollutant and Chemical Source Control	P	2
EQ 3.0	Outdoor Moisture Management	P	1
EQ 4.1	Ducted Returns		2
EQ 5.1	Construction Indoor Air Quality Management		5
EQ 5.2	Construction Moisture Management		1
EQ 6.1	Post Construction Indoor Air Quality		1
EQ 7.0	Low Emitting Materials	P	2
EQ 7.1	Additional Low Emitting Materials		5
EQ 8.1	Low Radon		1
EQ 9.1	Thermal Comfort - ASHRAE 55		4
EQ 10.1	Individual Controllability		1
EQ 10.2	Controllability of Systems		1
EQ 11.0	Daylighting: Glare Protection	P	4
EQ 11.1	Daylight Availability		5
EQ 12.0	Views	P	1
EQ 12.1	Additional Views		2
EQ 13.1	Electric Lighting Performance		3
EQ 13.2	Superior Electric Lighting Performance		5
EQ 14.0	Acoustical Performance	P	7
EQ 15.1	Low-EMF Wiring		1
EQ 15.2	Low-EMF Best Practices		2
EQ 16.1	High Intensity Fluorescent Fixtures		1
<b>IEQ Subtotal</b>			76
<b>Energy</b>			
EE 1.0	Energy Performance	P	6
EE 1.1	Superior Energy Performance		40
EE 2.1	Zero Energy Capable		3
EE 3.0	Commissioning	P	4
EE 3.1	Additional Commissioning Qualifications		1

EE 3.2	Building Envelope Commissioning		1
EE 3.3	Enhanced Commissioning		1
EE 4.0	Environmentally Preferable Refrigerants	P	1
EE 5.1	Energy Management System		2
EE 5.2	Advanced Energy Management System and Submetering		2
EE 6.1	Natural Ventilation and Energy Conservation Interlocks		2
EE 7.0	Local Energy Efficiency Incentive and Assistance	P	2
EE 8.1	Variable Air Volume Systems		1
EE 9.1	Renewable Energy Performance Monitoring		1
EE 10.1	Electric Vehicle Charging		1
<b>Energy Subtotal</b>			68
<b>Water</b>			
WE 1.0	Minimum Reduction in Indoor Potable Water Use	P	5
WE 2.1	Reduce Potable Water Use for Sewage Conveyance		4
WE 3.0	Irrigation and Exterior Water Budget - Use Reduction	P	4
WE 4.1	Reduce Potable Water Use for Non-Recreational Landscaping		2
WE 5.1	Reduce Potable Water Use for Recreational Landscaping		1
WE 6.0	Irrigation Systems Commissioning	P	1
WE 7.1	Rainwater Collection and Storage		2
WE 8.1	Water Management System		2
<b>Water Subtotal</b>			21
<b>Sites</b>			
SS 1.0	Site Selection	P	2
SS 2.1	Environmentally Sensitive Land		3
SS 3.1	Minimize Site Disturbance		1
SS 4.1	Construction Site Runoff Control and Sedimentation		1
SS 5.1	Poste Construction Stormwater Management		1
SS 6.1	Central location		2
SS 7.1	Located Near Public Transportation		1
SS 8.1	Joint-Use of Facilities		1
SS 9.1	Human-Powered Transportation		2

SS 10.1	Reduce Heat Islands - Landscaping and Sites		1
SS 11.1	Reduce Heat Islands - Cool Roofs and Green Walls		1
SS 12.1	Avoid Light Pollution and Unnecessary Lighting		2
SS 13.1	School Gardens		1
SS 14.1	Use Locally Native Plants for Landscape		1
SS 15.0	Site and Building Best Practices	P	2
<b>Sites Subtotal</b>			22
<b>Materials and Waste Management</b>			
MW 1.0	Storage and Collection of Recyclables	P	2
MW 2.0	Minimum Construction Site Waste Management	P	2
MW 2.1	Construction Site Waste Management		2
MW 3.1	Single Attribute - Recycled Content		2
MW 4.1	Single Attribute - Rapidly Renewable Materials		1
MW 5.1	Single Attribute - Certified Wood		1
MW 6.1	Single Attribute - Materials Reuse		1
MW 7.1	Multi-Attribute Materials Selection		2
MW 8.1	Building Reuse - Exterior		2
MW 9.1	Building Reuse - Interior		1
MW 10.1	Health Product Related Information Reporting		1
MW 11.1	Locally Produced Materials		2
<b>M&amp;W Subtotal</b>			19
<b>Total Points</b>			<b>250</b>

**Table II: Renovation Requirements**

Prerequisite	Renovation / Requirements					Commentary
	HVAC	Lighting	Envelope	Interior	Site	Prerequisites are limited to the scope of work of the project unless noted otherwise.
<b>Integration</b>						
II 1.0 Integrated Design	x	x	x	x	x	Flexibility in timing of meetings allowed.
<b>Operations and Maintenance</b>						
OM 1.0 Facility Staff & Occupant Training						Prerequisite applies only for systems that are within scope of work and for teacher and administrative staff, if affected.
Facility Staff	x	x	x	x	x	
Teacher and Administrative Staff	x	x		x		
OM 3.0 Performance Benchmarking Adopt Policy	x	x	x			Prerequisite applies when more than 50% of school is within pertinent scope of work.
<p><b>Deferrals:</b></p> <p><b>For Phased Renovation projects</b></p>						Schools can be incrementally recognized if in conjunction with a High Performance Transition Plan (HPTP). See II.4.1.
<b>Indoor Environmental Quality</b>						
EQ 1.0 HVAC Design – ASHRAE 62.1	x					Required in entirety when HVAC system is substantially improved, i.e., equipment and ductwork; otherwise required within scope of work.
Minimum Filtration (MERV 11)	x					Required when new HVAC system is installed.
EQ.7.0 Low-Emitting Materials						
Paints and Coatings			x	x		
Flooring Systems				x		
Composite Wood			x	x		
EQ.11.0 Daylighting: Glare Protection		x	x	x		Required only when the envelope is substantially improved; at least 70% of classrooms, libraries & administration  Exceptions: structural constraints, physical constraints, i.e., HVAC or electrical conduit systems, rooms without exterior access or site obstructions but never less than 50% of spaces is allowed to meet prerequisite.

EQ.14.0 Acoustical Performance*						
Reverberation				x		Required only in classrooms where any interior changes are made to walls.
HVAC Background noise	x		x			Required when HVAC equipment & ductwork and any envelope improvement is within scope. Only impacted classrooms need to comply.
Exterior Source noise			x	x		Required only in classrooms where exterior windows or exterior walls are within the scope of work.
			x	x		*Alternatively use the HPTP to request a mitigation plan compliance pathway.
<b>Energy</b>						
EE.1.0 Energy Performance	x	x	x			Components of ASHRAE 62.1 are triggered by specific scope.
EE.3.0 Commissioning	x	x				
<b>Water</b>						
All prerequisites triggered by scope.						
<b>Site</b>						
SS.1.0 Site Selection					x	US EPA Facility Assessment in School Siting Guidelines.
<b>Materials and Waste Management</b>						
MW 1.0 Storage and Collection of Recyclables			x	x		



## Collaborative for High Performance Schools (CHPS)

### Project Scorecard: NE-CHPS Version 3.2

**School Name:**

<b>Expected Completion:</b>	<b>Current Phase:</b>		
<b>School District:</b>	<b>Website:</b>		
<b>School Address:</b>	<b>City:</b>	<b>State:</b>	<b>Zip:</b>
<b>School Contact:</b>	<b>Phone:</b>	<b>E-mail:</b>	
<b>Student Capacity:</b>	<b>Notes:</b>		
<b>Approximate Square Feet:</b>			

**Verification**

Is this the final CHPS Scorecard?

Registered Principal Architect (Signature)

Project Manager (Signature)

Name, Title, Date (Please print)

Name, Title, Date (Please print)

Use this scorecard to track expected scores. Note that prerequisites have points associated with them even though they are required. This enables project teams to talk more meaningfully about the effort being put into each section of the Criteria. Prerequisite point columns are also highlighted for reference. Mark each credit as ready for review by using the appropriate column for each phase of the review.

**Key:** P - Prerequisite; PS - CHPS Plan Sheet Required; CD - Construction Documents Required; A - Attachment Required

Criteria	Title	Prerequisite	Points Possible	Points Targeted	Points Claimed	Responsible Team Member	Design Review Requirements	Ready for Design Review	Construction Review Requirements	Ready for Construction Review	Construction Documents Review Requirements	Ready for Performance Review	Documentation
							CD	A	CD	A	CD	A	
<b>Total</b>			<b>250</b>										
<b>Integration and Innovation</b>													
II 1.0	Integrated Design	P	4				CD			A			
II 1.1	Enhanced Integrated Design		2					A					
II 2.1	District Level Commitment		1					A					
II 3.1	School Master Plan		1					A					
II 4.1	High Performance Transition Plan		1					A		A			
II 5.0	Educational Display	P	1				CD			A			
II 5.1	Demonstration Area		1				CD			A			
II 6.1	Educational Integration		2					A		A			
II 7.1	Climate Change Action / Carbon Footprint Reporting		3					A		A			
II 8.0	Crime Prevention through Environmental Design	P	3							A			
II 9.1	Innovation		4				VARIABLES		VARIABLES		VARIABLES		
II 10.1	Biophilic Design		2					A		A			
<b>Subtotal</b>													
<b>Operations &amp; Metrics</b>													
OM 1.0	Facility Staff and Occupant Training	P	4				CD			A			
OM 2.1	Post Occupancy Transition		2					A					
OM 3.0	Performance Benchmarking	P	3					A		A		A	
OM 4.1	High Performance Operations		4					A		A		A	
OM 5.0	Systems Maintenance Plan	P	1							A			
OM 6.0	Indoor Environmental Management Plan	P	2							A			
OM 7.1	Green Cleaning		2							A		A	
OM 8.0	Integrated Pest Management	P	1				PS			A			
OM 9.0	Anti-Idling Measures	P	1				CD			A			
OM 10.1	Green Power		2					A					
OM 11.0	ENERGY STAR Equipment and Appliances	P	2					A					
OM 12.1	Computerized Maintenance Management System		1				PS			A			
<b>Subtotal</b>													
<b>Indoor Environmental Quality</b>													
EQ 1.0	HVAC Design - ASHRAE 62.1	P	8				PS						
EQ 1.1	Enhanced Filtration		2				CD			A			
EQ 1.2	Dedicated Outdoor Air System		3				CD			A			
EQ 2.0	Pollutant and Chemical Source Control	P	2				CD	A		A			
EQ 3.0	Outdoor Moisture Management	P	1				CD			A			
EQ 4.1	Ducted Returns		2				CD						
EQ 5.1	Construction Indoor Air Quality Management		5				CD			A			
EQ 5.2	Construction Moisture Management		1				CD			A			
EQ 6.1	Post Construction Indoor Air Quality		1				CD			A			
EQ 7.0	Low Emitting Materials	P	2				PS	CD		PS	A		
EQ 7.1	Additional Low Emitting Materials		5				PS	CD		PS	A		
EQ 8.1	Low Radon		1				CD			A			
EQ 9.1	Thermal Comfort - ASHRAE 55		4				PS	CD					
EQ 10.1	Individual Controllability		1				CD			A			
EQ 10.2	Controllability of Systems		1				CD			A			
EQ 11.0	Daylighting: Glare Protection	P	4				CD	A		A			
EQ 11.1	Daylight Availability		5				PS	CD	A		A		
EQ 12.0	Views	P	3				PS	CD					
EQ 13.1	Electric Lighting Performance		3				CD	A					
EQ 13.2	Superior Electric Lighting Performance		5				CD			A			
EQ 14.0	Acoustical Performance	P	7				PS	CD	A		A		A
EQ 15.1	Low-EMF Wiring		1				CD			A			
EQ 15.2	Low-EMF Best Practices		2				CD	A		A			
EQ 16.1	High Intensity Fluorescent Fixtures		1				CD			A			
<b>Subtotal</b>													

Energy												
EE 1.0	Energy Performance	P	6						CD	A		
EE 1.1	Superior Energy Performance		40						CD	A		
EE 2.1	Zero Net Energy Capable		3						CD			
EE 3.0	Commissioning	P	4						CD	A	A	
EE 3.1	Additional Commissioning Qualifications		1						CD	A	A	
EE 3.2	Building Envelope Commissioning		1						CD	A	A	
EE 3.3	Enhanced Commissioning		1						CD	A	A	A
EE 4.0	Environmentally Preferable Refrigerants	P	1						CD			
EE 5.1	Energy Management System		2						CD			
EE 5.2	Advanced Energy Management System and Submetering		2						CD			
EE 6.1	Natural Ventilation and Energy Conservation Interlocks		2					PS	CD		A	
EE 7.0	Local Energy Efficiency Incentive and Assistance	P	2							A	A	
EE 8.1	Variable Air Volume Systems		1						CD			
EE 9.1	Renewable Energy Performance Monitoring		1						CD		A	
EE 10.1	Electric Vehicle Charging		1						CD		A	
Subtotal												
Water												
WE 1.0	Minimum Reduction in Indoor Potable Water Use	P	5					PS	CD		A	
WE 2.1	Reduce Potable Water Use for Sewage Conveyance		4					PS	CD		A	
WE 3.0	Irrigation and Exterior Water Budget - Use Reduction	P	4						CD		A	
WE 4.1	Reduce Potable Water Use for Non-Recreational Landscaping		2						CD	A	A	
WE 5.1	Reduce Potable Water Use for Recreational Landscaping		1						CD		A	
WE 6.0	Irrigation Systems Commissioning	P	1							A	A	
WE 7.1	Rainwater Collection and Storage		2					PS	CD			
WE 8.1	Water Management System		2						CD		A	
Subtotal												
Sites												
SS 1.0	Site Selection	P	2							A		
SS 2.1	Environmentally Sensitive Land		3					PS	CD	A		
SS 3.1	Minimize Site Disturbance		1					PS	CD			
SS 4.1	Construction Site Runoff Control and Sedimentation		1						CD		A	
SS 5.1	Poste Construction Stormwater Management		1					PS	CD		A	
SS 6.1	Central location		2					PS		A		
SS 7.1	Located Near Public Transportation		1							A		
SS 8.1	Joint-Use of Facilities		1						CD	A		
SS 9.1	Human-Powered Transportation		2					PS	CD		A	
SS 10.1	Reduce Heat Islands - Landscaping and Sites		1						CD			
SS 11.1	Reduce Heat Islands - Cool Roofs and Green Walls		1						CD		A	
SS 12.1	Avoid Light Pollution and Unnecessary Lighting		2						CD		A	
SS 13.1	School Gardens		1						CD	A	A	
SS 14.1	Use Locally Native Plants for Landscape		1					PS	CD			
SS 15.0	Site and Building Best Practices	P	2					PS	CD	A		
Subtotal												
Materials and Waste Management												
MW 1.0	Storage and Collection of Recyclables	P	2						CD		A	
MW 2.0	Minimum Construction Site Waste Management	P	2						CD		A	
MW 2.1	Construction Site Waste Management		2						CD		A	
MW 3.1	Single Attribute - Recycled Content		2						CD		PS	A
MW 4.1	Single Attribute - Rapidly Renewable Materials		1						CD		PS	A
MW 5.1	Single Attribute - Certified Wood		1						CD		PS	A
MW 6.1	Single Attribute - Materials Reuse		1						CD		PS	A
MW 7.1	Multi-Attribute Materials Selection		2					PS	CD		PS	A
MW 8.1	Building Reuse - Exterior		2						CD		PS	A
MW 9.1	Building Reuse - Interior		1						CD		PS	A
MW 10.1	Health Product Related Information Reporting		1						CD		PS	A
MW 11.1	Locally Produced Materials		2						CD		PS	A
Subtotal												
Total			250									

# Rhode Island Addendum

Verification in Rhode Island will follow the requirements provided in the NE-CHPS. The Rhode Island [Green Buildings Act](#) requires that all new construction projects over 5,000 gsf, and all renovation projects over 10,000 gsf, constructed by a “public agency”... be designed and constructed to the LEED Certified or equivalent high performance green building standard. These rules are clarified by [implementation regulations](#) stating that LEED Equivalent Standards include High Performance Schools Standards, as required by the Rhode Island Department of Elementary and Secondary Education, as a condition of construction reimbursement. Additionally, [School Construction Regulations](#) established by the Rhode Island Department of Education (RIDE) include a 2% - 4% incentive for approved projects that demonstrate both energy and water efficiency cost reduction beyond the minimum school construction threshold requirements as defined in NE-CHPS. The Energy and Water Efficiency Incentive stipulates:

Districts are eligible for 2% additional reimbursement funds for projects that achieve energy efficiency 30% above the RI Building Energy Code; 3% additional reimbursement for energy efficiency 40% above the RI Building Energy Code; and 4% additional reimbursement for energy efficiency 50% above the RI Building Energy Code. For purposes of Rhode Island School construction regulations, this addendum clarifies that the term “RI Building Energy Code” henceforth shall be defined as the 2009 International Energy Conservation Code.

Projects utilizing NE-CHPS should refer to the table below in order to determine their performance relative to the RI Building Energy Code. This is because school construction incentives shall be granted relative to the 2009 International Energy Conservation Code (IECC), but NE-CHPS 4.0 is based on the 2018 version.

Points	NE-CHPS Reduction Requirement (IECC 2015)	zEPI Equivalent	Reduction from RI Code (Anchored to IECC 2009)
Prerequisite	10% minimum reduction	49	23.5%
12 points	20% minimum reduction	43	32%
18 points	30% minimum reduction	38	40.5%
22 points	40% minimum reduction	32	49%
25 points	50% minimum reduction	27	57.5%
28 points	60% minimum reduction	22	66%
31 points	70% minimum reduction	16	74.5%
34 points	80% minimum reduction	11	83%
37 points	90% minimum reduction	5	91.5%
40 points	100% minimum reduction (zero net-energy school)	0	100%

Rhode Island's School Construction Regulations and further information can be found at:  
<http://www.ride.ri.gov/Finance/Funding/construction/>

## RI High Performance Schools Scorecard Addendum

Section	Description	Comments
II 2.1- District Level Commitment	Prerequisite	CHPS membership is available at no cost.
II 3.1 Facilities Master Plan	Prerequisite	Also required for RIDE " <a href="#">Necessity of School Construction Application</a> "
II 4.1 High Performance Transition Plan (HPTP)	Prerequisite	Local Educational Authority (LEA) should notify RIDE (emails below), not CHPS, of plan's progress
II. 6.1 Educational Integration	Prerequisite	Should align with <a href="#">Rhode Island Environmental Educator's Association's School as a Tool Protocol</a>
OM 11.1 Computerized Maintenance Management System	Prerequisite	
EQ 8.0 Radon	Prerequisite	State Law Requires
EE 7.0 Energy Efficiency Incentives	Additional Resource	Link to: <a href="#">Rhode Island's incentive/rebate programs</a>
EE Energy/Water Efficiency	Demonstrate 30% energy and water reduction beyond code	Eligible for 2% additional reimbursement funds
EE Energy/Water Efficiency	Demonstrate 40% energy and water reduction beyond code	Eligible for 3% additional reimbursement funds
EE Energy/Water Efficiency	Demonstrate 50% energy and water reduction beyond code	Eligible for 4% additional reimbursement funds

### Rhode Island School as a Tool Protocol SCHOOL/DISTRICT Agreement

SCHOOL/DISTRICT \_\_\_\_\_

By this agreement, the SCHOOL/DISTRICT commits to implementing the School as a Tool / RI Sustainable Schools Protocol, pursuant to the RIDE School Construction Program.

The SCHOOL/DISTRICT has extensive infrastructure ideal for the School as a Tool protocol. The school itself can become a hands-on teaching tool to enable instruction about the benefits of high-performance design as well as to help prepare an environmentally literate student body. According to the RI Environmental Literacy Plan (2011), an environmentally literate student is one who has “the opportunity to become aware, inquire, investigate, and develop responsible citizenship action plans or behavior regarding local, national, or global environmental issues.” In preparing environmentally literate students, RI schools and communities also “have the opportunity to concurrently improve students’ proficiency” in core academic areas.

The SCHOOL/DISTRICT will develop the School as a Tool program by integrating sustainability through curriculum, campus, and community as outlined in the five (5) components below.

### **I. Establish a Green Team**

The SCHOOL/DISTRICT will assemble a motivated and empowered group of stakeholders including, but not limited to, principals, teachers, facility managers, students, nurses, and/or parents. The Green Team will:

- adopt an environmental vision statement specific to the SCHOOL/DISTRICT.
- plan and develop an action plan to be shared with all stakeholders.
- meet on a regular basis to implement, and monitor the action plan.
- coordinate and direct School as a Tool related initiatives and activities.

*Resources for establishing a green team:*

- *Green Schools Initiative:* <http://greenschools.net/>
- *Healthy Schools Campaign:* <http://www.greencleanschools.org/>
- *RIC Green Initiatives:* <http://www.ric.edu/green/>
- *URI Green Team:* <http://www.uri.edu/sustainability/greenteams.php>
- *The Green Team (Massachusetts):* <http://www.thegreenteam.org/>
- *Eco-Schools:* <http://www.eco-schools.org/>

### **II. Conduct a School Environment Survey**

Students and teachers will engage in data collection to acquire information about the SCHOOL/DISTRICT that will inform their forthcoming decisions.

- The survey might collect data on: greenhouse gas emissions; water quality and conservation; waste production and disposal; recycling; transportation methods; pest management; air quality; cleaning products and chemical management; physical fitness and outdoor time; food and nutrition; environmental education activities; and more.

*Resources for conducting a school environment survey:*

- *RI Green Ribbon Schools Online Application:* <http://www.ride.ri.gov/finance/funding/construction/schoolconstruction.aspx>
- *Green Flag Schools' The School Environment Survey:* <http://www.greenflagschools.org/Survey.pdf>
- *US EPA Healthy School Environment Resources:* <http://cfpub.epa.gov/schools/index.cfm>
- *Energy Education & Workforce Development:* <http://www1.eere.energy.gov/education/lessonplans/default.aspx>

### **III. Integrate Environmental Literacy into the Existing Curriculum**

Using the school as a hands-on laboratory and integrating environmental education activities into science, math, civics and government, engineering and technology, language arts, art, and elective courses provides abundant

opportunity for real world problem solving and instruction on the benefits of the SCHOOL/DISTRICT's sustainable building. The following section describes five (5) key elements in the School as a Tool program, each followed by examples of how the SCHOOL/DISTRICT may integrate them into the curriculum.

- Integrate environmental and sustainability concepts throughout the curriculum. Examples include:
  - creating environmental education units and lesson plans aligned to state and national standards (i.e. Common Core State Standards, Grade Level Expectations/Grade Span Expectations, etc.).
  - using sustainability and the environment as a context for learning science, technology, engineering and mathematics thinking skills and content knowledge.
  - establishing opportunities for interdisciplinary learning about the key relationships between environmental, energy and human systems.
  - allowing students to undertake study of environmental and sustainability themes such as energy, water, forest, pollution, and waste.
  - providing real-world contexts and relevant issues by using the facility as a teaching tool for indoor environmental quality, energy efficiency, renewable energy, and more.
  - involving the entire school in initiatives such as saving water, recycling, and saving energy.
  - using sustainability and the environment as a context for learning green technologies and career pathways.
  - offering environmental science courses.
- Integrate environmental literacy into student exhibitions, portfolios, and course assessments. Examples include:
  - incorporating environmental and sustainability concepts into classroom based and school wide assessments.
  - allowing students' civic and community engagement projects to focus on environmental and sustainability topics.
  - creating an environmental or sustainability literacy graduation requirement.
- Provide and/or promote professional development opportunities in environmental and sustainability education for all teachers.
- Promote outdoor education and time spent in nature. Examples include:
  - using the school yard, parks, and/or field trips to engage students in meaningful outdoor learning experiences at every grade level.
  - using outdoor settings to teach an array of subjects in contexts, engage the broader community, and develop civic skills.
- Increase alignment to North American Association for Environmental Education's (NAAEE) Guidelines for Learning.

*Resources for integrating environmental literacy into the existing curriculum:*

- *RI Environmental Literacy Plan:*  
[http://rieaa.org/images/stories/RI/documents/ri\\_elp\\_plan\\_2011.pdf](http://rieaa.org/images/stories/RI/documents/ri_elp_plan_2011.pdf) (NEEDS TO BE UPDATED)
- *NAAEE's Guidelines for Learning:*  
<http://eelinked.naaee.net/n/guidelines/topics/Excellence-in-EE-Guidelines-for-Learning-K-12>
- *Green Ribbon Schools:* <http://www2.ed.gov/programs/green-ribbon-schools/index.html>
- *Green Strides Resources:* <http://www2.ed.gov/about/inits/ed/green-strides/resources.html>
- *PLT Green Schools! Program:* <http://www.plt.org/about-project-learning-tree-greenschools-program>
- *Green Education Foundation:* <http://www.greeneducationfoundation.org/>

#### **IV. Inform and Involve the Community**

The SCHOOL/DISTRICT will facilitate communication about the School as a Tool program within and outside of the whole school community. Such activities can include:

- partnering with external organizations to implement the School as a Tool program.
- operating an information kiosk in the community where information pertaining to the School as a Tool program is regularly updated.
- developing a website/webpage to update the community on the School as a Tool program.

- organizing a semi-annual or annual event to showcase the ways in which students are involved in the School as a Tool program.
- conducting educational workshops for school personnel, parents, students, and/or community members.

*Resources for informing and involving the community:*

- *RI Environmental Education Association: <http://rieaa.org/>*
- *Sustainable Schools Network: <http://www.apeiron.org/new/education/rissn.php>*
- *Earth Day Network: <http://edu.earthday.org/>*

## **V. Monitor and Evaluate Progress**

By gathering and analyzing information and data initiated through the School as a Tool program, the SCHOOL/DISTRICT will be able to measure progress, inform future decisions, and even promote the program when applying for recognition or funding. Such activities can include:

- conducting an annual school survey of teachers, students, parents, and other project partners.
- facilitating an annual meeting or seminar to obtain feedback from project partners.

*Resources for monitoring and evaluating progress:*

- *Educational Survey Templates: <http://www.surveymonkey.com/mp/education-survey-templates/>*
- *School Survey Templates: <http://www.websurveymaster.com/1-School-Survey-templates->*

## **VI. Apply to the Green Ribbon Schools Program**

The SCHOOL/DISTRICT will apply for a Green Ribbon Schools Award, a national program that recognizes schools that save energy, reduce costs, feature environmentally sustainable learning spaces, protect health, foster wellness, and offer environmental education to boost academic achievement and community engagement.

*Resources for applying to the Green Ribbon Schools Program:*

- *Online Application: <http://www.ride.ri.gov/finance/funding/construction/schoolconstruction.aspx>*
- *US Department of Education Green Ribbon Schools: <http://www2.ed.gov/programs/green-ribbon-schools/index.html>*

### **Timeline**

By \_\_\_\_\_, the SCHOOL/DISTRICT will submit an environmental vision statement, action plan, roster, and meeting schedule.

By \_\_\_\_\_, the SCHOOL/DISTRICT will submit the results from the school environment survey.

By \_\_\_\_\_, the SCHOOL/DISTRICT will submit a preliminary proposal for how it will integrate environmental literacy into the curriculum; inform and involve the community; and monitor and evaluate progress.

By \_\_\_\_\_, the SCHOOL/DISTRICT will submit a final program description for how it will integrate environmental literacy into the curriculum; inform and involve the community; and monitor and evaluate progress.

By \_\_\_\_\_, the SCHOOL/DISTRICT will implement the approved program.

By \_\_\_\_\_, the SCHOOL/DISTRICT will apply to the Green Ribbons School program.

In addition, the SCHOOL/DISTRICT will welcome the opportunity to be active participants in sustainable schools opportunities in the future. These activities might include participation in sustainable schools meetings or hosting RIDE-sponsored events such as sustainable schools meetings.

\_\_\_\_\_  
Signature of SCHOOL/DISTRICT authorized representative

\_\_\_\_\_  
Date

\_\_\_\_\_  
Print name of SCHOOL/DISTRICT authorized representative

\_\_\_\_\_  
Title of SCHOOL/DISTRICT authorized representative

\_\_\_\_\_  
SCHOOL/DISTRICT



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**SECTION 01 81 19 – INDOOR AIR QUALITY REQUIREMENTS****PART 1 - GENERAL****1.1 CONSTRUCTION IAQ MANAGEMENT GOALS FOR THE PROJECT**

- A. The Owner has established that this Project shall minimize the detrimental impacts on Indoor Air Quality (IAQ) resulting from construction activities. Factors that contaminate indoor air, such as dust entering HVAC systems and ductwork, improper storage of materials on-site, poor housekeeping, shall be minimized.

**1.2 SUMMARY**

- A. This Section includes requirements for the development of a Construction Indoor Air Quality Management Plan (alternately referred to as “the Plan”),
1. Develop the Plan for approval by the Owner and Architect.
  2. The Plan shall be implemented throughout the duration of the project construction.
  3. The Plan shall be documented as outlined in the Submittal Requirements of Paragraph 1.7 below.
  4. The Plan is included as part of the LEED and NE-CHPS requirements for the project.
- B. Related Sections:
1. All sections of the Specifications related to interior construction, MEP systems, and items affecting indoor air quality.
  2. Section 018113 “NE-CHPS Sustainable Design Requirements” for sustainable design requirements.
  3. Section 019113 “General Commissioning Requirements” for verification and compilation of equipment operation.
  4. Section 099100 “Painting” for paint VOC contents.

**1.3 DEFINITIONS**

- A. Volatile Organic Compounds (VOC’s):
1. Chemical compounds common in and emitted by many building products, including solvents in paints, coatings, adhesives and sealants, wood preservatives, composite wood binder, and foam insulations.
  2. Not all VOCs are harmful, but many of those contained within building products contribute to the formation of smog and irritate (at best) building occupants by their smell and/or health impact.
- B. Materials that act as “sinks” for VOC contamination: Absorptive materials, typically dry and soft (such as textiles, carpeting, acoustical ceiling tiles and gypsum board) that readily absorb VOCs emitted by “source” materials and release them over a prolonged period of time.
- C. Materials that act as “sources” for VOC contamination: Products with high VOC contents that emit VOC’s either rapidly during application and curing (typically “wet” products, such as paints, sealants, adhesives, caulks, and sealers) or over a prolonged period (typically “dry” products such as flooring coverings with plasticizers and engineered wood with formaldehyde).

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#### 1.4 REFERENCES, RESOURCES

- A. "IAQ Guidelines for Occupied Buildings under Construction", First Edition, November 1995, The Sheet Metal and Air Conditioner Contractors National Association (SMACNA). (703) 803-2980, www.smacna.org.
- B. ANSI/ASHRAE 52.2-1999, "Method of testing General Ventilation Air-Cleaning Devices for Removal Efficiency by Particle Size", www.ashrae.org.

#### 1.5 LEED and NE-CHPS GENERAL REQUIREMENTS

- A. Implement practices and procedures to meet the project's environmental performance goals, which includes achieving LEED and NE-CHPS certification goals identified in this Contract. Specific project goals that may impact this area of work include:
  - 1. Use of recycled-content materials.
  - 2. Use of locally manufactured materials.
  - 3. Use of low-emitting materials
  - 4. Use of certified wood products.
  - 5. Construction waste recycling.
  - 6. The implementation of a construction indoor air quality management plan.
- B. Ensure that the requirements related to these goals, as defined in the sections below, are implemented to the fullest extent. Substitutions, or other changes to the work shall not be allowed if such changes substantially compromise the stated LEED and NE-CHPS Performance Criteria.

#### 1.6 CONSTRUCTION IAQ MANAGEMENT PLAN

- A. Prepare and submit a Construction IAQ Management Plan to the Owner for approval. The Construction IAQ Management Plan shall meet the following criteria:
  - 1. Construction activities shall be planned to meet or exceed the minimum requirements of the Sheet Metal and Air Conditioning National Contractors' Association I (SMACNA) "IAQ Guidelines for Occupied Buildings under Construction", First Edition, 1995.
  - 2. Absorptive materials shall be protected from moisture damage when stored on-site and after installation.
  - 3. If air handlers are to be used during construction, filtration with a Minimum Efficiency Reporting Value (MERV) of 8 must be at each return air grill, as determined by ASHRAE 52.2-1999.
  - 4. Filtration media shall be replaced immediately prior to occupancy. Filtration media shall have a Minimum Efficiency Reporting Value (MERV) of 13 as determined by ASHRAE 52.2-1999.
  - 5. A "Sequence of Finish Installation Plan" shall be developed, highlighting measures to reduce the absorption of VOCs by materials that act as "sinks".
  - 6. Upon approval of the Plan by the Owner and Architect, it shall be implemented through the duration of the construction process and documented in accordance with the Submittal Requirements of Paragraph 1.7 below.
  - 7. After construction ends but before occupancy, comply with one of the following requirements:
    - a. Perform a building flushout with outside air.
    - b. Conduct IAQ testing for air contaminant levels in the building.
  - 8. Prevent exposure of building systems to environmental tobacco smoke during construction. Smoking is prohibited on-site.

- B. Further description of the Construction IAQ Management Plan requirements are as follows:
1. SMACNA Guidelines: Chapter 3 of the referenced “IAQ Guidelines for Occupied Buildings Under Construction”, outline IAQ measures in five categories as listed below. The Construction IAQ Management Plan shall be organized in accordance with the SMACNA format and shall address measures to be implemented in each of the five categories (including subsections). All subsections shall be listed in the Plan, items that are not applicable for this project should be listed as such.
    - a. HVAC Protection:
      1. Return Side.
      2. Central Filtration.
      3. Supply Side.
      4. Duct Cleaning.
    - b. Source Control:
      1. Product Substitution.
      2. Modifying Equipment Operation.
      3. Changing Work Practices.
      4. Local exhaust.
      5. Air cleaning.
      6. Cover or seal.
    - c. Pathway Interruption:
      1. Depressurize Work Area.
      2. Pressurize Occupied Space.
      3. Erect Barriers to Contain Construction Areas.
      4. Relocate Pollutant Sources.
      5. Temporarily Seal the Building.
    - d. Housekeeping.
    - e. Scheduling.
  2. Protection of Materials from Moisture Damage: As part of the “Housekeeping” section of the Construction IAQ Management Plan, measures to prevent installed materials or material stored on-site from moisture damage shall be described. This Section should also describe measures to be taken if moisture damage does occur to absorptive materials during the course of construction.
  3. Replacement of Filtration Media: Under the “HVAC Protection” section of the Construction IAQ Management Plan, a description of the filtration media in all ventilation equipment shall be provided. The description shall include replacement criteria for filtration media during construction, and confirmation of filtration media replacement for all equipment immediately prior to occupancy.
  4. Sequence of Finish Installation for Materials: Where feasible, absorptive materials shall be installed after the installation of materials or finishes which have high short-term emissions of VOC’s, formaldehyde, particulates, or other air-borne compounds.
    - a. Absorptive materials include, but are not limited to:
      1. Acoustical Ceiling panels.
      2. Insulations (exposed to the airstream)
      3. Other woven, fibrous, or porous materials.

- b. Materials with high short-term emissions include, but are limited to:
  1. Adhesives.
  2. Sealants and glazing compounds (specifically those with petrochemical vehicles or carriers).
  3. Paints.
  4. Wood preservatives and finishes.
  5. Control and/or expansion joint fillers.
  6. Hard finishes requiring adhesive installations.
  7. Gypsum board (with associated finish processes and products).
5. Develop a separate sequencing plan that identifies feasible opportunities to meet the above stated goals for the project. The plan shall be submitted to the Architect and Owner in accordance with the Submittal Requirements of Paragraph 1.7 of this specification.
6. Implementation and Coordination: Implement the Construction IAQ Management Plan and coordinate the Plan with all affected trades. Designate one individual as the Construction IAQ Representative, who will be responsible for communicating the progress of the Plan with the Owner and Architect on a regular basis, and for assembling the required LEED and NE-CHPS documentation. Include provisions in the Construction IAQ Management Plan for addressing conditions in the field that do not adhere to the Plan, including provisions to implement a stop work order, or to rectify non-compliant conditions.

## 1.7 SUBMITTALS

- A. Submit the following LEED and NE-CHPS required records and documents:
  1. A copy of the Construction IAQ Management Plan as defined in paragraph 1.7 of this paragraph.
  2. The proposed IAQ Plan shall include, but not limited to, the following:
    - a. Protection of ventilation system components during construction.
    - b. Cleaning and replacing contaminated ventilation system components after construction, including filtration media.
    - c. Temporary ventilation.
    - d. Protection of absorptive materials from moisture damage when stored on-site and after installation, including exterior wall rain protection.
    - e. Sequence of finish installation plan.
    - f. Selection of cleaning products and procedures to be used during construction and final cleaning.
    - g. Other items as required by SMACNA IAQ Guidelines for Occupied Buildings under Construction, Chapter 3.
  3. Product cut-sheets for all filtration media used during construction and installed immediately prior to occupancy, with MERV values highlighted. Cut sheets shall be submitted with the Contractor's or Subcontractor's 'approved' stamp as confirmation that the products are the products installed on the project.
  4. Provide the Architect or Owner's Representative with a minimum of Twelve (12) photographs comprising of at least Four (4) photographs taken on three different occasions during construction. The photographs shall document the implementation of the Construction IAQ Management Plan throughout the course of the project construction. Examples include photographs of ductwork sealing and protection,

temporary ventilation measures, and conditions of on-site materials storage (to prevent moisture damage). Photographs shall be submitted with brief descriptions of the Construction IAQ Management Plan measure documented or be referenced to project meeting minutes or similar project documents which reference to the Construction IAQ Management Plan measure documented.

5. Comply with the requirements of LEED IEQc3.1 and IEQc3.2.
6. Indoor Air Quality (IAQ) Data: Submit emission test data as required, with testing laboratory and date clearly identified.
7. Material Safety Data Sheets (MSDS): Submit for materials as required, with date clearly identified. MSDS must contain specific chemical content data identifying the percent of the total product mass represented by each listed chemical.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 81 19

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**SECTION 01 91 13 - GENERAL COMMISSIONING REQUIREMENTS****PART 1 - GENERAL****1.1 RELATED DOCUMENTS**

- A. The Contractor, Subcontractors, and/or suppliers providing goods and services referenced in or related to this Section shall also be bound by the Related Documents identified in Division 01 Section "Summary."

**1.2 SECTION INCLUDES**

- A. Commissioning Scope
- B. Systems to be Commissioned
- C. Responsibilities
- D. Commissioning Team
- E. Pre-Functional and Functional Check List Sample

**1.3 RELATED SECTIONS**

- A. Division 1 – General Conditions and Requirements
- B. Division 22 - Plumbing
- C. Division 23 – Heating, Ventilating and Air Conditioning
- D. Division 26 - Electrical

**1.4 SCOPE**

- A. The work under this Section is subject to requirements of the Contract Documents including the Owner's General Conditions, Supplementary Conditions, and Division 1 – General Requirements.

**1.5 DESCRIPTION OF WORK**

- A. The objective of commissioning is to provide documented confirmation that a facility fulfills the functional and performance requirements of the building owner, occupants, and operators. To reach this goal, it is necessary for the commissioning process to establish and review the owner's criteria for system function, performance, and maintainability (Design Intent); and to also verify and document compliance with these criteria at start-up, and the initial period of operation. In addition, complete operation, and maintenance (O&M) manuals, as well as training on system operation, should be provided to the building operators to ensure the building continues to operate as intended.
- B. The Commissioning Agent (CA) shall be involved throughout the warranty phase. During construction, the CA develops and coordinates the execution of a testing plan, which includes observing and documenting all systems' performance to ensure that the systems are functioning in accordance with the owner's Design Intent (DI) requirements and the contract documents. The CA is not responsible for design or general construction scheduling, cost estimating, or construction management, but may assist with problem-solving or resolving non-conformance issues or deficiencies. The installing Contractors, TAB Sub and ATC Sub shall be required to provide support of the commissioning under their base Contracts.
- C. The following is a summary of services provided for commissioning:
  - 1. Develop commissioning plan
  - 2. Develop pre-functional and functional test procedures
  - 3. On-site reviews to confirm that systems are ready for commissioning
  - 4. Witness piping and ductwork tests
  - 5. Witness system flushing
  - 6. Review system start-up reports

7. Maintain master deficiency and resolution log
8. Perform prefunctional and functional testing
9. Ensure O&M and commissioning documentation requirements are complete.
10. Coordinate Owner staff training
11. Final report and presentation to Owner
12. Follow up visits after occupancy to review building operations

- D. Commissioning does not reduce responsibility of installing contractors to provide a finished and fully functioning product.
- E. This section shall in no way diminish the responsibility of the Divisions 22, 23, 26 Contractors, Sub-contractors, and Suppliers in performing all aspects of work and testing as outlined in the Contract Documents. Any requirements outlined in this section are in addition to requirements outlined in those divisions.

## 1.6 ABBREVIATIONS

- A. The following are common abbreviations used in the Specifications. Definitions are found further in this Section.

1. A/E - Architect and Design Engineers
2. BAS - Building Automation System
3. CA - Commissioning Agent
4. CM - Construction Manager
5. CT - Commissioning Team
6. Cx - Commissioning
7. Cx Plan - Commissioning Plan
8. CC - Controls Contractor
9. EC - Electrical Contractor
10. FPT - Functional Performance Test
11. MC - Mechanical Contractor
12. OR - Owner's Representative
13. PC - Pre-functional Checklist
14. TAB - Test, Adjust and Balance
15. O&M - Operations & Maintenance
16. RFI - Request for Information

- B. The following Standards shall be used where referenced by the following abbreviations:

1. AABC Associated Air Balance Council
2. ACGIH American Conference of Governmental Industrial Hygienists
3. ADC Air Diffusion Council
4. AGA American Gas Association
5. AIA American Institute of Architects
6. AMCA Air Moving and Conditioning Association
7. ANSI American National Standards Institute
8. API American Petroleum Institute
9. ARI Air Conditioning and Refrigeration Institute
10. ASHRAE American Society of Heating, Refrigerating and Air Conditioning Engineers
11. ASME American Society of Mechanical Engineers
12. ASPE American Society of Plumbing Engineers
13. ASSE American Society of Sanitary Engineers
14. ASTM American Society of Testing and Materials
15. NIST National Institute of Standards and Technology
16. SBI Steel Boiler Industry (Division of Hydronics Institute)
17. SMACNA Sheet Metal and Air Conditioning Contractors National Association
18. UL Underwriters' Laboratories

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## 1.7 DEFINITIONS

- A. Acceptance Phase: Phase of construction after start-up and initial checkout when Functional Performance Tests, O&M documentation review and training occur.
- B. Approval: Acceptance that a piece of equipment or system has been properly installed and is functioning in tested modes according to the Contract Documents.
- C. Architect/Engineer (A/E): Prime consultant (architect) and subconsultants who comprise the design team, generally HVAC Mechanical Designer/Engineer and Electrical Designer/Engineer.
- D. Basis of Design: Documentation of primary thought processes and assumptions behind design decisions made to meet design intent. Describes systems, components, conditions, and methods chosen to meet intent.
- E. Commissioning Agent (CA): Contracted to Owner. CA directs and coordinates day-to-day commissioning activities. CA reports directly to Owner.
- F. Commissioning Plan: Overall plan developed after bidding that provides structure, schedule, and coordination planning for commissioning process.
- G. Construction Manager (CM): The prime contractor for this project. Generally, refers to the CM's subcontractors as well. Also referred to as the Contractor in some contexts. The CM is hired by the Owner and is authorized to oversee fulfillment of all requirements of the Contract Documents.
- H. Contract Documents: Documents binding on parties involved in construction of this project (drawings, specifications, change orders, amendments, contracts, etc.).
- I. Control System: System and components associated with building automation system.
- J. Deferred Functional Tests: Functional tests performed after substantial completion due to partial occupancy, equipment, seasonal requirements, design, or other site conditions that disallow test from being performed.
- K. Deficiency: Condition of a component, piece of equipment or system that is not in compliance with Contract Documents (that is, does not perform properly or is not complying with design intent).
- L. Functional Performance Test Procedures: Commissioning protocols and detailed test procedures and instructions that fully describe system configuration and steps required to determine if the system is performing and functioning properly. These procedures shall be used to document Functional Performance Tests.
- M. Functional Performance Test (FPT): Test of dynamic function and operation of equipment and systems. Systems are tested under various modes, such as during low cooling or heating loads, high loads, component failures, unoccupied, varying outside air temperatures, life safety conditions, power failure, etc. Systems are run through all specified sequences of operation. Components are verified to be responding in accordance with Contract Documents. Functional Performance Tests are executed after pre-functional checklists and start-ups are complete.
- N. Monitoring: Recording of parameters (flow, current, status, pressure, etc.) of equipment operation using data loggers or trending capabilities of control systems.



- O. Overridden Value: Writing over a sensor value in control system to see response of a system (e.g., changing outside air temperature value from 72° F to 52° F to verify economizer operation). See also “Simulated Signal”.
- P. Pre-Functional Checklist (PC): A list of static inspections and elementary component tests that verify proper installation of equipment (e.g., belt tension, oil levels, labels affixed, gauges in place, sensors calibrated, etc.).
- Q. Seasonal Performance Tests: Functional Performance Tests deferred until system(s) ambient conditions are closer to design conditions.
- R. Simulated Condition: Condition created for testing component or system (e.g., applying heat to space temperature sensor to monitor response of VAV box).
- S. Simulated Signal: Disconnecting sensor and using signal generator to send amperage, resistance, or pressure transducer and/or DDC system to simulate value to BAS.
- T. Specifications: Construction specifications of Contract Documents.
- U. Start-up: The activities where systems or equipment are initially tested and operated. Start-up is completed prior to functional testing.
- V. Sub-contractor: Contractors of CM, and their sub-contractors, who provide and install building components and systems.
- W. Test Procedures: Step-by-step process, which must be executed to fulfill test requirements.
- X. Test Requirements: Requirements specifying what modes and functions will be tested. Test requirements are not detailed test procedures and are identified in the Cx Plan.
- Y. Trending: Monitoring using building control system.
- Z. Vendor: Supplier of equipment.
- AA. Warranty Period: Warranty period for entire project, including equipment components.

## 1.8 COORDINATION

- A. Commissioning Team: Members of Commissioning Team (CT) will consist of:
  1. Commissioning Agent (CA)
  2. Owner’s Representative(s) (OR)
  3. Construction Manager (CM)
  4. Architect and Design Engineers (A/E)
  5. Mechanical Contractor (MC)
  6. Electrical Contractor (EC)
  7. Test and Balance Agency (TAB Agency)
  8. Controls Contractor (CC)
  9. Equipment Suppliers and Vendors
- B. Management: Owner will contract services of the CA. The CA directs and coordinates commissioning activities and reports to OR. All members of the Commissioning Team shall cooperate to fulfill responsibilities and objectives of the Contract Documents.
- C. Kick-off Meeting: Just prior to the start of installation, CA will plan, schedule, and conduct a commissioning kick-off meeting. Membership and responsibilities of the commissioning team will be clarified at this meeting. CA will distribute meeting minutes to all parties.

- D. Scheduling:
1. A/E will work with commissioning team to establish required commissioning activities to incorporate in preliminary commissioning schedule. The CM will integrate commissioning activities into master construction schedule. Representatives of the commissioning team will address scheduling problems. Necessary notifications are to be made in a timely manner in order to expedite commissioning.
  2. The CA will provide initial schedule of primary commissioning events at commissioning kick-off meeting. As construction progresses, more detailed schedules are developed by the commissioning team.

## 1.9 SUBMITTALS

- A. Contractor shall provide CA with documentation required for commissioning work. At minimum, documentation shall include Full sequences of operation, O&M data, performance data, any performance test procedures, control drawings and details, start-up reports. In addition, installation and checkout materials actually shipped inside equipment and actual field checkout sheet forms used by factory or field technicians shall be submitted to CA.
- B. CA shall review submittals for conformance as it relates to commissioning. Review is primarily intended to aid in development of functional testing procedures and only secondarily to verify compliance with equipment specifications. The CA shall not be part of the A/E's submittal approval process.
1. CA shall review concurrently with the Engineer of Record the RTU submittals. Any comments, the CA has will be provided to the Engineer for review and inclusion into their own approval process as they see fit.

## 1.10 START-UP PLAN

- A. Sub-contractor responsible for purchase, installation and start-up of equipment develops and submits start-up plan by combining manufacturer's detailed start-up and checkout procedures with normally used field checkout sheets. Plan shall include checklists and procedures with specific boxes or lines for recording and documenting inspections of each piece of equipment.
- B. A/E reviews submitted start-up plan for content and format. Primary role of A/E is to substantiate written documentation for each manufacturer-recommended procedure.

## PART 2 PRODUCTS

### 2.1 TEST EQUIPMENT

- A. Division contractors shall provide all specialized tools, test equipment and instruments required to execute start-up, checkout, and functional performance testing of equipment under their contract.
- B. Test equipment shall be of sufficient quality and accuracy to test and/or measure system performance with tolerances specified. A testing laboratory shall have calibrated test equipment within the previous 12 months. Calibration shall be NIST traceable. Equipment shall be calibrated according to manufacturer's recommended intervals and when dropped or damaged. Calibration tags shall be affixed or certificates readily available.

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## PART 3 EXECUTION

### 3.1 COMMISSIONING OVERVIEW

- A. The following provides a brief overview of typical commissioning tasks during construction and general order in which they occur:
1. Commissioning during construction begins with a kick-off meeting conducted by CA where membership of commissioning team is established, and responsibilities reviewed.
  2. A Commissioning Plan is written up based on the project requirements.
  3. CA schedules subsequent meetings as necessary to plan, coordinate and schedule commissioning activities. Deficiencies and problem resolution will also be discussed at these meetings. Limited meetings anticipated. Zoom where possible.
  4. Sub-contractors develop and submit detailed start-up plans to Cx team.
  5. CM develops, with cooperation of Sub-contractor/vendor, detailed training plan. Training plan is reviewed and approved by commissioning team.
  6. CA develops specific pre-functional checklists and equipment and system Functional Performance Test procedures. C
  7. Sub-contractors inform CA when the pre-functional items are complete.
  8. The Sub-contractors perform start-up and initial checkout. CA collects documentation completed according to approved plans.
  9. Functional Performance Tests are executed by Sub-contractors, under supervision of and documented by CA. This is intended to be at a single site visit but may require additional site visits if issues are discovered.
  10. Items of non-compliance in material, installation or set-up will be corrected at Sub-contractors' expense and system shall be retested.
  11. CM coordinates training sessions and executes training plan. Specific training to be provided as specified in Divisions 23, by Sub-contractor/vendor.

### 3.2 SYSTEMS TO BE COMMISSIONED

The commissioning process shall include the following disciplines and components. However, component types shall be according to the latest contract documents.

1. Rooftop Unit Replacements with
2. Associated Packaged Controls

### 3.3 RESPONSIBILITIES

- A. Responsibilities of commissioning team members are:
1. Architect/Engineer (A/E):
    - a. Document design intent of systems
    - b. Perform necessary CA
    - c. Review O&Ms and record documents
    - d. Attend commissioning kick-off meeting
  2. Commissioning Agent (CA):
    - a. Identify commissioning activities for inclusion into the project schedule by the CM.
    - b. Develop detailed project specific pre-functional performance tests and Functional Performance Test procedures.
    - c. Document site visits with observation reports
    - d. Document deficiencies with a Master Deficiency Log
    - e. Spot Check pre-functional checklists filled out by sub contractors
    - f. Witness FPTs performed by sub-contractors... Document test results and recommend system for acceptance.
    - g. Review, track and coordinate resolution of non-compliance and deficiencies identified by commissioning team. Maintain records of all issues submitted by commissioning team.

- h. Review completed TAB reports.
  - i. Review training plan developed by GC
  - j. Monitor completion and accuracy of project closeout documents and training.
  - k. Provide final commissioning report, summarizing final disposition of building systems after functional testing.
  - l. Facilitate cooperation of CT in commissioning work.
  - m. Confirm the contractor has performed deferred/seasonal testing.
3. Construction Manager (CM):
- a. Incorporate commissioning activities into the construction schedule.
  - b. Periodically update commissioning activities in the construction schedule.
  - c. Develop, with cooperation of A/E and Sub-contractor/vendor, detailed training plan.
  - d. CM coordinates training sessions and executes training plan through his sub-contractors.
  - e. Facilitate cooperation of Sub-contractors in commissioning work.
  - f. Submit copies of approved submittals, with manufacturer start-up criteria, contractor start-up checklists and operating and maintenance criteria to CA.
  - g. Verify equipment and systems are ready for execution of pre-functional checklists by the CA. Assures CA at each phase of installation equipment and systems are ready.
  - h. Insures resolution of non-compliance and deficiencies of construction related items identified by commissioning team. Obtains written documentation of completion from the appropriate Sub-contractors.
  - i. Coordinate Sub-contractor/vendor participation in training sessions. Provide workspace or conference room as needed. Ensure attendance at training is documented.
  - j. Schedule, coordinate and assist CT in seasonal or deferred testing.
  - k. Participate in warranty review of system/equipment performance.
4. Sub-contractors/Vendors:
- a. Review commissioning plan, pre-functional checklists, and FPT procedures.
  - b. Ensure installation work and pre-functional test sheets are completed and that work is complete and is in compliance with Contract Documents and is ready for Functional Performance Testing.
  - c. Develop and submit detailed equipment start-up procedures to CT. Procedures shall include checklist to be completed by Sub-contractor/vendor.
  - d. Perform testing in accordance with specification requirements and/or per the requirements of the local authority
  - e. Notify CT that equipment and systems are ready for functional performance testing.
  - f. Execute FPTs developed by CA as described in Contract Documents and commissioning plan, under direction of CA.
  - g. Provide certified and calibrated instrumentation required to take measurements of system and equipment performance during functional performance testing.
  - h. Assist CT with developing a comprehensive commissioning schedule.
  - i. Attend commissioning kick-off meeting and other commissioning team meetings.
  - j. Prepare training plans with CM and execute training as specified in Division 1, 22, 23, 26 of these specifications.
  - k. Execute seasonal or deferred functional performance testing as necessary.
  - l. Make necessary amendments to O&M manuals and as-built drawings for applicable issue identified in season/deferred testing.
  - m. Provide CA with individually tabbed binder which includes maintenance procedures, trouble shooting charts, maintenance logs and exploded parts lists per each type of equipment. Intent of this maintenance binder is to provide building Owner with quick reference guide for maintenance procedures.
  - n. Participate in a warranty review of system/equipment performance.

5. Controls Contractor (CC): - NOT APPLICABLE TO THIS PROJECT
- a. Completely install and thoroughly inspect components, thoroughly start-up, test, adjust, calibrate, and document systems and equipment under Building Automation/Controls Contract.
  - b. Provide laptop computer, software, and training to accommodate TAB Contractor in system balancing.
  - c. Maintain database of control parameters submitted by TAB Contractor subsequent to field adjustments and measurements.
  - d. Provide on-site technician skilled in software programming and hardware operation to exercise sequences of operation and to correct control deficiencies identified during functional performance testing.
  - e. Provide instrumentation, computer, software, and communication resources necessary to demonstrate total operation of building systems during functional performance testing of control system equipment.
  - f. Attend commissioning kick-off meeting and other commissioning team meetings.
  - g. Prepare training plans with CM and execute training as specified in Division 1, 21, 22, 23, 26, 27 of these specifications.
  - h. Maintain comprehensive system calibration and checkout records. Submit records to CT.
  - i. Set up trend logs as requested by CT to substantiate proper systems operation.
  - j. Participate in a warranty review of system/equipment performance.
  - k. Provide computer generated reports and signed documentation indicating the commands listed below function as intended:
    - 1) All installed points receive and transmit the correct information prior to loading/activating the system software.
    - 2) ON/OFF commands from the workstation shall be performed in order to verify each binary output.
    - 3) Each binary input point is to be tested using the HOA (hand/off/automatic) selector switch on the associated motor control panel or by manually completing the circuit across the field device contacts.
    - 4) Each analog output points providing control shall be tested using a command from the workstation confirming the signals are properly sent and received
    - 5) Each analog input point is to be tested by comparing the reading obtained through the workstations to the value of an independent testing meter.
    - 6) All equipment programmed with a Sequence of Operations is to be verified; all heating/cooling modes, valves hot and chilled water, dampers, fans, energy recovery wheels, sensors, mechanical cooling, and all other associated equipment components are to be tested and checked out prior to CA functional testing.
6. Test, Adjust and Balance (TAB) Agency:
- a. Attend commissioning kick-off meeting and other commissioning team meetings.
  - b. Submit TAB plan and forms describing methodology for execution of test and balance procedures specific to this project to CT for review.
  - c. Cooperate with CC with execution of required work.
  - d. Rebalance deficient areas identified during commissioning.
  - e. Provide on-site technician, as necessary, skilled in TAB procedures to provide verification of equipment and system performance and TAB reading during functional performance testing.
  - f. Participate in a warranty review of system/equipment performance.

### 3.4 COMMISSIONING TEAM (CT) MEETINGS

- A. CT meetings will be held as needed during the construction and installation of new rooftop units. CA will record minutes and attendance. .

- B. Discussions held in CT meetings shall include, but not be limited to system/equipment start-up, progress, scheduling, testing, documentation, deficiencies, and problem resolution.

### 3.5 REPORTING

- A. CA will provide observation reports for any and all site visits during construction
- B. CA will regularly communicate with members of commissioning team, keeping them apprised of commissioning progress.
- C. CA shall submit non-compliance and deficiency reports to Owner and CM.
- D. CA shall provide a final summary report to Owner.

### 3.6 START-UP AND INITIAL CHECKOUT

- A. Sub-contractor shall schedule equipment start-up with Commissioning Team. Sub-contractor shall execute equipment start-up.
- B. CA reserves the right to witness any start-up or equipment testing.
- C. Pre-functional checklists are provided and executed by CA. Prototypical examples of PFCs are included at the end of this specification section. Final copies of PFCs will be developed after issuance the Construction Documents and issued to the CT as part of the Commissioning Plan. CM and Sub-contractor shall review final construction documentation for applicable details and specifications related to equipment to be commissioned in order to fully ascertain all of the pre-functional checklist requirements.

### 3.7 FUNCTIONAL PERFORMANCE TESTING

- A. Objectives and Scope:
  - 1. The objective of Functional Performance Testing is to demonstrate each system is operating according to documented design intent and Contract Documents. Functional Performance Testing facilitates bringing system from a state of substantial completion to full dynamic operation. Additionally, during Functional Performance Testing, areas of deficient performance are identified and corrected, improving operation, and functioning of systems.
  - 2. Each system shall be operated through all modes of operation (occupied, unoccupied, warm-up, cool-down, etc.) where there is a specified system response. Verifying each sequence in the sequences of operation is required.
- B. Development of Test Procedures:
  - 1. The purpose of any given specific test is to verify and document compliance with stated criteria of acceptance given on test form. CA shall develop specific test procedures and forms to verify and document proper operation of each piece of equipment and system. Sub-contractor responsible to execute test will provide assistance to CA in developing procedure (i.e., answering questions about equipment, operation, sequences, etc.) Prior to execution, CA shall provide a copy of test procedures to Sub-contractor. Sub-contractor will review tests for feasibility, safety, and equipment warranty protection.
  - 2. Test procedure forms developed by the CA will include (but not be limited to) the following information:
    - a. System and equipment or component name(s)
    - b. Date
    - c. Project name
    - d. Specific sequence of operation or other specified parameters being verified

- e. Specific step-by-step procedures to execute test, in a clear, sequential, and repeatable format
  - f. A Yes/No checkbox to allow for clearly marking whether or not proper performance of each part of the test was achieved
  - g. Section for comments
3. Prototypical examples of Functional Performance Test Checklists are included at the end of this specification section. Final copies of FPTs will be developed after issuance the Construction Documents and issued to the CT as part of the Commissioning Plan. CM and Sub-contractors shall review final construction documentation for applicable details and specifications related to equipment to be commissioned in order to fully ascertain all FPT requirements.

C. Coordination and Scheduling:

1. CM will provide sufficient notice to CA regarding completion of schedule for equipment and systems. CM will schedule Functional Performance Test with CT. CA shall witness and document functional testing of equipment and systems. Sub-contractor shall execute test under direction of CA.
2. Functional Performance Testing is conducted after system operation and checkout is satisfactorily completed. Air balancing and water balancing is completed and debugged before functional testing of air-related or water-related equipment or systems.

### 3.8 DOCUMENTATION, NON-COMFORMANCE AND APPROVAL OF TESTS

A. Documentation:

1. CA will witness and document results of FPT using specific Functional Performance Test developed for that purpose. Prior to testing, FPTs are provided to the Commissioning Team for review and approval. CA will include filled out FPTs in Commissioning Turnover Package.

B. Non-Conformance:

1. CA will record results of functional testing. Deficiency or non-conformance issues will be noted and reported to CM and Owner on standard non-compliance FPT form.
2. Corrections of minor deficiencies identified may be made during tests at discretion of CA. In such cases, deficiency and resolution will be documented on FPT form.
3. Every effort will be made to expedite testing and minimize unnecessary delays, while not comprising integrity of tests. CA shall not overlook deficient work or relax acceptance criteria to satisfy scheduling or cost issues unless directed to do by the Owner.
4. Deficiencies are handled in the following manner:
  - a. When there is no dispute on deficiency and Sub-contractor accepts responsibility for remedial action:
    - 1) CA documents deficiency and Sub-contractors' response and intentions and they go on to another test or sequence. CA submits deficiency report to CM and Owner. Copy is provided to Sub-contractor. Sub-contractor corrects deficiency, and verifies correction to CM. CM forwards response to CA.
    - 2) CM reschedules test with Sub-contractor.
  - b. When there is a dispute about a deficiency, regarding whether it is a deficiency or who is responsible:
    - 1) CA documents deficiency and Contractor's response and they go on to another test or sequence. CA submits deficiency report to CM and Owner. Copy is provided to Sub-contractor.
    - 2) CM facilitates resolution of deficiency. Other parties are brought into discussions as needed. Final interpretive authority is A/E. Final acceptance authority is with the Owner.
    - 3) CM documents resolution process.
    - 4) Once interpretation and resolution has been decided, appropriate party corrects deficiency, and verifies correction to CM. CM forwards

response to CA. CM reschedules test and test is repeated until satisfactory performance is achieved.

- C. Cost of Retesting:
  - 1. Sub-contractor shall retest FPT, if they are responsible for deficiency at no additional cost.
  - 2. Time for CA to direct any retesting required because a specific pre-functional checklist or start-up test items reported to have been successfully completed, but determined during Functional Performance Testing to be faulty, may be backcharged to Sub-contractor.
- D. Approval:
  - 1. CA notes each satisfactorily demonstrated function on test form. CA, A/E and Owner provide formal approval of FPT. CA recommends acceptance of each test to Owner.

### 3.9 COMMISSIONING DOCUMENTATION

- A. Commissioning Turnover Package
  - 1. CA is responsible to compile and organize commissioning records. CA shall deliver Cx records to the Owner in Commissioning Binders. Turnover Package to include the following:
    - a. Commissioning Plan
    - b. Commissioning Observation Reports
    - c. Prefunctional Checklists and Test Procedures
    - d. Completed Functional Performance Test records
    - e. Deficiency Reports
    - f. Final Commissioning Report
- B. Final Report Details
  - 1. Final Commissioning Report will include an executive summary, list of participants and roles, brief building description, overview of commissioning and testing scope and general description of testing and verification methods. Recommendations for improvement to equipment or operations, future actions, etc., will also be listed. Each non-compliance issue will be referenced to specific FPT where deficiency is documented.

### 3.10 TRAINING OF OWNER PERSONNEL

- A. Sub-contractors will provide complete training in start-up, operation, and maintenance of all equipment under contract.
- B. CM and Sub-contractors will be responsible for developing Owner training plan, scheduling of Owner training, execution of Owner training and documentation of completed Owner training.
- C. A/E will be responsible for approving content and adequacy of Owner training.
- D. CA will be responsible for monitoring completion of Owner training.
- E. Sub-contractor will submit a written training plan to A/E and CA for review and approval with submission of shop drawings. Plan will cover the following elements:
  - 1. Equipment (included in training)
  - 2. Intended audience
  - 3. Location of training
  - 4. Objectives
  - 5. Subjects covered
  - 6. Duration of training on each subject
  - 7. Instructor for each subject



8. Methods (classroom lecture, video, site walk-through, actual operational demonstrations, written handouts, etc.)
  9. Instructors and qualifications
- F. CM and sub-contractors schedule training with CA and Owner. CA develops criteria to determine training satisfactorily completed.
- G. Professional videotaping shall be provided for training sessions as required by Division 1 and respective contractor.

### 3.11 DEFERRED TESTING

- A. Deferred Seasonal Testing:
1. During warranty period, seasonal testing (test delayed until weather conditions are closer to system's design) will be completed as part of this contract. CM will coordinate this activity. Tests will be executed, documented and deficiencies corrected by the appropriate sub-contractor(s). CA will incorporate final updates to Turnover Package as necessary.

NOTE: The prototypical Pre-Functional Checklists and Functional Performance Test procedures are enclosed.

END OF SECTION 01 91 13

# Contractor Checklist and Functional Test Procedures

## AIR HANDLING UNITS

### 1. Participants

Discipline	Name	Company
CxA		
Mechanical		
Controls		
TAB		
Plumbing		
Electrical		
Date Returned to CxA		

### 2. Prerequisite Checklist

Check	Description
<input type="checkbox"/>	The above equipment and systems integral to them are complete and ready for functional testing.
<input type="checkbox"/>	All control system functions for this and all interlocking systems are programmed and operable per contract documents, including final setpoints and schedules with debugging, loop tuning and sensor calibrations completed.
<input type="checkbox"/>	Test and balance completed and approved for the hydronic systems and terminal units connected
<input type="checkbox"/>	All A/E punchlist items for this equipment corrected.
<input type="checkbox"/>	Safeties and operating ranges reviewed. Schedules and reviewed <ul style="list-style-type: none"><li>This checklist does not take the place of the manufacturer's recommended checkout and startup procedures.</li><li>Items that do not apply shall be noted with the reasons on this form (N/A = not applicable, BO = by others).</li><li>Contractor's assigned responsibility for sections of the checklist shall be responsible to see that checklist items by their subcontractors are completed and checked off.</li></ul>

### 3. Installation Checks

Check if Okay. Enter comment or note number if deficient.

Check	Equip Tag→	AHU's	Comments
<b>Cabinet and General Installation</b>			
Permanent labels affixed, including for fans		<input type="checkbox"/>	
Casing condition good: no dents, leaks, door gaskets installed		<input type="checkbox"/>	
Access doors close tightly - no leaks		<input type="checkbox"/>	
Boot between duct and unit tight and in good condition		<input type="checkbox"/>	
Vibration isolation equipment installed & released from shipping locks		<input type="checkbox"/>	
Maintenance access acceptable for unit and components		<input type="checkbox"/>	
Thermal insulation properly installed and according to specification		<input type="checkbox"/>	
Instrumentation installed according to specification (thermometers, pressure gages, flow meters, etc.)		<input type="checkbox"/>	
Clean up of equipment completed per contract documents		<input type="checkbox"/>	
Filters installed and replacement type and efficiency permanently affixed to housing--construction filters removed		<input type="checkbox"/>	
Unit Configuration is correct		<input type="checkbox"/>	
<b>Valves, Piping and Coils</b>			
Pipe fittings complete and pipes properly supported		<input type="checkbox"/>	
Pipes properly labeled		<input type="checkbox"/>	
Pipes properly insulated		<input type="checkbox"/>	
Strainers in place and clean		<input type="checkbox"/>	
Piping system properly flushed		<input type="checkbox"/>	
No leaking apparent around fittings		<input type="checkbox"/>	
All coils are clean and fins are in good condition		<input type="checkbox"/>	
Condensate drains with P-trap or capped where appropriate		<input type="checkbox"/>	
Valves properly labeled		<input type="checkbox"/>	
Valves installed in proper direction		<input type="checkbox"/>	
OSAT, MAT, SAT, RAT, hot water, chilled water supply sensors properly located and secure (related OSAT sensor shielded)		<input type="checkbox"/>	
Sensors calibrated		<input type="checkbox"/>	
Isolation valves installed per drawings		<input type="checkbox"/>	
<b>Fans and Dampers</b>			
Supply fan and motor alignment correct		<input type="checkbox"/>	
Supply fan belt tension & condition good		<input type="checkbox"/>	
Supply fan area clean		<input type="checkbox"/>	
Supply fan and motor properly lubricated		<input type="checkbox"/>	
Return fan and motor aligned		<input type="checkbox"/>	
Return fan belt tension & condition good		<input type="checkbox"/>	
Return fan area clean		<input type="checkbox"/>	
Return fan and motor lube lines installed and lubed		<input type="checkbox"/>	
Filters clean and tight fitting		<input type="checkbox"/>	
Filter pressure differential measuring device installed and functional (magnahelic, inclined manometer, etc.)		<input type="checkbox"/>	
All dampers close tightly		<input type="checkbox"/>	
All damper linkages have minimum play		<input type="checkbox"/>	
Low limit freeze stat sensor located to deal with stratification & bypass		<input type="checkbox"/>	
<b>Ducts</b>			
Ducts properly insulated		<input type="checkbox"/>	

Check if Okay. Enter comment or note number if deficient.

Check	Equip Tag→	AHU's	Comments
Duct joint sealant properly installed		<input type="checkbox"/>	
No apparent severe duct restrictions		<input type="checkbox"/>	
Turning vanes in square elbows as per drawings		<input type="checkbox"/>	
OSA intakes located away from pollutant sources & exhaust outlets		<input type="checkbox"/>	
Balancing dampers installed as per drawings and TAB's site visit		<input type="checkbox"/>	
<b>Electrical and Controls</b>			
Power disconnects in place and labeled		<input type="checkbox"/>	
Safeties in place and operable		<input type="checkbox"/>	
Control system interlocks hooked up and functional		<input type="checkbox"/>	
Smoke detectors in place		<input type="checkbox"/>	
All control devices wiring complete		<input type="checkbox"/>	
Service light if provided is operational		<input type="checkbox"/>	

**The checklist items all successfully completed for given trade**  YES  NO

#### 4. Operational Checks

Check if Okay. Enter comment or note number if deficient.

Check	Equip Tag→	AHU's	Comments
<b>General Findings</b>			
<b>Operation of Dampers and Valves</b>			
Dampers stroke fully without binding and spans calibrated and BAS reading site verified.		<input type="checkbox"/>	
Valves stroke fully and easily and spanning is calibrated.		<input type="checkbox"/>	
Valves verified to not be leaking through coils when closed at normal operating pressure.		<input type="checkbox"/>	
<b>Operator Station Display to read as follows:</b>			
System graphic		<input type="checkbox"/>	
System On/Off indication		<input type="checkbox"/>	
System Occupied/Unoccupied mode		<input type="checkbox"/>	
System supply fan On/Off indication		<input type="checkbox"/>	
Return exhaust fan status On/Off indication		<input type="checkbox"/>	
Outside air temp indication		<input type="checkbox"/>	
Outside air humidity indication		<input type="checkbox"/>	
Outside air enthalpy calculation		<input type="checkbox"/>	
Supply air temperature		<input type="checkbox"/>	
Supply air temperature setpoint		<input type="checkbox"/>	
Return air temperature		<input type="checkbox"/>	
Damper positioning (%)		<input type="checkbox"/>	
Supply static pressure setpoint		<input type="checkbox"/>	
Supply static pressure		<input type="checkbox"/>	
Hot water coil valve position		<input type="checkbox"/>	
Chilled water coil valve position		<input type="checkbox"/>	
Space/average space temperature		<input type="checkbox"/>	
CO2 indication and setpoint		<input type="checkbox"/>	
All alarm indications		<input type="checkbox"/>	

**The checklist items all successfully completed for given trade**  YES  NO

## 5. Functional Testing Record

### Air Handling Units

Test#	Mode ID	Test Procedure	Expected Response	Pass Y/N	Note
1	Unoccupied Mode	Using BMS put unit into unoccupied mode. Using the trend log features ensure the following occurs	OA temp is above 40°F. - Verify Outside Air and Exhaust Dampers are Closed and return air damper is open, HW/CHW coil valves are closed		
		Unit in unoccupied with a call for heat – If Average temperature drops 2 degrees below the unoccupied heating setpoint of 60°F (adj)	OA temp is below 40°F – The HW heating coil valve is 25% open subject to safeties. OA damper shall remain closed. Subject to safeties, supply fan shall cycle and 3-way valve shall open based on call for heat from space sensor. Once space temp is 1°F above unoccupied setpoint, the supply fan shuts down. Ensure areas with perimeter radiation use radiant heat as 1 <sup>st</sup> stage if applicable		
2	Morning Warm-up	Set up trends for morning warm up status, heating control valve temperature, discharge air temperature and supply fan status	Check trending to verify that the warm up cycle is occurring prior to the occupied mode enable. OA dampers remain closed, SF starts, and HW valve opens 100%. The supply fan VFD shall modulate to maintain static pressure setpoint.		
3	Occupied, Fan On	Return unit to occupied mode using BMS.	Outside, return and relief damper opens to minimum position, supply fan and return fan start (once OA damper is proven open), RA damper modulates inverse of OA damper.		
4	Supply Fan and Return Fan Control	Using BMS set unit to occupied mode	Supply fan starts and runs continuously during occupied times. Return fan VFD shall track the supply fan by an adjustable offset as determined by the balancer.		
		Manually fail the supply fan and return fan	Verify an alarm is generated at the BMS		
5	Economizer Control	Simulate a situation, using the BMS controls where the unit is looking for cooling and the OA enthalpy is less than 22 btu/lb.	HW valve closed, OA damper modulates to 100% open.		
6	Chilled Water Cooling Coil	With a need for cooling, set the enthalpy setpoint below the actual OA enthalpy	The Chilled water cooling coil shall open and cool air shall be delivered		
		Create a situation where there is a need for cooling, the economizer damper is at 100% open and the cooling setpoint is not satisfied	The economizer damper shall remain 100% open and the chilled water cooling coil valve shall open. Cool air shall be delivered.		
7	Hot Water Heating Coil	In occupied mode, with fan running, raise the space temperature setpoint	Verify the hot water coil valve modulates to satisfy the heating requirement. (Ensure the system resets Supply air temperature to maintain space temp (adj.))		
8	Smoke Control	Simulate a smoke condition	Verify the duct smoke detectors will send a signal to stop the fans and close the OA dampers		
9	Freeze Condition	Manually simulate a freeze condition at the low limit duct thermostat	Verify the supply fan stops, OA dampers close, heating coil valve opens (when temp falls below 40°F) and an alarm is sent to the BMS		
		Manually reset the alarm	The alarm shall be cleared and the units shall be capable of restarting		
10	Filter Switch	Simulate a dirty filter condition	Ensure that the BMS reports an alarm		
11	Demand Control Ventilation (CO <sub>2</sub> Override)	Simulate a CO <sub>2</sub> level beyond the adjustable setpoint	The outside air damper shall be allowed to modulate past minimum position until the CO <sub>2</sub> concentration has fallen below setpoint		

**The functional tests have all passed for given trade**  YES  NO

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## SECTION 024119 - SELECTIVE DEMOLITION

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. Section Includes:

- 1. Demolition and removal of selected portions of building elements.
- 2. Salvage of existing items to be reused or recycled.

- B. Related Requirements:

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

#### 1.3 DEFINITIONS

- A. Remove: Detach items from existing construction and legally dispose of them off-site unless indicated to be removed and salvaged or removed and reinstalled.
- B. Remove and Salvage: Carefully detach from existing construction, in a manner to prevent damage, and deliver to Owner ready for reuse.
- C. Remove and Reinstall: Detach items from existing construction, prepare for reuse, and reinstall where indicated.
- D. Existing to Remain: Existing items of construction that are not to be permanently removed and that are not otherwise indicated to be removed, removed and salvaged, or removed and reinstalled.

#### 1.4 MATERIALS OWNERSHIP

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

#### 1.5 PREINSTALLATION MEETINGS

- A. Pre-demolition Conference: Conduct conference at Project site.

1. Inspect and discuss condition of construction to be selectively demolished.
2. Review structural load limitations of existing structure.
3. Review and finalize selective demolition schedule and verify availability of materials, demolition personnel, equipment, and facilities needed to make progress and avoid delays.
4. Review requirements of work performed by other trades that rely on substrates exposed by selective demolition operations.
5. Review areas where existing construction is to remain and requires protection.

#### 1.6 INFORMATIONAL SUBMITTALS

- A. Schedule of Selective Demolition Activities: Indicate the following:
1. Detailed sequence of selective demolition and removal work, with starting and ending dates for each activity.
  2. Interruption of utility services. Indicate how long utility services will be interrupted.
  3. Coordination for shutoff, capping, and continuation of utility services.
  4. Use of elevator and stairs.
  5. Coordination of Owner's continuing occupancy of portions of existing building and of Owner's partial occupancy of completed Work.
- B. Inventory: Submit a list of items to be removed and salvaged and deliver to Owner prior to start of demolition.
- C. Pre-demolition Photographs or Video: Submit before Work begins.

#### 1.7 CLOSEOUT SUBMITTALS

- A. Landfill Records: Provide documentation as requested by Owner.

#### 1.8 FIELD CONDITIONS

- A. Notify Architect of discrepancies between existing conditions and Drawings before proceeding with selective demolition.
- B. Storage or sale of removed items or materials on-site is not permitted.
- C. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.
1. Maintain fire-protection facilities in service during selective demolition operations.

#### 1.9 WARRANTY

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

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## PART 2 - PRODUCTS

### 2.1 PERFORMANCE REQUIREMENTS

- A. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.
- B. Standards: Comply with ANSI/ASSE A10.6 and NFPA 241.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Verify that utilities have been disconnected and capped before starting selective demolition operations.
- B. Review record documents of existing construction provided by Owner. Owner does not guarantee that existing conditions are same as those indicated in record documents.
- C. Survey existing conditions and correlate with requirements indicated to determine extent of selective demolition required.
- D. When unanticipated mechanical, electrical, or structural elements that conflict with intended function or design are encountered, investigate and measure the nature and extent of conflict. Promptly submit a written report to Architect.
- E. Perform an engineering survey of condition of building to determine whether removing any element might result in structural deficiency or unplanned collapse of any portion of structure or adjacent structures during selective building demolition operations.
  - 1. Perform surveys as the Work progresses to detect hazards resulting from selective demolition activities.
  - 2. Steel Tendons: Locate tensioned steel tendons and include recommendations for de-tensioning.

### 3.2 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

- A. Existing Services/Systems to Remain: Maintain services/systems indicated to remain and protect them against damage.
  - 1. Comply with requirements for existing services/systems interruptions specified in Section 011000 "Summary."
- B. Existing Services/Systems to Be Removed, Relocated, or Abandoned: Locate, identify, disconnect, and seal or cap off indicated utility services and mechanical/electrical systems serving areas to be selectively demolished.
  - 1. Arrange to shut off indicated utilities with utility companies.
  - 2. If services/systems are required to be removed, relocated, or abandoned, provide temporary services/systems that bypass area of selective demolition and that maintain continuity of services/systems to other parts of building.



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### 3.3 PREPARATION

- A. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
  - 1. Comply with requirements for access and protection specified in Section 015000 "Temporary Facilities and Controls."
- B. Temporary Facilities: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.
  - 1. Provide protection to ensure safe passage of people around selective demolition area and to and from occupied portions of building.
  - 2. Provide temporary weather protection, during interval between selective demolition of existing construction on exterior surfaces and new construction, to prevent water leakage and damage to structure and interior areas.
  - 3. Protect walls, ceilings, floors, and other existing finish work that are to remain or that are exposed during selective demolition operations.
  - 4. Cover and protect furniture, furnishings, and equipment that have not been removed.
  - 5. Comply with requirements for temporary enclosures, dust control, heating, and cooling specified in Section 015000 "Temporary Facilities and Controls."

### 3.4 SELECTIVE DEMOLITION, GENERAL

- A. General: Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:
  - 1. Proceed with selective demolition systematically, from higher to lower level. Complete selective demolition operations above each floor or tier before disturbing supporting members on the next lower level.
  - 2. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping, to minimize disturbance of adjacent surfaces. Temporarily cover openings to remain.
  - 3. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
  - 4. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain fire watch and portable fire-suppression devices during flame-cutting operations.
  - 5. Maintain adequate ventilation when using cutting torches.
  - 6. Remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials and promptly dispose of off-site.
  - 7. Remove structural framing members and lower to ground by method suitable to avoid free fall and to prevent ground impact or dust generation.
  - 8. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
  - 9. Dispose of demolished items and materials promptly.
- B. Removed and Salvaged Items:
  - 1. Clean salvaged items.
  - 2. Pack or crate items after cleaning. Identify contents of containers.
  - 3. Store items in a secure area until delivery to Owner.

4. Transport items to Owner's storage area.
5. Protect items from damage during transport and storage.

C. Removed and Reinstalled Items:

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

- D. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by Architect, items may be removed to a suitable, protected storage location during selective demolition and cleaned and reinstalled in their original locations after selective demolition operations are complete.

### 3.5 SELECTIVE DEMOLITION PROCEDURES FOR SPECIFIC MATERIALS

- A. Floor Coverings: Remove floor coverings and adhesive according to recommendations in RFCI's "Recommended Work Practices for the Removal of Resilient Floor Coverings." Do not use methods requiring solvent-based adhesive strippers.

### 3.6 DISPOSAL OF DEMOLISHED MATERIALS

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

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

- B. Burning: Do not burn demolished materials.

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

### 3.7 CLEANING

- A. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before selective demolition operations began.

END OF SECTION 024119

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**SECTION 06 10 53 - MISCELLANEOUS ROUGH CARPENTRY****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. Framing with dimension lumber.
  - 2. Wood blocking, cants, and nailers.
  - 3. Wood furring.
  - 4. Wood sleepers.
  - 5. Utility shelving.

**1.3 DEFINITIONS**

- A. Dimension Lumber: Lumber of 2 inches nominal (38 mm actual) or greater but less than 5 inches nominal (114 mm actual) in least dimension.
- B. Lumber grading agencies, and the abbreviations used to reference them, include the following:
  - 1. NeLMA: Northeastern Lumber Manufacturers' Association.
  - 2. NHLA: National Hardwood Lumber Association.
  - 3. NLGA: National Lumber Grades Authority.
  - 4. SPIB: The Southern Pine Inspection Bureau.
  - 5. WCLIB: West Coast Lumber Inspection Bureau.
  - 6. WWPA: Western Wood Products Association.
  - 7. ALSC: American Lumber Standard Committee, Inc.

**1.4 ACTION SUBMITTALS**

- A. Product Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.
  - 1. Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Indicate type of preservative used and net amount of preservative retained.
  - 2. Include data for fire-retardant treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Include physical properties of treated materials based on testing by a qualified independent testing agency.
  - 3. For fire-retardant treatments, include physical properties of treated lumber both before and after exposure to elevated temperatures, based on testing by a qualified independent testing agency according to ASTM D 5664.
  - 4. Include copies of warranties from chemical treatment manufacturers for each type of treatment.

## 1.5 INFORMATIONAL SUBMITTALS

- A. Evaluation Reports: For the following, from ICC-ES:
1. Preservative-treated wood.
  2. Fire-retardant-treated wood.

## 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Stack lumber flat with spacers beneath and between each bundle to provide air circulation. Protect lumber from weather by covering with waterproof sheeting, securely anchored. Provide for air circulation around stacks and under coverings.

## PART 2 - PRODUCTS

### 2.1 WOOD PRODUCTS, GENERAL

- A. Lumber: DOC PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, provide lumber that complies with the applicable rules of any rules-writing agency certified by the ALSC Board of Review. Provide lumber graded by an agency certified by the ALSC Board of Review to inspect and grade lumber under the rules indicated.
1. Factory mark each piece of lumber with grade stamp of grading agency.
  2. Where nominal sizes are indicated, provide actual sizes required by DOC PS 20 for moisture content specified. Where actual sizes are indicated, they are minimum dressed sizes for dry lumber.
  3. Provide dressed lumber, S4S, unless otherwise indicated.
- B. Maximum Moisture Content of Lumber: 19 percent for 2-inch nominal (38-mm actual) thickness or less, no limit for more than 2-inch nominal (38-mm actual) thickness unless otherwise indicated.

### 2.2 WOOD-PRESERVATIVE-TREATED MATERIALS

- A. Preservative Treatment by Pressure Process: AWWA U1; Use Category UC2 for interior construction not in contact with the ground, Use Category UC3b for exterior construction not in contact with the ground, and Use Category UC4a for items in contact with the ground.
1. Preservative Chemicals: Alkaline copper quaternary (ACQ) similar to Preserve as manufactured by Chemical Specialties, Inc. or equal. Materials shall contain no arsenic or chromium.
- B. Retention Rates:
1. Above Ground: 0.25 – 0.40 pcf.
  2. Below Ground: 0.40 pcf.
- C. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent. Do not use material that is warped or does not comply with requirements for untreated material.
- D. Quality Mark: All copper quaternary preservative-treated wood members shall bear an end tag or permanent ink stamp indicating the following:
1. Name of wood treating company.

2. Treatment plant city and state.
  3. Symbol for alkaline copper quaternary (ACQ).
  4. Preservative retention level.
  5. Approved use.
  6. Code report number.
- E. Application: Treat items indicated on Drawings, and the following:
1. Wood cants, nailers, curbs, equipment support bases, blocking, stripping, and similar members in connection with roofing, flashing, vapor barriers, and waterproofing.
  2. Wood sills, sleepers, blocking, furring, stripping, and similar concealed members in contact with masonry or concrete.
  3. Wood framing and furring attached directly to the interior of below-grade exterior masonry or concrete walls.
  4. Wood floor plates that are installed over concrete slabs-on-grade.

### 2.3 FIRE-RETARDANT-TREATED MATERIALS

- A. General: Where fire-retardant-treated materials are indicated, use materials complying with requirements in this article, that are acceptable to authorities having jurisdiction, and with fire-test-response characteristics specified as determined by testing identical products per test method indicated by a qualified testing agency.
- B. Fire-Retardant-Treated Lumber and Plywood by Pressure Process: Products with a flame spread index of 25 or less when tested according to ASTM E 84, and with no evidence of significant progressive combustion when the test is extended an additional 20 minutes, and with the flame front not extending more than 10.5 feet (3.2 m) beyond the centerline of the burners at any time during the test. Material shall have an Underwriters Laboratories FRS rating or a flame spread and smoke index rating denoting a surface-burning characteristic rating of 25 or less for flame spread and smoke developed.
1. Use treatment that does not promote corrosion of metal fasteners.
  2. Exterior Type: Treated materials shall comply with requirements specified above for fire-retardant-treated lumber and plywood by pressure process after being subjected to accelerated weathering according to ASTM D 2898. Use for exterior locations and where indicated.
  3. Interior Type A: Treated materials shall have a moisture content of 28 percent or less when tested according to ASTM D 3201 at 92 percent relative humidity. Use where exterior type is not indicated.
- C. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent. Kiln-dry plywood after treatment to a maximum moisture content of 15 percent.
- D. Identify fire-retardant-treated wood with the Underwriters Laboratories label or stamp attesting to the FRS rating or flame spread and smoke index rating, or the ESR Building Code Approval, and to the fact that it also meets the American Wood Protection Association, (AWPA):P50, U1, UCFA for Interior Type A (HT) use.
- E. Application: Treat items indicated on Drawings, and the following:
1. Framing for raised platforms.
  2. Concealed blocking in fire rated construction.
  3. Wood cants, nailers, curbs, equipment support bases, blocking, and similar members in connection with roofing.
  4. Plywood backing panels.

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## 2.4 MISCELLANEOUS LUMBER

- A. General: Provide miscellaneous lumber indicated and lumber for support or attachment of other construction, including the following:
1. Blocking.
  2. Nailers.
  3. Rooftop equipment bases and support curbs.
  4. Cants.
  5. Furring.
  6. Grounds.
- B. For items of dimension lumber size, provide Construction or No. 2 grade lumber of any species.
1. Hem-fir (north); NLGA.
  2. Mixed southern pine; SPIB.
  3. Spruce-pine-fir; NLGA.
  4. Hem-fir; WCLIB or WWPA.
  5. Spruce-pine-fir (south); NeLMA, WCLIB, or WWPA.
  6. Western woods; WCLIB or WWPA.
  7. Northern species; NLGA.
  8. Eastern softwoods; NeLMA.
- C. For concealed boards, provide lumber with 19 percent maximum moisture content Construction or No. 2 grade of any species.
- D. For blocking and nailers used for attachment of other construction, select and cut lumber to eliminate knots and other defects that will interfere with attachment of other work.
- E. For furring strips for installing plywood or hardboard paneling, select boards with no knots capable of producing bent-over nails and damage to paneling.

## 2.5 FASTENERS

- A. General: Provide fasteners of size and type indicated that comply with requirements specified in this article for material and manufacture.
1. Where carpentry is exposed to weather, in ground contact, pressure-preservative treated, or in area of high relative humidity, provide fasteners with hot-dip zinc coating complying with ASTM A 153/A 153M or of Type 304 stainless steel.
- B. Nails, Brads, and Staples: ASTM F 1667.
- C. Power-Driven Fasteners: NES NER-272.
- D. Wood Screws: ASME B18.6.1.
- E. Screws for Fastening to Metal Framing: ASTM C 1002, length as recommended by screw manufacturer for material being fastened.
- F. Lag Bolts: ASME B18.2.1 (ASME B18.2.3.8M).
- G. Bolts: Steel bolts complying with ASTM A 307, Grade A (ASTM F 568M, Property Class 4.6); with ASTM A 563 (ASTM A 563M) hex nuts and, where indicated, flat washers.
- H. Expansion Anchors: Anchor bolt and sleeve assembly of material indicated below with capability to sustain, without failure, a load equal to 6 times the load imposed when installed in

unit masonry assemblies and equal to 4 times the load imposed when installed in concrete as determined by testing per ASTM E 488 conducted by a qualified independent testing and inspecting agency.

### PART 3 - EXECUTION

#### 3.1 INSTALLATION, GENERAL

- A. Set carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit carpentry to other construction; scribe and cope as needed for accurate fit. Locate furring, nailers, blocking and similar supports to comply with requirements for attaching other construction.
- B. Framing Standard: Comply with AF&PA's WCD 1, "Details for Conventional Wood Frame Construction," unless otherwise indicated.
- C. Provide blocking and framing as indicated and as required to support facing materials, fixtures, specialty items, and trim.
- D. Provide fire blocking in furred spaces, stud spaces, and other concealed cavities as indicated and as follows:
  - 1. Fire block furred spaces of walls, at each floor level, at ceiling, and at not more than 96 inches (2438 mm) o.c. with solid wood blocking or noncombustible materials accurately fitted to close furred spaces.
  - 2. Fire block concealed spaces between floor sleepers with same material as sleepers to limit concealed spaces to not more than 100 sq. ft. (9.3 sq. m) and to solidly fill space below partitions.
  - 3. Fire block concealed spaces behind combustible cornices and exterior trim at not more than 20 feet (6 m) o.c.
- E. Sort and select lumber so that natural characteristics will not interfere with installation or with fastening other materials to lumber. Do not use materials with defects that interfere with function of member or pieces that are too small to use with minimum number of joints or optimum joint arrangement.
- F. Comply with AWPA M4 for applying field treatment to cut surfaces of preservative-treated lumber. Use materials acceptable to preservative manufacturer.
- G. Securely attach carpentry work to substrate by anchoring and fastening as indicated.
- H. Use steel common nails unless otherwise indicated. Select fasteners of size that will not fully penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections between members. Install fasteners without splitting wood. Drive nails snug but do not countersink nail heads unless otherwise indicated.

#### 3.2 WOOD SLEEPER, BLOCKING, AND NAILER INSTALLATION

- A. Install where indicated and where required for attaching other work. Form to shapes indicated and cut as required for true line and level of attached work. Coordinate locations with other work involved.
- B. Attach items to substrates to support applied loading. Recess bolts and nuts flush with surfaces unless otherwise indicated.

### 3.3 WOOD FURRING INSTALLATION

- A. Install level and plumb with closure strips at edges and openings. Shim with wood as required for tolerance of finish work.

### 3.4 PROTECTION

- A. Protect wood that has been treated with inorganic boron (SBX) from weather. If, despite protection, inorganic boron-treated wood becomes wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.
- B. Protect miscellaneous rough carpentry from weather. If, despite protection, miscellaneous rough carpentry becomes wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.

END OF SECTION 06 10 53



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**SECTION 078413 - PENETRATION FIRESTOPPING****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. Penetrations in fire-resistance-rated walls.
2. Penetrations in horizontal assemblies – rated and non-rated.
3. Penetrations in smoke barriers.

**B. Related Requirements:**

1. Section 017419 "Construction Waste Management Plan" for provision of waste management.
2. Section 018113 "Sustainable Design Requirements" for provision of general LEED requirements and forms.
3. Section 078443 "Joint Firestopping" for joints in or between fire-resistance-rated construction, at exterior curtain-wall/floor intersections, and in smoke barriers.

**1.3 PREINSTALLATION MEETINGS****A. Preinstallation Conference: Conduct conference at Project site.**

1. Simultaneous with the submission of the firestop system submittals, the Contractor shall schedule a pre-installation conference with the firestopping system contractor and manufacturer's technical representative. At a minimum, the conference shall be attended by the on-site foreman of each trade whose work requires firestop systems. The purpose of the meeting shall be to answer questions, review application procedures and review the requirements for annular spaces, sleeves, etc. to insure that they are properly installed in the walls and floors in accordance with manufacturer's tested systems.

**1.4 ACTION SUBMITTALS****A. Product Data: For each type of product.**

- B. Product Schedule: For each through-penetration firestop system, show each type of construction condition penetrated, relationships to adjoining construction and type of penetrating item. Include firestop design designation of qualified testing and inspecting agency that evidences compliance with requirements for each condition indicated.

1. Submit documentation, including illustrations, from a qualified testing and inspecting agency that is applicable to each through-penetration firestop system configuration for construction and penetrating items.
2. Where Project conditions require modification to a qualified testing and inspecting agency's illustration for a particular penetration firestopping condition, submit illustration,

- 
- with modifications marked, approved by penetration firestopping manufacturer's fire-protection engineer as an engineering judgment or equivalent fire-resistance-rated assembly.
3. A copy of the approved schedule and manufacturer's drawings shall be maintained in the field as a guide for installation.
  4. For penetrations involving insulated piping, provide firestopping system that includes insulation passing through the penetration.
- C. LEED Submittals:
1. Provide manufacturer's product data for construction adhesives and sealants, included printed statement of VOC content and MSDS Sheets. Complete "LEED Materials Documentation Sheet", section "EQ4.1 Low Emitting Materials – Adhesives and Sealants".
  2. Provide manufacturer's product data for interior paints, paint primers and coatings, including printed statement of VOC content and MSDS Sheets (Green Seal certification to GS-11). Complete "LEED Materials Documentation Sheet", section "EQ4.2 Low Emitting Materials – Paints and Coatings".
- D. Product Schedule: For each penetration firestopping system. Include location, illustration of firestopping system, and design designation of qualified testing and inspecting agency.
1. Engineering Judgments: Where Project conditions require modification to a qualified testing and inspecting agency's illustration for a particular penetration firestopping system, submit illustration, with modifications marked, approved by penetration firestopping system manufacturer's fire-protection engineer as an engineering judgment or equivalent fire-resistance-rated assembly. Obtain approval of authorities having jurisdiction prior to submittal.
- 1.5 INFORMATIONAL SUBMITTALS
- A. Qualification Data: For Installer.
  - B. Product Test Reports: For each penetration firestopping system, for tests performed by a qualified testing agency.
- 1.6 CLOSEOUT SUBMITTALS
- A. Installer Certificates: From Installer indicating that penetration firestopping systems have been installed in compliance with requirements and manufacturer's written instructions.
- 1.7 QUALITY ASSURANCE
- A. Installer Qualifications: A firm that has been approved by FM Global according to FM Global 4991, "Approval of Firestop Contractors," or been evaluated by UL and found to comply with its "Qualified Firestop Contractor Program Requirements."
- 1.8 PROJECT CONDITIONS
- A. Environmental Limitations: Do not install penetration firestopping system when ambient or substrate temperatures are outside limits permitted by penetration firestopping system manufacturers or when substrates are wet because of rain, frost, condensation, or other causes.

- B. Install and cure penetration firestopping materials per manufacturer's written instructions using natural means of ventilations or, where this is inadequate, forced-air circulation.

## 1.9 COORDINATION

- A. Coordinate construction of openings and penetrating items to ensure that penetration firestopping systems can be installed according to specified firestopping system design.
- B. Coordinate sizing of sleeves, openings, core-drilled holes, or cut openings to accommodate penetration firestopping systems.
- C. Do not cover up through-penetration firestop system installations that will become concealed behind other construction until each installation has been examined by inspecting agency, Architect, Contractor and building inspector, if required by authorities having jurisdiction.

## PART 2 - PRODUCTS

### 2.1 LEED REQUIREMENTS

- A. Credit EQ4.1: For field applications that are inside the weatherproofing system, use adhesives and sealants that comply with the South Coast Air Quality Management District (SCAQMD) Rule #1168 VOC limits, corresponding to an effective date of July 1, 2005 and rule amendment date of January 7, 2005. For aerosol adhesives, comply with Greenseal Standard 36 (GS-36) VOC limits in effect on October 19, 2000.
- B. Credit EQ4.2: For field applications that are inside the weatherproofing system, use paints, primers and coatings that comply with the VOC content limits of Green Seal Standard GS-11, Paints, First Edition, May 20, 1993.

### 2.2 PERFORMANCE REQUIREMENTS

- A. Fire-Test-Response Characteristics:
  - 1. Perform penetration firestopping system tests by a qualified testing agency acceptable to authorities having jurisdiction.
  - 2. Test per testing standards referenced in "Penetration Firestopping Systems" Article. Provide rated systems complying with the following requirements:
    - a. Penetration firestopping systems shall bear classification marking of a qualified testing agency.
      - 1) UL in its "Fire Resistance Directory."

### 2.3 PENETRATION FIRESTOPPING SYSTEMS

- A. Penetration Firestopping Systems: Systems that resist spread of fire, passage of smoke and other gases, and maintain original fire-resistance rating of construction penetrated. Penetration firestopping systems shall be compatible with one another, with the substrates forming openings, and with penetrating items if any.

- B. Penetrations in Fire-Resistance-Rated Walls: Penetration firestopping systems with ratings determined per ASTM E 814 or UL 1479, based on testing at a positive pressure differential of **0.01-inch wg (2.49 Pa)**.
1. F-Rating: Not less than the fire-resistance rating of constructions penetrated.
- C. Penetrations in Horizontal Assemblies: Penetration firestopping systems with ratings determined per ASTM E 814 or UL 1479, based on testing at a positive pressure differential of **0.01-inch wg (2.49 Pa)**.
1. F-Rating: At least one hour, but not less than the fire-resistance rating of constructions penetrated.
  2. T-Rating: At least one hour, but not less than the fire-resistance rating of constructions penetrated except for floor penetrations within the cavity of a wall.
  3. Non-rated Horizontal Assembly: At least one hour.
- D. Penetrations in Smoke Barriers: Penetration firestopping systems with ratings determined per UL 1479, based on testing at a positive pressure differential of **0.30-inch wg (74.7 Pa)**.
1. L-Rating: Not exceeding **5.0 cfm/sq. ft. (0.025 cu. m/s per sq. m)** of penetration opening at and no more than **50-cfm (0.024-cu. m/s)** cumulative total for any **100 sq. ft. (9.3 sq. m)** at both ambient and elevated temperatures.
- E. Exposed Penetration Firestopping Systems: Flame-spread and smoke-developed indexes of less than 25 and 450, respectively, per ASTM E 84.
- F. VOC Content: Penetration firestopping sealants and sealant primers shall comply with the following limits for VOC content:
1. Sealants: 250 g/L.
  2. Sealant Primers for Nonporous Substrates: 250 g/L.
  3. Sealant Primers for Porous Substrates: 775 g/L.
- G. Accessories: Provide components for each penetration firestopping system that are needed to install fill materials and to maintain ratings required. Use only those components specified by penetration firestopping system manufacturer and approved by qualified testing and inspecting agency for conditions indicated.
1. Permanent forming/damming/backing materials.
  2. Substrate primers.
  3. Collars.
  4. Steel sleeves.

## 2.4 FILL MATERIALS

- A. Cast-in-Place Firestop Devices: Factory-assembled devices for use in cast-in-place concrete floors and consisting of an outer sleeve lined with an intumescent strip, a flange attached to one end of the sleeve for fastening to concrete formwork, and a neoprene gasket.
- B. Latex Sealants: Single-component latex formulations that do not re-emulsify after cure during exposure to moisture.
- C. Firestop Devices: Factory-assembled collars formed from galvanized steel and lined with intumescent material sized to fit specific diameter of penetrant.
- D. Intumescent Composite Sheets: Rigid panels consisting of aluminum-foil-faced intumescent elastomeric sheet bonded to galvanized-steel sheet.

- E. Intumescent Putties: Nonhardening, water-resistant, intumescent putties containing no solvents or inorganic fibers.
- F. Intumescent Wrap Strips: Single-component intumescent elastomeric sheets with aluminum foil on one side.
- G. Mortars: Prepackaged dry mixes consisting of a blend of inorganic binders, hydraulic cement, fillers and lightweight aggregate formulated for mixing with water at Project site to form a nonshrinking, homogeneous mortar.
- H. Pillows/Bags: Reusable heat-expanding pillows/bags consisting of glass-fiber cloth cases filled with a combination of mineral-fiber, water-insoluble expansion agents, and fire-retardant additives. Where exposed, cover openings with steel-reinforcing wire mesh to protect pillows/bags from being easily removed.
- I. Silicone Foams: Multicomponent, silicone-based liquid elastomers that, when mixed, expand and cure in place to produce a flexible, nonshrinking foam.
- J. Silicone Sealants: Single-component, silicone-based, neutral-curing elastomeric sealants.

## 2.5 MIXING

- A. Penetration Firestopping Materials: For those products requiring mixing before application, comply with penetration firestopping system manufacturer's written instructions for accurate proportioning of materials, water (if required), type of mixing equipment, selection of mixer speeds, mixing containers, mixing time, and other items or procedures needed to produce products of uniform quality with optimum performance characteristics for application indicated.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for opening configurations, penetrating items, substrates, and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Surface Cleaning: Before installing penetration firestopping systems, clean out openings immediately to comply with manufacturer's written instructions and with the following requirements:
  - 1. Remove from surfaces of opening substrates and from penetrating items foreign materials that could interfere with adhesion of penetration firestopping materials.
  - 2. Clean opening substrates and penetrating items to produce clean, sound surfaces capable of developing optimum bond with penetration firestopping materials. Remove loose particles remaining from cleaning operation.
  - 3. Remove laitance and form-release agents from concrete.

- B. Prime substrates where recommended in writing by manufacturer using that manufacturer's recommended products and methods. Confine primers to areas of bond; do not allow spillage and migration onto exposed surfaces.

### 3.3 INSTALLATION

- A. General: Install penetration firestopping systems to comply with manufacturer's written installation instructions and published drawings for products and applications.
- B. Install forming materials and other accessories of types required to support fill materials during their application and in the position needed to produce cross-sectional shapes and depths required to achieve fire ratings.
  - 1. After installing fill materials and allowing them to fully cure, remove combustible forming materials and other accessories not forming permanent components of firestopping.
- C. Install fill materials by proven techniques to produce the following results:
  - 1. Fill voids and cavities formed by openings, forming materials, accessories and penetrating items to achieve required fire-resistance ratings.
  - 2. Apply materials so they contact and adhere to substrates formed by openings and penetrating items.
  - 3. For fill materials that will remain exposed after completing the Work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.

### 3.4 IDENTIFICATION

- A. Wall Identification: Permanently label walls containing penetration firestopping systems with the words "FIRE AND/OR SMOKE BARRIER - PROTECT ALL OPENINGS," using lettering not less than 3 inches (76 mm) high and with minimum 0.375-inch (9.5-mm) strokes.
  - 1. Locate in accessible concealed floor, floor-ceiling, or attic space at 15 feet (4.57 m) from end of wall and at intervals not exceeding 30 feet (9.14 m).

### 3.5 FIELD QUALITY CONTROL

- A. Owner will engage a qualified testing agency to perform tests and inspections according to ASTM E 2174.
- B. Where deficiencies are found or penetration firestopping system is damaged or removed because of testing, repair or replace penetration firestopping system to comply with requirements.
- C. Proceed with enclosing penetration firestopping systems with other construction only after inspection reports are issued and installations comply with requirements.

### 3.6 CLEANING AND PROTECTION

- A. Clean off excess fill materials adjacent to openings as the Work progresses by methods and with cleaning materials that are approved in writing by penetration firestopping system manufacturers and that do not damage materials in which openings occur.
- B. Provide final protection and maintain conditions during and after installation that ensure that penetration firestopping systems are without damage or deterioration at time of Substantial

Completion. If, despite such protection, damage or deterioration occurs, immediately cut out and remove damaged or deteriorated penetration firestopping material and install new materials to produce systems complying with specified requirements.

END OF SECTION 078413

## SECTION 07 92 00 - JOINT SEALANTS

## PART 1 - GENERAL

## 1.1 RELATED DOCUMENTS

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

## 1.2 SUMMARY

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

## 1.3 ACTION SUBMITTALS

- A. Product Data: For each joint-sealant product indicated.
- B. Samples for Initial Selection: Manufacturer's color charts consisting of strips of cured sealants showing the full range of colors available for each product exposed to view.
- C. Samples for Verification: For each kind and color of joint sealant required, provide Samples with joint sealants in 1/2-inch- (13-mm-) wide joints formed between two 6-inch- (150-mm-) long strips of material matching the appearance of exposed surfaces adjacent to joint sealants.
- D. Joint-Sealant Schedule: Include the following information:
  - 1. Joint-sealant application, joint location, and designation.
  - 2. Joint-sealant manufacturer and product name.
  - 3. Joint-sealant formulation.
  - 4. Joint-sealant color.

## 1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For qualified Installer.
- B. Product Certificates: For each kind of joint sealant and accessory, from manufacturer.
- C. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, indicating that sealants comply with requirements.
- D. Warranties: Sample of special warranties.

## 1.5 QUALITY ASSURANCE

- A. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for installation of units required for this Project.



- B. Source Limitations: Obtain each kind of joint sealant from single source from single manufacturer.

## 1.6 PROJECT CONDITIONS

- A. Do not proceed with installation of joint sealants under the following conditions:
1. When ambient and substrate temperature conditions are outside limits permitted by joint-sealant manufacturer or are below 40 deg F (5 deg C).
  2. When joint substrates are wet.
  3. Where joint widths are less than those allowed by joint-sealant manufacturer for applications indicated.
  4. Where contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

## 1.7 WARRANTY

- A. Special Installer's Warranty: Manufacturer's standard form in which Installer agrees to repair or replace joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.
1. Warranty Period: Five years from date of Substantial Completion.
- B. Special Manufacturer's Warranty: Manufacturer's standard form in which joint-sealant manufacturer agrees to furnish joint sealants to repair or replace those that do not comply with performance and other requirements specified in this Section within specified warranty period.
1. Warranty Period: Five years from date of Substantial Completion.
- C. Special warranties specified in this article exclude deterioration or failure of joint sealants from the following:
1. Movement of the structure caused by structural settlement or errors attributable to design or construction resulting in stresses on the sealant exceeding sealant manufacturer's written specifications for sealant elongation and compression.
  2. Disintegration of joint substrates from natural causes exceeding design specifications.
  3. Mechanical damage caused by individuals, tools, or other outside agents.
  4. Changes in sealant appearance caused by accumulation of dirt or other atmospheric contaminants.

## PART 2 - PRODUCTS

### 2.1 MATERIALS, GENERAL

- A. Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by joint-sealant manufacturer, based on testing and field experience.
- B. Liquid-Applied Joint Sealants: Comply with ASTM C 920 and other requirements indicated for each liquid-applied joint sealant specified, including those referencing ASTM C 920 classifications for type, grade, class, and uses related to exposure and joint substrates.

- C. Stain-Test-Response Characteristics: Where sealants are specified to be nonstaining to porous substrates, provide products that have undergone testing according to ASTM C 1248 and have not stained porous joint substrates indicated for Project.
- D. Suitability for Contact with Food: Where sealants are indicated for joints that will come in repeated contact with food, provide products that comply with 21 CFR 177.2600.
- E. Colors of Exposed Joint Sealants: As selected by Architect from manufacturer's full range.

## 2.2 URETHANE JOINT SEALANTS

- A. Single-Component, Nonsag, Urethane Joint Sealant: ASTM C 920, Type S, Grade NS, Class 25, for Use NT.
  - 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
    - a. BASF Building Systems; Sonolastic NP1, Sonalastic TX1, Sonolastic Ultra.
    - b. Bostik, Inc.; Chem-Calk 900, 915.
    - c. Pecora Corporation; Dynatrol I-XL.
    - d. Polymeric Systems, Inc.; Flexiprene 1000.
    - e. Sika Corporation, Construction Products Division; Sikaflex - 1a.
    - f. Tremco Incorporated; Dymonic, Vulkem 116.
- B. Joint-Sealant Application: Exterior joints in vertical surfaces and horizontal nontraffic surfaces.
  - 1. Joint Locations:
    - a. Construction joints in cast-in-place concrete.
    - b. Joints between different materials listed above.
    - c. Perimeter joints between materials listed above and frames of doors, windows and louvers.
    - d. Other joints as indicated.
  - 2. Urethane Joint Sealant: Single component, nonsag, Class 25.

## 2.3 LATEX JOINT SEALANTS

- A. Latex Joint Sealant: Acrylic latex or siliconized acrylic latex, ASTM C 834, Type OP, Grade NF, paintable.
  - 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
    - a. BASF Building Systems; Sonolac.
    - b. Bostik, Inc.; Chem-Calk 600.
    - c. Pecora Corporation; AC-20+.
    - d. Tremco Incorporated; Tremflex 834.

## 2.4 JOINT SEALANT BACKING

- A. General: Provide sealant backings of material that are nonstaining; are compatible with joint substrates, sealants, primers, and other joint fillers; and are approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.
- B. Cylindrical Sealant Backings: ASTM C 1330, Type C (closed-cell material with a surface skin), Type O (open-cell material), Type B (bicellular material with a surface skin) or any of the preceding types, as approved in writing by joint-sealant manufacturer for joint application indicated, and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance.
- C. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint surfaces at back of joint. Provide self-adhesive tape where applicable.

## 2.5 MISCELLANEOUS MATERIALS

- A. Primer: Material recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.
- B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants to joint substrates.
- C. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting joint-sealant performance.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions and the following requirements:
  - 1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.
  - 2. Clean porous joint substrate surfaces by brushing, grinding, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining after cleaning

operations above by vacuuming or blowing out joints with oil-free compressed air. Porous joint substrates include the following:

- a. Concrete.
  - b. Masonry.
  - c. Unglazed surfaces of ceramic tile.
  - d. Exterior insulation and finish systems.
3. Remove laitance and form-release agents from concrete.
  4. Clean nonporous joint substrate surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants. Nonporous joint substrates include the following:
    - a. Metal.
    - b. Glass.
    - c. Porcelain enamel.
    - d. Glazed surfaces of ceramic tile.
- B. Joint Priming: Prime joint substrates where recommended by joint-sealant manufacturer or as indicated by preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.
- C. Masking Tape: Use masking tape where required to prevent contact of sealant or primer with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

### 3.3 INSTALLATION OF JOINT SEALANTS

- A. General: Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.
- B. Sealant Installation Standard: Comply with recommendations in ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.
- C. Install sealant backings of kind indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.
1. Do not leave gaps between ends of sealant backings.
  2. Do not stretch, twist, puncture, or tear sealant backings.
  3. Remove absorbent sealant backings that have become wet before sealant application and replace them with dry materials.
- D. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.
- E. Install sealants using proven techniques that comply with the following and at the same time backings are installed:
1. Place sealants so they directly contact and fully wet joint substrates.
  2. Completely fill recesses in each joint configuration.
  3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.

- F. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified in subparagraphs below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.
1. Remove excess sealant from surfaces adjacent to joints.
  2. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
  3. Provide concave joint profile per Figure 8A in ASTM C 1193, unless otherwise indicated.
  4. Provide flush joint profile where indicated per Figure 8B in ASTM C 1193.
  5. Provide recessed joint configuration of recess depth and at locations indicated per Figure 8C in ASTM C 1193.
    - a. Use masking tape to protect surfaces adjacent to recessed tooled joints.

### 3.4 CLEANING

- A. Clean off excess sealant or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.

### 3.5 PROTECTION

- A. Protect joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated joint sealants immediately so installations with repaired areas are indistinguishable from original work.

### 3.6 JOINT-SEALANT SCHEDULE

- A. Joint-Sealant Application: Interior joints in vertical surfaces and horizontal nontraffic surfaces.
1. Joint Locations:
    - a. Control and expansion joints on exposed interior surfaces of exterior walls.
    - b. Perimeter joints of exterior openings where indicated.
    - c. Vertical joints on exposed surfaces of interior unit masonry walls and partitions.
    - d. Perimeter joints between interior wall surfaces and frames of interior doors, windows.
    - e. Perimeter joints of plumbing fixtures at walls, floors and counters.
    - f. Perimeter of countertops and backsplashes at adjacent walls.
    - g. Other joints as indicated.
  2. Joint Sealant: Latex.

END OF SECTION 07 92 00

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## SECTION 09 51 13 - ACOUSTICAL PANEL CEILINGS

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. Section includes acoustical panels and exposed suspension systems for ceilings.
- B. Related Requirements:
  - 1. Section 017419 "Construction Waste Management Plan" for provision of waste management.

#### 1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Samples: For each exposed product and for each color and texture specified, 6 inches (150 mm) in size.

#### 1.4 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For finishes to include in maintenance manuals.

#### 1.5 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
  - 1. Acoustical Ceiling Panels: Full-size panels equal to 5 percent of quantity installed.
  - 2. Suspension-System Components: Quantity of each exposed component equal to 5 percent of quantity installed.

#### 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver acoustical panels, suspension-system components, and accessories to Project site in original, unopened packages and store them in a fully enclosed, conditioned space where they will be protected against damage from moisture, humidity, temperature extremes, direct sunlight, surface contamination, and other causes.
- B. Before installing acoustical panels, permit them to reach room temperature and a stabilized moisture content.
- C. Handle acoustical panels carefully to avoid chipping edges or damaging units in any way.

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## 1.7 FIELD CONDITIONS

- A. Environmental Limitations: Do not install acoustical panel ceilings until spaces are enclosed and weatherproof, wet work in spaces is complete and dry, work above ceilings is complete, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.
1. Pressurized Plenums: Operate ventilation system for not less than 48 hours before beginning acoustical panel ceiling installation.

## PART 2 - PRODUCTS

### 2.1 PERFORMANCE REQUIREMENTS

- A. Surface-Burning Characteristics: Comply with ASTM E 84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
1. Flame-Spread Index: Comply with ASTM E 1264 for Class A materials.
  2. Smoke-Developed Index: 450 or less.
- B. Fire-Resistance Ratings: Comply with ASTM E 119; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
1. Indicate design designations from UL's "Fire Resistance Directory" or from the listings of another qualified testing agency.

### 2.2 ACOUSTICAL PANELS, GENERAL

- A. Source Limitations:
1. Acoustical Ceiling Panel: Obtain each type from single source from single manufacturer.
  2. Suspension System: Obtain each type from single source from single manufacturer.
- B. Glass-Fiber-Based Panels: Made with binder containing no urea formaldehyde.
- C. Acoustical Panel Standard: Provide manufacturer's standard panels of configuration indicated that comply with ASTM E 1264 classifications as designated by types, patterns, acoustical ratings, and light reflectances unless otherwise indicated.
1. Mounting Method for Measuring NRC: Type E-400; plenum mounting in which face of test specimen is 15-3/4 inches (400 mm) away from test surface according to ASTM E 795.
- D. Acoustical Panel Colors and Patterns: Match appearance characteristics indicated for each product type.

### 2.3 ACOUSTICAL PANELS

- A. Basis-of-Design Product: Provide acoustic panels from manufacturers listed below. Subject to compliance with requirements, compatible products by alternate manufacturers are acceptable.
- B. Type 1 Acoustic Panels (ACT-1) (Armstrong World Industries):
1. Size: 24" x 24"

2. Thickness: 5/8"
3. Composition: Mineral fiber.
4. Edge: Angled tegular.
5. Surface Color: White.
6. Surface Finish: No. 1833 Fine Fissured Medium Texture for 15/16" wide grid system.

C. Type 2 Acoustic Panels (ACT-2) (Armstrong World Industries):

1. Size: 24" x 48"
2. Thickness: 5/8"
3. Composition: Mineral fiber.
4. Edge: Angled tegular.
5. Surface Color: White.
6. Surface Finish: No. 1834 Fine Fissured Medium Texture for 15/16" wide grid system.

## 2.4 METAL SUSPENSION SYSTEMS, GENERAL

- A. Metal Suspension-System Standard: Provide manufacturer's standard direct-hung metal suspension systems of types, structural classifications, and finishes indicated that comply with applicable requirements in ASTM C 635/C 635M.
- B. Attachment Devices: Size for five times the design load indicated in ASTM C 635/C 635M, Table 1, "Direct Hung," unless otherwise indicated. Comply with seismic design requirements.
1. Power-Actuated Fasteners in Concrete: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other accessory devices for attaching hangers of type indicated and with capability to sustain, without failure, a load equal to 10 times that imposed by ceiling construction, as determined by testing according to ASTM E 1190, conducted by a qualified testing and inspecting agency.
- C. Wire Hangers, Braces, and Ties: Provide wires complying with the following requirements:
1. Zinc-Coated, Carbon-Steel Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper.
  2. Size: Select wire diameter so its stress at three times hanger design load (ASTM C 635/C 635M, Table 1, "Direct Hung") will be less than yield stress of wire, but provide not less than minimum size as recommended by manufacturer.
- D. Angle Hangers: Angles with legs not less than 7/8 inch (22 mm) wide; formed with 0.04-inch- (1-mm-) thick, galvanized-steel sheet complying with ASTM A 653/A 653M, G90 (Z275) coating designation; with bolted connections and 5/16-inch- (8-mm-) diameter bolts.
- E. Seismic Stabilizer Bars: Manufacturer's standard perimeter stabilizers designed to accommodate seismic forces.
- F. Seismic Struts: Manufacturer's standard compression struts designed to accommodate seismic forces.
- G. Seismic Clips: Manufacturer's standard seismic clips designed and spaced to secure acoustical panels in place.

## 2.5 METAL SUSPENSION SYSTEM

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



1. Armstrong World Industries, Inc.
  2. CertainTeed Corp.
  3. Chicago Metallic Corporation.
  4. USG Interiors, Inc.; Subsidiary of USG Corporation.
- B. Wide-Face, Capped, Double-Web, Steel Suspension System (Type 1 & 2 Acoustic Panels): Main and cross runners roll formed from cold-rolled steel sheet; prepainted, hot-dip galvanized according to ASTM A 653/A 653M, not less than G30 (Z90) coating designation; with prefinished 15/16-inch- (24-mm-) wide metal caps on flanges.
1. Structural Classification: Heavy-duty system.
  2. End Condition of Cross Runners: Override (stepped) or butt-edge type.
  3. Face Design: Flat, flush.
  4. Cap Material: Galvanized steel cold-rolled sheet.
  5. Cap Finish: Painted white.
- C. Roll-Formed, Sheet-Metal Edge Moldings and Trim: Type and profile indicated or, if not indicated, manufacturer's standard moldings for edges and penetrations that comply with seismic design requirements; formed from sheet metal of same material, finish, and color as that used for exposed flanges of suspension-system runners.
1. Provide manufacturer's standard edge moldings that fit acoustical panel edge details and suspension systems indicated and that match width and configuration of exposed runners unless otherwise indicated.
  2. For lay-in panels with reveal edge details, provide stepped edge molding that forms reveal of same depth and width as that formed between edge of panel and flange at exposed suspension member.
  3. For circular penetrations of ceiling, provide edge moldings fabricated to diameter required to fit penetration exactly.
  4. Baked-Enamel or Powder-Coat Finish: Minimum dry film thickness of 1.5 mils (0.04 mm). Comply with ASTM C 635/C 635M and coating manufacturer's written instructions for cleaning, conversion coating, and applying and baking finish.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, including structural framing to which acoustical panel ceilings attach or abut, with Installer present, for compliance with requirements specified in this and other Sections that affect ceiling installation and anchorage and with requirements for installation tolerances and other conditions affecting performance of acoustical panel ceilings.
- B. Examine acoustical panels before installation. Reject acoustical panels that are wet, moisture damaged, or mold damaged.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Measure each ceiling area and establish layout of acoustical panels to balance border widths at opposite edges of each ceiling. Avoid using less-than-half-width panels at borders, and comply with layout shown on reflected ceiling plans.

---

### 3.3 INSTALLATION

- A. General: Install acoustical panel ceilings to comply with ASTM C 636/C 636M and seismic design requirements indicated, according to manufacturer's written instructions and CISCA's "Ceiling Systems Handbook."
- B. Suspend ceiling hangers from building's structural members and as follows:
1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structure or of ceiling suspension system.
  2. Splay hangers only where required to miss obstructions; offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
  3. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with location of hangers at spacings required to support standard suspension-system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices.
  4. Secure wire hangers to ceiling-suspension members and to supports above with a minimum of three tight turns. Connect hangers directly either to structures or to inserts, eye screws, or other devices that are secure and appropriate for substrate and that will not deteriorate or otherwise fail due to age, corrosion, or elevated temperatures.
  5. Secure flat, angle, channel, and rod hangers to structure, including intermediate framing members, by attaching to inserts, eye screws, or other devices that are secure and appropriate for both the structure to which hangers are attached and the type of hanger involved. Install hangers in a manner that will not cause them to deteriorate or fail due to age, corrosion, or elevated temperatures.
  6. Do not support ceilings directly from permanent metal forms or floor deck. Fasten hangers to cast-in-place hanger inserts, postinstalled mechanical or adhesive anchors, or power-actuated fasteners that extend through forms into concrete.
  7. When steel framing does not permit installation of hanger wires at spacing required, install carrying channels or other supplemental support for attachment of hanger wires.
  8. Do not attach hangers to steel deck tabs.
  9. Do not attach hangers to steel roof deck. Attach hangers to structural members.
  10. Space hangers not more than 48 inches (1200 mm) o.c. along each member supported directly from hangers unless otherwise indicated; provide hangers not more than 8 inches (200 mm) from ends of each member.
  11. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards and publications.
- C. Install edge moldings and trim of type indicated at perimeter of acoustical ceiling area and where necessary to conceal edges of acoustical panels.
1. Apply acoustical sealant in a continuous ribbon concealed on back of vertical legs of moldings before they are installed.
  2. Screw attach moldings to substrate at intervals not more than 16 inches (400 mm) o.c. and not more than 3 inches (75 mm) from ends, leveling with ceiling suspension system to a tolerance of 1/8 inch in 12 feet (3.2 mm in 3.6 m). Miter corners accurately and connect securely.
  3. Do not use exposed fasteners, including pop rivets, on moldings and trim.
- D. Install suspension-system runners so they are square and securely interlocked with one another. Remove and replace dented, bent, or kinked members.
- E. Install acoustical panels with undamaged edges and fit accurately into suspension-system runners and edge moldings. Scribe and cut panels at borders and penetrations to provide a neat, precise fit.
1. Arrange directionally patterned acoustical panels as follows:
    - a. Install panels with pattern running in one direction parallel to long axis of space.

2. For square-edged panels, install panels with edges fully hidden from view by flanges of suspension-system runners and moldings.
3. For reveal-edged panels on suspension-system runners, install panels with bottom of reveal in firm contact with top surface of runner flanges.
4. For reveal-edged panels on suspension-system members with box-shaped flanges, install panels with reveal surfaces in firm contact with suspension-system surfaces and panel faces flush with bottom face of runners.
5. Paint cut edges of panel remaining exposed after installation; match color of exposed panel surfaces using coating recommended in writing for this purpose by acoustical panel manufacturer.
6. Protect lighting fixtures and air ducts to comply with requirements indicated for fire-resistance-rated assembly.

### 3.4 CLEANING

- A. Clean exposed surfaces of acoustical panel ceilings, including trim, edge moldings, and suspension-system members. Comply with manufacturer's written instructions for cleaning and touchup of minor finish damage. Remove and replace ceiling components that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

END OF SECTION 09 51 13

## SECTION 099100 - PAINTING

## PART 1 - GENERAL

## 1.1 RELATED DOCUMENTS

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

## 1.2 SUMMARY

- A. Section includes surface preparation and the application of paint systems on interior substrates including but not limited to:
  - 1. Concrete masonry units (CMU).
  - 2. Steel.
  - 3. Wood for opaque finish.
  - 4. Wood for transparent finish.
  - 5. Gypsum board.
- B. Paint all exposed surfaces in all rooms, except where a surface or material is specifically indicated not to be painted or is to remain natural. Where an item or surface is not specifically mentioned, paint the same as similar adjacent materials or surfaces. If color or finish is not designated, the Architect will select from standard colors or finishes available.
  - 1. Painting includes field-painting exposed bare and covered pipes and ducts (including color coding), hangers, exposed steel and iron work, wood decks, and primed metal surfaces of mechanical and electrical equipment.
  - 2. Back priming of all painted/stained woods.
- C. Painting is not required on prefinished items, finished metal surfaces, concealed surfaces, operating parts, and labels.
  - 1. Prefinished items not to be painted include the following factory-finished components:
    - a. Acoustic materials
    - b. Metal gutter and downspout systems.
    - c. Finished mechanical and electrical equipment. Electrical load center panel covers in finished spaces shall be painted as specified herein regardless of factory finish.
    - d. Light fixtures
    - e. Metal louvers and brick vents
  - 2. Finished metal surfaces not to be painted include:
    - a. Anodized aluminum
    - b. Stainless steel
    - c. Chromium plate
    - d. Copper
    - e. Bronze
    - f. Brass
    - g. Galvanized lintels and railings.
  - 3. Operating parts not to be painted include moving parts of operating equipment, such as the following:

- a. Valve and damper operators.
- b. Linkages.
- c. Sensing devices.

D. Related Requirements:

1. Division 05 Sections for shop priming of metal substrates with primers specified in this Section.
2. Division 06 Sections for shop priming carpentry with primers specified in this Section.

### 1.3 DEFINITIONS

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

### 1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product. Include preparation requirements and application instructions.
- B. Samples for Initial Selection: For each type of topcoat product.
- C. Product List: For each product indicated, include the following:
  1. Cross-reference to paint system and locations of application areas. Use same designations indicated on Drawings and in schedules.
  2. Printout of current "MPI Approved Products List" for each product category specified, with the proposed product highlighted.

### 1.5 QUALITY ASSURANCE

- A. Applicator Qualifications: Engage an experienced applicator who has completed painting system applications similar in material and extent to those indicated for the Project that have resulted in a five-year construction record of successful in-service performance.
- B. The number of coats and film thickness indicated in the schedule, at the end of this Section, are as specified by the manufacturers herein specified, and are specified so as to provide complete

and thoroughly covered opaque surfaces. It is the Contractor's responsibility to provide the required film thickness to insure adequate coverage.

- C. Single-Source Responsibility: Provide primers and undercoat paint produced by the same manufacturer as the finish coats.

#### 1.6 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

- 1. Paint: 5 percent, but not less than [1 gal. (3.8 L) of each material and color applied.

#### 1.7 DELIVERY, STORAGE, AND HANDLING

- A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F (7 deg C).

- 1. Maintain containers in clean condition, free of foreign materials and residue.
- 2. Remove rags and waste from storage areas daily.

#### 1.8 FIELD CONDITIONS

- A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F (10 and 35 deg C).
- B. Do not apply paints in snow, rain, fog, or mist; when relative humidity exceeds 85 percent; at temperatures less than 5 deg F (3 deg C) above the dew point; or to damp or wet surfaces.
- C. Do not apply paints when relative humidity exceeds 85 percent; at temperatures less than 5 deg F (3 deg C) above the dew point; or to damp or wet surfaces.

#### 1.9 WASTE MANAGEMENT AND DISPOSAL

- A. Paint, stain and wood preservative finishes and related materials (thinners, solvents, etc.) are regarded as hazardous products and are subject to regulations for disposal. Obtain information on these controls from applicable Federal, State and Local government departments having jurisdiction.
- B. All waste materials shall be separated and recycled. Where paint recycling is available, collect waste paint by type and provide for delivery to recycling or collection facility. Materials that cannot be reused must be treated as hazardous waste and disposed of in an appropriate manner.
- C. Place materials defined as hazardous or toxic waste, including used sealant and adhesive tubes and containers, in containers or areas designated for hazardous waste.
- D. To reduce the amount of contaminants entering waterways, sanitary/storm drain systems or into the ground the following procedures shall be strictly adhered to:
  - 1. Retain cleaning water for water-based materials to allow sediments to be filtered out. In no case shall equipment be cleaned using free draining water.

2. Retain cleaners, thinners, solvents and excess paint and place in designated containers and ensure proper disposal.
  3. Return solvent and oil soaked rags used during painting operations for contaminant recovery, proper disposal, or appropriate cleaning and laundering.
  4. Dispose of contaminants in an approved legal manner in accordance with hazardous waste regulations.
  5. Empty paint cans are to be dry prior to disposal or recycling (where available).
  6. Close and seal tightly partly used cans of materials including sealant and adhesive containers and store protected in well ventilated fire-safe area at moderate temperature.
- E. Set aside and protect surplus and uncontaminated finish materials not required by the Owner and deliver or arrange collection for verifiable re-use or re-manufacturing.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
1. Benjamin Moore & Co.
  2. Glidden Professional Paints
  3. PPG Architectural Finishes, Inc.
  4. Sherwin-Williams Company (The).

### 2.2 PAINT, GENERAL

- A. MPI Standards: Provide products that comply with MPI standards indicated and that are listed in its "MPI Approved Products List."
- B. Material Compatibility:
1. Provide materials for use within each paint system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
  2. For each coat in a paint system, provide products recommended in writing by manufacturers of topcoat for use in paint system and on substrate indicated.
- C. VOC Content: Provide materials that comply with VOC limits of authorities having jurisdiction.
- D. Colors: As selected by Architect from manufacturer's full range. Architect reserves the right to select, allocate and vary colors on different surfaces throughout the building subject to the limitation that no more than 30% of deep colors will be selected.

### 2.3 PRIMERS/SEALERS

- A. Primer Sealer, Latex, Interior: MPI #61.

### 2.4 WATER-BASED PAINTS

- A. Latex, Exterior Semi-Gloss (Gloss Level 5): MPI #11.

- B. Latex, Interior, (Gloss Level 3): MPI #52.
- C. Latex, Interior, Semi-Gloss, (Gloss Level 5): MPI #54.

## 2.5 WOOD FILLERS

- A. Wood Filler Paste: MPI #91.

## 2.6 POLYURETHANE VARNISHES

- A. Varnish, Interior, Polyurethane, Oil-Modified, Satin (Gloss Level 4): MPI #57.

## 2.7 SOURCE QUALITY CONTROL

- A. Testing of Paint Materials: Owner reserves the right to invoke the following procedure:
  1. Owner will engage the services of a qualified testing agency to sample paint materials. Contractor will be notified in advance and may be present when samples are taken. If paint materials have already been delivered to Project site, samples may be taken at Project site. Samples will be identified, sealed, and certified by testing agency.
  2. Testing agency will perform tests for compliance with product requirements.
  3. Owner may direct Contractor to stop applying paints if test results show materials being used do not comply with product requirements. Contractor shall remove noncomplying paint materials from Project site, pay for testing, and repaint surfaces painted with rejected materials. Contractor will be required to remove rejected materials from previously painted surfaces if, on repainting with complying materials, the two paints are incompatible.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
- B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:
  1. Concrete: 12 percent.
  2. Masonry (Clay and CMU): 12 percent.
  3. Wood: 15 percent.
  4. Gypsum Board: 12 percent.
- C. Gypsum Board Substrates: Verify that finishing compound is sanded smooth.
- D. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.
- E. Proceed with coating application only after unsatisfactory conditions have been corrected.
  1. Application of coating indicates acceptance of surfaces and conditions.



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### 3.2 PREPARATION

- A. Comply with manufacturer's written instructions and recommendations in "MPI Manual" applicable to substrates and paint systems indicated.
- B. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.
  - 1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection.
- C. Clean substrates of substances that could impair bond of paints, including dust, dirt, oil, grease, and incompatible paints and encapsulants.
  - 1. Remove incompatible primers and reprime substrate with compatible primers or apply tie coat as required to produce paint systems indicated.
- D. Concrete Substrates: Remove release agents, curing compounds, efflorescence, and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces to be painted exceeds that permitted in manufacturer's written instructions.
- E. Masonry Substrates: Remove efflorescence and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces or mortar joints exceeds that permitted in manufacturer's written instructions.
- F. Steel Substrates: Remove rust, loose mill scale, and shop primer if any. Clean using methods recommended in writing by paint manufacturer.
- G. Shop-Primed Steel Substrates: Clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with the same material as used for shop priming to comply with SSPC-PA 1 for touching up shop-primed surfaces.
- H. Wood Substrates (Opaque Finish):
  - 1. Scrape and clean knots. Before applying primer, apply coat of knot sealer before applying primer.
  - 2. Sand surfaces that will be exposed to view, and dust off.
  - 3. Prime edges, ends, faces, undersides, and backsides of wood.
  - 4. After priming, fill holes and imperfections in the finish surfaces with putty or plastic wood filler. Sand smooth when dried.
- I. Wood Substrates (Transparent Finish):
  - 1. Countersink steel nails, if used, and fill with putty tinted to final color to eliminate rust leach stains.
  - 2. Prime all surfaces not exposed to view.
  - 3. Apply wood filler paste to open-grain woods, as defined in "MPI Architectural Painting Specification Manual" to produce smooth, glasslike finish.
- J. PVC Trim Substrates: Remove dust, dirt, and other foreign material that might impair bond of paints to substrates.

### 3.3 APPLICATION

- A. Apply paints according to manufacturer's written instructions and recommendations in "MPI Manual."

1. Use applicators and techniques suited for paint and substrate indicated.
  2. Paint surfaces behind movable equipment and furniture same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed equipment or furniture with prime coat only.
  3. Paint both sides and edges of exterior doors and entire exposed surface of exterior door frames.
  4. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
  5. Primers specified in painting schedules may be omitted on items that are factory primed or factory finished if acceptable to topcoat manufacturers.
- B. Tint undercoats same color as topcoat, but tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of same material are to be applied. Provide sufficient difference in shade of undercoats to distinguish each separate coat.
- C. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.
- D. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.
- E. Painting Fire Suppression, Plumbing, HVAC, Electrical, Communication, and Electronic Safety and Security Work:
1. Paint the following work where exposed in occupied spaces:
    - a. Equipment, including panelboards.
    - b. Uninsulated metal piping.
    - c. Uninsulated plastic piping.
    - d. Pipe hangers and supports.
    - e. Metal conduit.
    - f. Plastic conduit.
    - g. Duct, equipment, and pipe insulation having cotton or canvas insulation covering or other paintable jacket material.
    - h. Other items as directed by Architect.
  2. Paint portions of internal surfaces of metal ducts, without liner, behind air inlets and outlets that are visible from occupied spaces.

### 3.4 FIELD QUALITY CONTROL

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

### 3.5 CLEANING AND PROTECTION

- A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.

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

### 3.6 INTERIOR PAINTING SCHEDULE

#### A. Steel Substrates:

- 1. Latex Vapor Barrier Primer Sealer System: MPI INT. 5.1Q
  - a. Prime Coat: Benjamin Moore, Latex Vapor Barrier Primer Sealer 573, MPI #61.
  - b. Intermediate Coat: Benjamin Moore, Premium Interior Latex Semi-Gloss Finish W627, MPI #54.
  - c. Topcoat: Benjamin Moore, Premium Interior Latex Semi-Gloss Finish W627, MPI #54.

#### B. Gypsum Board Substrates:

- 1. Latex System: MPI INT. 9.2A
  - a. Prime Coat: Benjamin Moore, Regal, Premium Interior Latex Primer, N216, MPI #50.
  - b. Intermediate Coat: Benjamin Moore, Premium Interior Latex Eggshell Finish W626, MPI #44.
  - c. Topcoat: Benjamin Moore, Premium Interior Latex Eggshell Finish W626, MPI #44.

#### C. CMU Substrates:

- 1. Latex System: MPI INT. 4.2A
  - a. Prime Coat: Benjamin Moore, Latex Vapor Barrier Primer Sealer 573, MPI #61.
  - b. Intermediate Coat: Benjamin Moore, Premium Interior Latex Semi-Gloss Finish W627, MPI #54.
  - c. Topcoat: Benjamin Moore, Premium Interior Latex Semi-Gloss Finish W627, MPI #54.

#### D. Wood Substrates: Including wood trim, architectural woodwork and wood-based panel products scheduled for opaque finish.

- 1. Latex System: MPI INT. 6.3T and 6.4R
  - a. Prime Coat: Benjamin Moore, Latex Vapor Barrier Primer Sealer 573, MPI #61.
  - b. Intermediate Coat: Benjamin Moore, Premium Interior Latex Semi-Gloss Finish W627, MPI #54.
  - c. Topcoat: Benjamin Moore, Premium Interior Latex Semi-Gloss Finish W627, MPI #54.

- E. Wood Substrates: Including wood trim, architectural woodwork and wood-based panel products scheduled for transparent finish.
  - 1. Polyurethane Varnish System: MPI INT. 6.3K and 6.4J
    - a. Prime Coat: Polyurethane varnish matching topcoat.
    - b. Intermediate Coat: Polyurethane varnish matching topcoat.
    - c. Topcoat: Varnish, interior, polyurethane, oil-modified, satin (Gloss Level 4), MPI #57.

END OF SECTION 09 91 00

SECTION 23 00 00

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## SECTION 23 00 00

## HVAC

## PART 1 GENERAL

## 1.1 GENERAL REQUIREMENTS AND REFERENCES

- A. Include “General Requirements” and applicable parts of Division 1 as part of this section.
- B. Examine all other sections of the Specifications for requirements which affect work under this Section whether or not such work is specifically mentioned in this section. Where paragraphs of this section conflict with similar paragraphs of Division 1, requirements of this section shall prevail.
- C. Coordinate work with that of all other trades affecting, or affected by work of this section. Cooperate with such trades to assure the steady progress of all work under the Contract.
- D. The HVAC Subcontractor shall be responsible for filing all documents, payment of all fees, and securing of all inspections and approvals necessary for the work of this section.

## 1.2 DEFINITIONS

- A. As used in this section, “provide” means “furnish and install”, “POS” means “Provided Under Other Sections” and “HVAC” means “Heating, Ventilating and Air Conditioning”.
- B. As used in the Drawings and Specifications for Mechanical Work, certain non-technical words shall be understood to have specific meanings as follows, regardless of indications to the contrary in the General Conditions of other documents governing the HVAC work.
  - 1. “Furnish” means: Purchase and deliver to the project site complete with every necessary appurtenance and support, all as part of the HVAC work. Purchasing shall include payment of all sales taxes and other surcharges as may be required to assure that purchased item(s) are free of all liens, claims, or encumbrances.
  - 2. “Install” means: Unload at the delivery point at the site and perform every operation necessary to establish secure mounting and correct operation at the proper location in the project, all as part of the HVAC work.
  - 3. “Provide” means: “Furnish” and “Install”.
  - 4. “New” means: Manufactured within the past two (2) years and never before used.
- C. Except where modified by a specific notation to the contrary, it shall be understood that the indication and/or description of any HVAC item in the Drawings or Specifications for HVAC work carries with it the instruction to furnish, install and connect the item as part of the HVAC work, regardless of whether or not this instruction is explicitly stated.
- D. It shall be understood that the Specifications and Drawings for HVAC work are complimentary and are to be taken together for a complete interpretation of the HVAC work except that indications on the Drawings, which refer to an individual element of work, take precedence over the Specifications where they conflict.

## 1.3 SCOPE

- A. Perform work and provide material and equipment as shown on Drawings and as specified or indicated in this Section of the Specifications. Completely coordinate work of this Section with work of other trades and provide a complete and fully functional installation.
- B. Drawings and Specifications form complimentary requirements; provide work specified and not shown, and work shown and not specified as though explicitly required by both. Although work is not specifically shown or specified, provide supplementary or miscellaneous items, appurtenances, devices and materials obviously necessary for a sound, secure and complete installation.
- C. Give notices, file plans, obtain permits and licenses, pay fees and back charges, and obtain necessary approvals from Authorities that have jurisdiction as required to perform work in accordance with all legal requirements and with Specifications, Drawings, Addenda and Change Orders, all of which are part of Contract Documents.
- D. Work shall include, but shall not be limited to, the following:
  - 1. Coordinate maintenance of existing services during construction with Owner.
  - 2. Hoisting and rigging required to complete the work of this Section.
  - 3. Sleeves, inserts and hangers.
  - 4. Flexible connections for vibrating and rotating equipment.
  - 5. Equipment bases and supports.
  - 6. Vibration isolation.
  - 7. Motors.
  - 8. Expansion joints.
  - 9. Sheetmetal work.
  - 10. Complete air distribution system including low and medium pressure ductwork, diffusers, registers, grilles, splitters, dampers, etc.
  - 11. Insulation for duct, piping equipment and tanks.
  - 12. Constant volume and variable air volume air handling units, including fans, coils, filters, motors and mixing boxes.
  - 13. Variable air volume terminal boxes.
  - 14. Rooftop heating and ventilating units and related equipment.
  - 15. Pipe, duct, valve and equipment identification.
  - 16. Instruction manuals and startup instructions.
  - 17. Testing and balancing.
  - 18. Cleaning.
  - 19. Automatic temperature controls, variable air volume controls and other controls.



- E. Before submitting bid, visit and carefully examine site to identify existing conditions and difficulties that will affect work of this Section. No extra payment will be allowed for additional work caused by unfamiliarity with site conditions that are visible or readily construed by experienced observer. Site visit is particularly important because this is renovation work.
- F. Before starting work in a particular area of the project, visit site and examine conditions under which work must be performed including preparatory work done under other Sections or Contracts or by Owner. Report conditions that might affect work adversely in writing through Contractor to Architect. Do not proceed with work until defects have been corrected and conditions are satisfactory. Commencement of work shall be construed as complete acceptance of existing and preparatory work.

#### 1.4 RELATED WORK UNDER OTHER SECTIONS

- A. The following items are not included in this section and will be performed under the designated sections.
  - 1. Excavation and backfill.
  - 2. Concrete work, including concrete housekeeping pads and other pads and blocks for vibrating and rotating equipment.
  - 3. Cutting and patching of masonry, concrete, tile and other parts of structure, with the exception of drilling for hangers and providing holes and openings in metal decks.
  - 4. Flashing of roof fans, or rooftop HVAC units, and of ductwork and all roof penetrations.
  - 5. Installation of access panels in floor, wall, furred space or above ceiling.
  - 6. Painting, except as specified herein.
  - 7. Electric power wiring for all equipment.
  - 8. Structural supports necessary to distribute loading from equipment to roof or floor except as specified herein.
  - 9. Temporary light, power, water, heat, gas and sanitary facilities for use during construction and testing.
  - 10. Outdoor air intake or exhaust louvers.
  - 11. Gypsum drywall enclosures of supply and return ductwork on all rooftop air handlers, supply and return airshafts, as shown on Drawings.
  - 12. Finish carpentry and millwork.
  - 13. Fire protection.
  - 14. Plumbing.
  - 15. Electrical.

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## 1.5 REGULATORY REQUIREMENTS

- A. Perform work strictly as required by rules, regulations, standards, codes, ordinances and laws of Local, State and Federal governments, and all other Authorities that have legal jurisdiction over the site. Materials and equipment shall be manufacturer installed and tested as specified in latest editions of applicable publications, standards, rulings and determinations of:
1. Local and State Building, Plumbing, Mechanical, Electrical, Fire and Health Department Codes.
  2. American Gas Association (AGA).
  3. National Fire Protection Association (NFPA).
  4. American Insurance Association (A.I.A.) (formerly National Board of Fire Underwriters).
  5. Occupational Safety and Health Act (OSHA).
  6. Underwriters' Laboratories (UL).
- B. Material and equipment shall be listed by Underwriters' Laboratories (UL), and approved by ASME and AGA for intended service.
- C. When requirements cited in this Specification conflict with each other or with Contract Documents the most stringent shall govern work. The Architect may relax this requirement when such relaxation does not violate the rulings of Authorities that have jurisdiction. Approval for such relaxation shall be obtained in writing.
- D. Most recent editions of applicable Specifications and publications of the following organizations shall form part of the Contract Documents.
1. American National Standards Institute (ANSI).
  2. American Society of Mechanical Engineers (ASME).
  3. National Electric Manufacturers Association (NEMA).
  4. American Society for Testing and Materials (ASTM).
  5. American Water Works Association (AWWA).
  6. American Society for Heating, Refrigerating and Air Conditioning Engineers (ASHRAE).
  7. Air Moving and Conditioning Association (AMCA).
  8. Sheetmetal and Air Conditioning Contractors National Association (SMACNA).
  9. Air Conditioning and Refrigeration Institute (ARI).
  10. Thermal Insulation Manufacturers Association (TIMA).

## 1.6 SUBMITTALS

- A. This section shall supplement Division 1.
- B. Definitions:

1. Shop Drawings: Information prepared by the Contractor to illustrate portions of the work in more detail than shown in the Contract Documents.
2. Coordination Drawings: Detailed, large-scale layout Shop Drawings showing HVAC, Electrical, Plumbing and Fire Protection work superimposed to identify conflicts and ensure inter-coordination of Mechanical, Electrical, Architectural, Structural and other work.
3. Manufacturer's Product Data: Information prepared by the manufacturer which depicts standard equipment.

C. Submittals Procedures and Format:

1. Review submittal packages for compliance with Contract Documents and then submit to Architect and Engineer for review. Submittal packages shall be sent electronically, either emailed or through utilization of a web based construction administration application such as Procore or Submittal Exchange. All reviews will be returned in kind, either by email or through the web based application with a cover sheet and applicable submittal notations per below.
2. Each Shop Drawing shall indicate in title block, and each Product Data package shall indicate on cover sheet, the following information:
  - a. Title.
  - b. Name and location of project.
  - c. Names of Architect, Engineer, Contractor and Subcontractor(s).
  - d. Names of Manufacturer, Supplier, Vendor, etc.
  - e. Date of submittal.
  - f. Whether original submittal or resubmitted.
3. Shop Drawings showing layouts of systems shall contain sufficient plans, elevations, sections, details and schematics to describe work clearly. They shall be  $\frac{1}{4}'' = 1'-0''$  and shall indicate work of other Sections where physical clearances are critical and where interferences are possible. Provide larger scale details as necessary. Sheetmetal Drawings shall show elements of Architect's reflected ceiling plan, exposed ductwork, walls, partitions, diffusers, registers, grilles, fire dampers, sleeves and other aspects of construction as necessary for coordination.

D. Acceptable Manufacturers:

1. The Architect's Mechanical/Electrical design for each project is based on the single manufacturer listed in the schedule or shown on the Drawings. In Division 15 of these Specifications certain "Alternate Manufacturers" are listed as being acceptable. These are acceptable only if, as a minimum, they:
  - a. Meet all performance criteria listed in the schedules and outlined in the Specifications.
  - b. Have identical operating characteristics to those called for in the Specifications.
  - c. Fit within the available space it was designed for, including space for maintenance and component removal, with no modifications to either the space or the product. Clearances to walls, ceilings and other equipment will be at least equal to those shown on the Contract Documents. The fact that a manufacturer's name appears as acceptable shall not be taken to mean the Architect has determined that the manufacturer's products will fit within the available space. This determination is solely the responsibility of the Contractor.
  - d. For equipment mounted in areas where structural matters are a consideration, the products must have a weight no greater than the product listed in the schedules or Specifications.

e. Products must adhere to all architectural considerations including, but not limited to, being the same size and of the same physical appearance as scheduled or specified products.

E. Substitutions: Substitution of products by manufacturers other than those listed shall only be done in accordance with subparagraph “F” “Substitutions and Deviations”.

F. Substitutions and Deviations:

1. Deviations from the Contract Documents and the substitution of materials or equipment relative to the “Acceptable Manufacturers” referred to above, shall be requested individually in writing whether deviations result from field conditions, standard shop practice, or other cause. Submit letter with transmittal of Shop Drawings which flags the substitution or deviation to the attention of the Architect. The letter shall describe changes in the system shown and physical characteristics (connections to adjacent materials, electrical services, service access requirements, and other characteristics), and differences in operating characteristics or cycles.
2. Without letters flagging the substitution or deviation to the Architect, it is possible that the Architect may not notice such substitution or deviation or may not realize its ramifications. Therefore, if such letters are not submitted to the Architect, the Contractor shall hold the Architect and his consultants harmless for any and all adverse consequences resulting from the deviations being implemented. Adverse consequences shall include, but not be limited to, excessive noise, excessive maintenance, shortened longevity, spatial coordination problems, and inadequate performance versus scheduled design. This shall apply regardless of whether the Architect has reviewed or approved Shop Drawings containing the deviation, and will be strictly enforced.
3. Do not request substitute materials or equipment unless identical material or equipment has been operated successfully for at least three (3) consecutive years. Such materials and equipment shall be a regular cataloged item shown in the current catalog of the manufacturer. When deviation or substitution is permitted, coordinate fully with related changes to Architectural, Structural, Plumbing, Fire Protection, Mechanical, and other work. Ensure that related changes necessary for coordination of substituted items are made within the Contract Price. Assume full responsibility for safety, operation and performance of the altered system.
4. Substitutions of equipment, systems, etc. requiring approval of local Authorities must comply with such regulations and be filed by the Contractor (should filing be necessary).
5. Consideration will not be given to claims that the substituted item meets the performance requirements with lesser construction. Performance, as delineated in schedules and in the Specifications, shall be interpreted as minimum performance.
6. Approval of proposed deviations or substitutions, if any, will be made at discretion of Architect.
7. If equipment is proposed for substitution that is not tested and rated according to industry-wide standards, the Architect shall have the right to have performance tests completed, at the Contractor’s expense, to confirm the manufacturer’s performance claims.

G. Submittal Notations: will be returned from the Architect marked as illustrated below:

NO EXCEPTION TAKEN	ACCEPTED AS NOTED
NOT ACCEPTED	REVISE AND RESUBMIT

1. Checking is only for general conformance with the design concept of the project and general compliance with the information given in the Contract Documents. Any action shown is subject to the requirements of the Drawings and Specifications. Contractor is responsible for dimensions which shall be confirmed and correlated at the job site; fabrication process and techniques of

construction; coordination of his work with that of all other trades; and the satisfactory performance of his work.

- H. Schedule: Incorporate the Shop Drawing review period into the construction schedule so that work is not delayed. Contractor shall assume full responsibility for delays caused by not incorporating the following Shop Drawing review time requirements into his project schedule. Allow at least ten (10) working days, exclusive of transmittal time, for review each time a Shop Drawing is submitted or resubmitted with the exception that fifteen (15) working days, exclusive of transmittal time, are required for the following:
1. Automatic temperature controls.
  2. Coordination Drawings, if required by this Specification.
  3. If more than five (5) Shop Drawings of this trade are received in one (1) calendar week.
- I. List of Proposed Equipment and Materials: Within four (4) weeks after Award of Contract and before ordering materials or equipment, submit a complete list of proposed materials and equipment and indicate manufacturer's names and addresses. No consideration will be given to partial lists submitted out of sequence.
- J. Responsibility:
1. The intent of submittal review is to check for capacity, rating, and certain construction features. Contractor shall ensure that work meets requirements of the Contract Documents regarding information that pertains to fabrication processes or means, methods, techniques, sequences and procedures of construction; and for coordination of work of this and other Sections. Work shall comply with submittals marked "REVIEWED" to extent that they agree with the Contract Documents. Submittal review shall not diminish responsibility under this Contract for dimensional coordination, quantities, installation, wiring, supports and access for service, nor the Shop Drawing errors or deviations from requirements of the Contract Documents. The Architect's noting of some errors while overlooking others will not excuse the Contractor for proceeding in error. Contract Document requirements are not limited, waived, nor superseded in any way by review.
  2. Inform Subcontractors, Manufacturers, Suppliers, etc. of scope and limited nature of review process and enforce compliance with the Contract Documents.
- K. Material and equipment requiring Shop Drawing and/or Manufacturer's Data Submittals shall include but not be limited to:
1. Diffusers, registers, grilles, splitters, dampers and accessories.
  2. Filters.
  3. Variable air volume boxes.
  4. Automatic controls.
  5. Insulation and acoustical lining.
  6. Vibration isolation.
  7. Equipment bases and supports.
  8. Identification for pipe, duct, valves and equipment.

9. Access panels.

10. Color selection charts and samples for equipment and systems in finished areas.

#### 1.7 SURVEYS AND MEASUREMENTS

- A. Base all required measurements, both horizontal and vertical, on reference points established by the General Contractor and be responsible for the correct laying out of the Mechanical work. In the event of a discrepancy between actual measurements and those indicated, notify the General Contractor in writing. Do not proceed with the work required until written instructions have been issued by the General Contractor.

#### 1.8 COORDINATION

- A. HVAC, Plumbing, Fire Protection, and Electrical Drawings are diagrammatic. They indicate general arrangements of Mechanical systems and other work. They do not show all offsets required for coordination nor do they show the exact routings and locations needed to coordinate with Structural and other trades and to meet Architectural requirements.
- B. Work shall be performed in cooperation with other trades on the project and so scheduled as to allow speedy and efficient completion of the work.
- C. Furnish to other trades advance information on locations and sizes of all frames, boxes, sleeves and openings needed for their work. Furnish information and Shop Drawings necessary to allow trades affected by the work to install their work properly and without delay.
- D. In all spaces, prior to installation of visible material and equipment, including access panels, review Architectural Drawings for exact locations and where not definitely indicated, request information from Architect. Where the HVAC work shall interfere with the work of other trades, assist in coordinating the space conditions to make satisfactory adjustments before installation. Without extra cost to the Owner, make reasonable modifications to the work as required by normal Structural interferences. The Mechanical Contractor shall be liable for any additional openings, or relocating and/or enlarging existing openings through concrete floors, walls, beams and roof required for any work which was not properly coordinated. Maintain maximum headroom at all locations. All piping, duct, conduit, and associated components to be as tight to underside of structure as possible.
- E. If any HVAC work has been installed before coordination with other trades so as to cause interference with the work of such trades, all necessary adjustments and corrections shall be made by the trades involved without extra cost to the Owner.
- F. Where conflicts or potential conflicts exist and engineering guidance is desired, submit sketch of proposed resolution to Architect for review and approval.
- G. Protect all materials and work of other trades from damage which may be caused by the Mechanical work, and repair all damages without extra cost to the Owners.

#### 1.9 MECHANICAL AND ELECTRICAL COORDINATION

- A. The HVAC Subcontractor shall furnish and install various electrical items relating to the heating and ventilating equipment and control apparatus. The Electrical Subcontractor shall be required to connect power wiring to this equipment unless noted otherwise.
- B. The HVAC and Electrical Subcontractors shall coordinate their respective portions of the work, as well as the electrical characteristics of the heating, ventilating and air conditioning equipment.
- C. All power wiring and local disconnect switches will be provided by the Electrical Subcontractor for the line voltage power. All control and interlocking wiring shall be the responsibility of the HVAC

Subcontractor.

- D. 120V and above power wiring sources extended and connected to HVAC control panels, transformers and switches shall be the responsibility of the Electrical Subcontractor. All low voltage thermostats and any switch wiring shall be the responsibility of the HVAC Subcontractor.
- E. Temperature control and equipment wiring shall be installed by the HVAC Subcontractor.
- F. The Electrical Subcontractor will provide all magnetic starters except those furnished as an integral part of packaged equipment.

#### 1.10 COORDINATION DRAWINGS

A. Coordination Drawings:

- 1. The Sheetmetal Subcontractor shall prepare a complete set of 3D model electronic Drawings at a scale not less than 3/8" equals 1'-0", showing structure and other information as needed for coordination. He shall show sheetmetal layout thereon. These will be the Coordination Drawings.
- 2. The main paths of egress and for equipment removal, from main Mechanical, Electrical, Plumbing and Fire Protection rooms must be clearly shown on the Coordination Drawings. All fire and smoke partitions must be highlighted on the Coordination Drawings for appropriate coordination.
- 3. Each of the below specialty trades shall add its work to these background Drawings with appropriate elevations and grid dimensions. Specialty trade information is required for fan rooms and mechanical rooms, horizontal exits from duct shafts, crossovers, and for spaces in and above ceilings where congestion of work may occur such as corridors, and even entire floors. Drawings shall indicate horizontal and vertical dimensions, to avoid interference with structural framing, ceilings, partitions, and other services.
  - a. Specialty Trades:
    - 1) Plumbing System.
    - 2) HVAC Piping and Associated Control System.
    - 3) Electrical.
    - 4) Sheet Metal Work.
    - 5) Sprinkler System.
- 4. Each specialty trade shall sign and date each electronic Coordination Drawing. Return Drawings to the Sheetmetal Subcontractor, who shall route them sequentially to all specialty trades.
- 5. Where conflicts occur with placement of materials of various trades, the Sheetmetal Subcontractor will be responsible to coordinate the available space to accommodate all trades. Any resulting adjustments shall be initialed and dated by the specialty trade. The Sheetmetal Subcontractor shall then final date and sign each Coordination Drawing. If he cannot resolve conflicts, the decision of the General Contractor shall be final, subject to the approval of the Architect.
- 6. A Subcontractor who fails to promptly review and incorporate his work on the Coordination Drawings shall assume full responsibility of any installation conflicts affecting his work and of any schedule ramifications.
- 7. The Sheetmetal Subcontractor shall make electronic copies of all Coordination Drawings. Fabrication shall not start until such electronic Drawings are received by the Architect/Engineer and have been reviewed.

8. Review of Coordination Drawings shall not diminish responsibility under this Contract for final coordination of installation and maintenance clearances of all systems and equipment with Architectural, Structural, Mechanical, Electrical, Plumbing and Fire Protection Contractors.

#### 1.11 INSTALLATION REQUIREMENTS

- A. The arrangement of all HVAC work shown on the Drawings is diagrammatic only and indicates the minimum requirements of the work. Conditions at the building including actual measurements shall determine the details of the installation. All work shall be laid out and installed so as to require the least amount of cutting and patching.
- B. Review the Architectural Drawings and Specifications before ordering any material and equipment. Any discrepancies shall be brought to the attention of the Architect for his determination prior to proceeding with the work.

#### 1.12 TYPICAL DETAILS

- A. Typical details where shown on the Drawings shall apply to each and every item of the project where such items are applicable. They are not repeated in full on the Drawings, which in many cases are diagrammatic only, but with the intention that such details shall be incorporated in full. Any alternate method proposed for use by the Contractor shall have the prior approval of the Architect.

#### 1.13 SLEEVES, INSERTS

- A. Furnish and install all sleeves, inserts, anchor bolts and similar items to be set into masonry or concrete, as required for mechanical work. Internal diameter of sleeve ball shall be 1/2" larger than the outside diameter of the pipe or insulation covered line passing through it.

#### 1.14 CORING, DRILLING

- A. Core, cut and/or drill all small holes 4.5" diameter or less in walls and floors required for the installation of sleeves and supports for the Mechanical Electrical work.

#### 1.15 ACCESSIBILITY

- A. Install all work such that parts requiring periodic inspection, operation, maintenance and repair are readily accessible.
- B. Furnish all access panels appropriate to particular conditions, to be installed by trades having responsibility for the construction of actual walls, floors or ceilings at required locations.

#### 1.16 SUPPLEMENTARY SUPPORTING STEEL

- A. Provide all supplementary (non-structural) steelwork required for mounting or supporting equipment and materials.
- B. Steelwork shall be firmly connected to building construction as required. Locations and methods of attachment shall be approved by the Architect.
- C. Steelwork shall be of sufficient strength to allow only minimum deflection in conformity with manufacturer's published requirements.
- D. All supplementary steelwork shall be installed in a neat and workmanlike manner parallel to floor, wall and ceiling construction: all turns shall be made at forty-five and ninety degrees, and/or as dictated by construction and installation conditions.
- E. All manufactured steel parts and fittings shall be galvanized.



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### 1.17 TOOLS AND EQUIPMENT

- A. Provide all tools and equipment required for the fabrication and installation of the mechanical equipment at the site.

### 1.18 PORTABLE AND DETACHABLE PARTS

- A. Contractors shall retain in their possession all portable and/or detachable parts and portions of materials, devices, equipment, etc. necessary for the proper operation and maintenance of the Mechanical and Electrical systems until final completion of the work, at which time they shall be handed over to the Owners.

### 1.19 RIGGING REQUIREMENTS

- A. The work to be done under this Section of the Specifications shall include all hoisting, scaffolding and planking including the furnishing, set-up and maintenance of all derricks, hoisting machinery, cranes, helicopters, scaffolds, staging and planking as required for the work.
- B. Provide installation and erection information including; lifting requirements, and any special rigging or installation requirements for all equipment under the submittals.

### 1.20 RECORD DRAWINGS, PROJECT CLOSEOUT

- A. As work progresses and for the duration of Contract, maintain a complete and separate set of prints of Contract Drawings at job site at all times. Record work completed and all changes from original Contract Drawings clearly and accurately including work installed as a modification or addition to the original design. Work shall be updated on a weekly basis and shall be made available for review by Architect. Failure to perform this work shall be reason for withholding requisition payments. In addition, take photographs of all concealed equipment in gypsum board ceilings, shafts, and other concealed, inaccessible work. At completion of work, make copies of photographs with written explanation on back. These shall become part of Record Documents.
- B. At the completion of work, prepare a complete set of Record Drawings showing all systems as actually installed. The copies will be made available for the HVAC Contractor's copying, at his expense, to serve as backgrounds for the Record Drawings. The quantity of copies which are made available shall in no way be interpreted as setting a limit to the number of Drawings necessary to show the required information. The HVAC Contractor's professional Draft Person shall transfer changes to electronic CAD files. Submit three (3) sets of electronic copies to Architect for comments as to compliance with this section.
- C. The Architect will not certify the accuracy of the Record Drawings. This is the sole responsibility of the Mechanical Contractor.
- D. This trade shall submit the Record Drawings for approval by the Fire and Building Departments in a form acceptable to the departments, when required by the jurisdiction.
- E. Record Drawings shall show record condition of details, sections, riser diagrams, control changes and corrections to schedules. Schedules shall show actual manufacturer, make and model numbers of final equipment installation.

### 1.21 GUARANTEE/WARRANTY

- A. Guarantee and 24 hour service.
  - 1. Guarantee Work of this Section in writing for not less than one (1) year following the date of

acceptance by the Owner. If the equipment is used for temporary heat, cooling, etc, prior to acceptance by the Owner, the bid price shall include an extended period of warranty covering the one (1) year of occupancy, starting from the date of acceptance by the Owner. The guarantee shall repair or replace defective materials, equipment, workmanship and installation that develop within this period, promptly and to the Architect's satisfaction and correct damage caused in making necessary repairs and replacements under guarantee within Contract Price.

2. In addition to guarantee requirements of Division 1 and of Subparagraph A above, obtain written equipment and material warranties offered in manufacturer's published data without exclusion or limitation, in Owner's name.
3. Upon receipt of notice from the Owner of failure of any part of the systems or equipment during the warranty period, the affected part or parts shall be replaced by this Contractor without any reimbursement.
4. Replace material and equipment that require excessive service during guarantee period as defined and as directed by Architect.
5. Provide 24 hour service beginning on the date the project is accepted by the Owner, whether or not fully occupied, and lasting until the termination of the guarantee period. Service shall be at no cost to the Owner. Service can be provided by this Contractor or a separate service organization. Choice of service organization shall be subject to Architect and Owner approval. Submit name and a phone number that will be answered on a 24 hour basis each day of the week, for the duration of the service.
6. Submit copies of equipment and material warranties to Architect before final payment.
7. At end of guarantee period, transfer manufacturer's equipment and material warranties still in force to Owner.
8. This paragraph shall not be interpreted to limit Owner's rights under applicable codes and laws and under this Contract.
9. PART 2 paragraphs of this Specification may specify warranty requirements that exceed those of this paragraph. Those paragraphs shall govern.
10. Use of systems provided under this Section for temporary services and facilities shall not constitute Final Acceptance of Work by Owner, and shall not initiate the guarantee period.
11. Provide manufacturer's engineering and technical staff at site to analyze and rectify problems that develop during guarantee period immediately. If problems cannot be rectified immediately to Owner's satisfaction, advise the Architect in writing, describe efforts to rectify situation, and provide analysis of cause of problem. The Architect and/or Engineer will direct course of action.

## 1.22 OPERATING, INSTRUCTION AND MAINTENANCE MANUALS

- A. Obtain at time of purchase of equipment, three copies of operation, lubrication and maintenance manuals for all items. Assemble literature in coordinated manuals with additional information describing combined operation of field-assembled units, including as-built wiring diagrams. The manual shall contain the names and addresses of manufacturers and local representatives who stock or furnish repair parts for items or equipment. Divide manuals into three sections or books as follows:
  1. Directions for and sequence of operation of each item of HVAC system, e.g. air handling units and boilers. Sequence shall list valves, switches and other devices used to start, stop and control system. Detail procedure to be followed in case of malfunctions. Include detailed approved flow diagrams of temperature control, heating, condensate, chilled water, condenser water, etc. as appropriate for systems provided. Include approved valve directory showing each valve number,

location of each valve and equipment or fixture controlled by valve.

2. Detailed maintenance and troubleshooting manuals containing data furnished by manufacturer for complete maintenance. Include copy of balancing report.
  3. Lubrication instructions detailing type of lubricant, amount and intervals recommended by manufacturer for each item of equipment. Include additional instructions necessary for implementation of first class lubrication program. Include approved summary of lubrication instructions in chart form, where appropriate.
- B. Furnish three copies of manuals to the Architect for approval and distribution to the Owner. Deliver manuals no less than 30 days prior to acceptance of equipment to permit the Owner's personnel to become familiar with equipment and operation prior to acceptance.
- C. Operating Instructions: Upon completion of installation or when the Owner accepts portions of building and equipment for operational use, instruct the Owner's operating personnel in any or all parts of the various systems. Instructions shall be performed by factory authorized personnel. The Owner shall determine which systems require additional instructions. The duration of instructions shall take equipment through complete cycle of operation (at least five working days). Make adjustments under operating conditions.
- D. Each contractor shall be responsible for his work and equipment until finally inspected, tested and accepted. Carefully store materials and equipment which are not immediately installed after delivery to site. Close open ends of work with temporary covers or plug during construction to prevent entry of obstructing material.
- E. Each separate contractor shall protect the work and material of other trades that might be damaged by his work or workmen and make good all damage thus caused.

#### 1.23 SERVICE CHARACTERISTICS

- A. Secondary Building Voltage – High Level: 277/480.
- B. Secondary Building Voltage – Low Level: 120/208.
- C. All equipment and wiring shall be suitable for the applied voltage.
- D. All motors rated 1/2 horsepower and above shall be 208V or 480V, 3-phase.

#### 1.24 QUALITY ASSURANCE

- A. The requirements of the State Building Code and Local regulations establish the minimum acceptable quality of workmanship and materials, and all work shall conform thereto unless more stringent requirements are indicated or specified herein.
- B. All work shall comply with the latest editions of the codes as referenced herein.
- C. Follow manufacturer's directions for articles furnished, in addition to directions shown on Drawings or specified herein.
- D. Protect all work, materials, and equipment from damage during process of work. Replace all damaged or defective work, materials and equipment without additional cost to the Owner.
- E. All equipment and materials for permanent installation shall be the products of recognized manufacturers and shall be new.

## F. Equipment and materials shall:

1. Where normally subject to Underwriters Laboratory Inc. listing or labeling services, be so listed and labeled.
2. Be without blemish or defect.
3. Not be used for temporary purposes.
4. Be in accordance with the latest applicable ASHRAE standards.

## G. Purchase products which will meet with the acceptance of all Authorities Having Jurisdiction over the work. Where such acceptance is contingent upon having the products examined, tested and certified by Underwriters or other recognized testing laboratory, the product shall be so examined, tested and certified.

## H. Except for plans, all items of equipment or material of one generic type shall be the product of one manufacturer throughout.

## I. For items which are to be installed but not purchased as part of the HVAC work, the Mechanical Contractor work shall include:

1. The coordination of their delivery.
2. Their unloading from delivery trucks driven into any point on the property line at grade level.
3. Their safe handling and field storage until the time of permanent placement in the project.
4. The correction of any damage, defacement or corrosion to which they may have been subjected. Replacement, if necessary, shall be coordinated with the Contractor who originally purchased the item.
5. Field erection and internal wiring as necessary for their proper operation.
6. Mounting in place, including the purchase and installation of all dunnage, supporting members, and fastenings, necessary to adapt them to architectural and structural conditions.

## J. Items which are to be installed, but not purchased as part of the HVAC work shall be carefully examined upon delivery to the project. Claims that any of these items have been received in such condition that their installation will require procedures beyond the reasonable scope of the HVAC work will be considered only if presented in writing within one (1) week of the date of delivery to the project of the items in question. The mechanical work includes all procedures, regardless of how extensive, necessary to put into satisfactory operation, all items for which no claims have been submitted as outlined above.

## 1.25 DELIVERY, STORAGE AND HANDLING

- A. All materials for the work of this section shall be delivered, stored and handled so as to preclude damage of any nature. Manufactured materials shall be delivered and stored in their original containers, plainly marked with the products' and manufacturer's name. Materials in broken containers or in packages showing watermarks or other evidence of damage shall not be used and shall be removed from the site.

## PART 2 PRODUCTS

2.1 DUCTWORK AND AIR DISTRIBUTION EQUIPMENT

A. Reference Standards:

1. Material, construction and installation shall meet requirements of most recent editions of the following standards and references, except for more stringent requirements specified or shown on the Drawings:

Standard	As Applicable To
SMACNA HVAC Duct Construction Standards Metal and Flexible	Sheetmetal Ductwork; Duct Liners; Adhesives; Fasteners; Flexible Ductwork
SMACNA HVAC Air Duct Leakage Test Manual	Duct Leakage Testing
ADC and TIMA Flexible Duct Performance Standards	Flexible Ductwork

B. General:

1. Provide supporting and hanging devices necessary to install the entire HVAC system including ductwork and equipment, and to prevent vibration.
2. Provide vertical and horizontal supports as required by code to meet minimum applicable earthquake resistance standards.
3. Ductwork shall be free from vibration under all conditions of operation. Dimensions shown on the Drawings for lined ductwork are net inside dimensions. Increase ductwork dimensions to accommodate lining requirements.
4. Pipe or conduit crossing duct: No pipe, conduit, hanger, Architectural element nor structural member shall pass through ductwork.
5. When making offsets and transformations necessary to accommodate structural conditions, preserve full cross-sectional area of the ductwork as shown on the Drawings.
6. Ductwork shall have pressure-velocity classifications as follows:

Duct Construction Class	Static Pressure Rating	Pressure	SMACNA Seal Class	SMACNA Leakage Class	Velocity
4"	4"	Pos. *	A	6	4000 fpm or less
3"	3"	Pos. or Neg.	A	6	4000 fpm or less
2"	2"	Pos. or Neg.	B	12	2500 fpm or less
1"	1"	Pos. or Neg.	B	12	2500 fpm or less
1/2"	1/2"	Pos. or Neg.	B	12	2000 fpm or less

- a. For negative pressures over 3" w.g., refer to SMACNA Round and Rectangular Industrial Duct Construction Standards for joint and intermediate reinforcement requirements
- b. Unless otherwise specified or shown on the Drawings, the following pressure classifications shall be used for the types of ductwork listed below:
  - 1) 4" Class: All ductwork from discharge of air units to inlets of terminal volume.
  - 2) 3" Class: All fume hood, kitchen hood and smoke exhaust ductwork.
  - 3) 2" Class: All other ductwork.
7. Sealing requirements for Class A, Leakage Class 6, galvanized, non-welded aluminum or non-

- welded stainless steel ductwork:
- a. Transverse Joints:
    - 1) During assembly seal all flanged transverse joints with sealing tape of quality equal to Hardcast Inc. Model 1902-FR. Corners shall be sealed as described by SMACNA and when applicable per manufacturer's published procedures.
    - 2) Seal all non-flanged transverse joints with Hardcast Inc. Versa Grip Model 102 or approved equal.
  - b. Longitudinal Seams: Seal all longitudinal seams during ductwork fabrication with Hardcast Inc. Cold Seal Model 1001 or approved equal.
  - c. Joints and Duct Wall Penetrations: Seal all duct joints at takeoffs, access doors, damper bearing penetrations, flexible duct connections etc., with Hardcast Inc. Versa Grip Model 102 or approved equal.
8. Sealing requirements for Class B, Leakage Class 12, galvanized, non-welded, aluminum or non-welded stainless steel ductwork:
- a. Transverse Joints:
    - 1) During assembly seal all flanged transverse joints with sealing tape of quality equal to Hardcast Inc. Model 1902-FR. Corners shall be sealed as described by SMACNA and when applicable per manufacturer's published procedures.
    - 2) Seal all non-flanged transverse joints with Hardcast Inc. Versa Grip Model 102 or approved equal.
  - b. Longitudinal Seams: Seal all longitudinal seams during ductwork fabrication with Hardcast Inc. Cold Seal Model 1001 or approved equal.
9. Support:
- a. Space hangers as required by SMACNA (8 ft. max.) for horizontal duct on 8 ft. centers, unless concentrated loadings require closer spacing.
  - b. Support vertical duct on each floor or slab it penetrates.
  - c. Supports for ductwork and equipment shall be galvanized unless specified otherwise.
10. Connections:
- a. Connect inlets and outlets of air handling units and fans to ductwork with flexible connections unless fan has vibration isolator mounts inside unit with flexible connections and no external vibration isolators. Exception: Do not use flex on life safety smoke exhaust fans.
  - b. Indoors, flexible connections shall be neoprene-coated fibrous glass fire retardant fabric, by Ventifabrics, or Durodyne. Outdoors, flexible connections shall be DuPont hyplon-coated fibrous glass fire, weather and UV-resistant by Ventifabrics or Durodyne.
  - c. Secure flexible connections tightly to air handlers with metal bands. Bands shall be same material as duct construction.
  - d. Connections from trunk to branch duct shall be as detailed on Drawings.
11. Construction:
- a. No sharp metal edges shall extend into air streams.
  - b. Install drive slips on air-leaving side of duct with sheetmetal screws on 6" centers.
  - c. Spin in collars shall NOT be used for branch connections in 3" or higher pressure class ductwork.

12. Joints:

- a. Longitudinal lock seams shall be double-locked and flattened to make tight joints.
- b. Make transverse joints, field connections, collar attachments and flexible connections to ducts and equipment with sheetmetal screws or bolts and nuts. Do not use rivets or staples.

13. Prefabricated Transverse Duct Joints:

- a. Transverse joints in galvanized sheetmetal ductwork may be made with galvanized gasketed frame and angle duct systems by Ductmate, TDF, TDC or approved equal. Angles shall be at least 20 gauge. Prefabricated transverse duct joints shall not be used for duct 16 ga. and heavier, nor for duct 23 ga. and lighter.
- b. Secure angles to duct with screws (using clutched arbor) or spot-welds spaced as recommended by manufacturer for duct pressure class.

14. Elbows and Bends:

- a. Elbows and bends for rectangular ducts shall have centerline radius of 1-1/2 times duct width wherever possible. Elbows for grease exhaust and fume hood exhaust shall be full radius. Vanes or mitered duct are not allowed.
- b. Where centerline radius is less than 1-1/2 times duct width (on supply, return and exhaust ductwork), elbows shall be radius throat (square throat allowed when turning around column or other close objects) with radius heel. For elbows whose width is greater than 48 inches and/or where shown on plans, provide splitter vanes. Install vanes in accordance with SMACNA. Where multiple elbows are separated by less than ten duct diameters use splitter (full length) vanes.
- c. For round ductwork provide stamped elbows, with centerline radii equal to 1-1/2 times duct diameter, or gored elbows as follows:

Elbow Angle	No. of Gores
0° - 36°	2
37° - 72°	3
73° - 90°	5

- d. Elbows for flat oval ducts shall have centerline radii equal to 1-1/2 times duct diameter in plane of bend, or gored elbows with gores as specified for round ducts.

15. Access Panels/Doors:

- a. Provide proper pressure and leakage rated, gasketed, duct mounted access panels/doors for the following items with minimum sizes, as indicated. Access doors shall be of double wall construction. Access doors in insulated ducts shall be insulated. Gauges of door materials, number of hinges, number and type of door locks shall be as required by the SMACNA Duct Construction Standards. Hinged doors are not acceptable, screwed or bolted access panels are not acceptable. Doors shall be chained to frame with a minimum length of 6" to prevent loss of door. For seal Class A, access doors shall be leakage rated, neoprene gasketed UL 94 HF1 listed, DUCTMATE "sandwich" or approved equal. Door metal shall be the same gauge as the attached duct material. For grease and high temperature ducts, door assembly shall be rated for 2300° F. The minimum sizes shall be:
  - 1) Fire dampers – 12" x 12", or larger.
  - 2) Combination Fire/Smoke dampers – 12" x 12", or larger.
  - 3) Smoke dampers – 6" x 6" minimum.
  - 4) Automatic control dampers – 6" x 6" minimum.

- 5) Manual volume dampers 2 sq. ft. and larger – 6" x 6" minimum.
  - 6) Inlet side to all coils – 12" x 12", or larger.
  - 7) Suction and discharge sides of inline fans – 24" x 24" minimum
  - 8) At additional locations indicated on Drawings, or specified elsewhere – 12" x 12" minimum.
  - 9) Generally access doors are not shown on the Drawings, but shall be provided in accordance with the above.
16. Extractors shall have adjusting rod and locknut on outside of duct.
17. Connections to roof fans:
- a. Shall be at least 22 gauge galvanized steel soldered watertight.
  - b. Solder side seams at least 12" up from bottom.
  - c. Provide suitable dielectric gaskets to join dissimilar materials.
18. Duct Pressure Tests:
- a. Pressure test ducts after takeoffs and wall penetrations are in place and before applying exterior insulation. Correct any leaks.
  - b. Pressure and leak test 100% of medium and low-pressure ductwork at 100% of operating system pressure. Duct shall be constructed so there is no joint or structural failure at the test pressure.
19. Duct Leakage Tests: Leak testing shall be per SMACNA HVAC Air Duct Leakage Test Manual. Provide orifice assembly including straightening vanes, orifice-plate mounted in straight tube with properly located pressure taps, and U-tube manometer or other device as specified by SMACNA. The orifice assembly shall be calibrated accurately and shall come with calibration curve. Leakage classes shall be as previously specified. Submit leak test report (per SMACNA format) for Architect review. Drawings of ductwork tested shall also be submitted with report, indicating presence of takeoffs, wall penetrations, joints, etc.
20. Materials:
- a. Sheetmetal ducts shall be constructed of hot-dipped galvanized sheetmetal with G90 Commercial coating according to ASTM 527 unless specified otherwise.
  - b. Stainless steel (SS) ductwork shall be 18 gauge for kitchen hoods; and as required by SMACNA for other ducts. Materials shall be 316/No. 4 finish for exposed duct, 304/No. 1 finish for concealed ducts. Joints and seams shall be welded as required by SMACNA Guidelines for Welding Sheetmetal.
  - c. Aluminum ductwork shall be Alclad 3003-1414 or alloy 552-H32, of thickness required by the SMACNA duct construction standards with Alloy 6061 bracing angles, and Pittsburgh lock longitudinal corner and double-side seaming.
  - d. Flexible Ductwork:
    - 1) Flexible ductwork, connecting to un-insulated or unlined duct, shall be polyester core with corrosion-resistant helical wire reinforcing. The polyester core shall be minimum two-ply and shall have a minimum thickness of 0.0017". Flex duct shall be UL rated for 6" WC positive pressure, 2" WC negative pressure with a maximum velocity of 4000 FPM. Flexduct must be listed as a Class 1 Connector according to UL 181 and shall meet the requirements of NFPA 90A. The maximum ASTM E-84 fire-hazard rating shall be 25 flame spread, 50 fuel contributed and 50 smoke developed. Un-insulated flexible duct shall be equivalent to Wiremold, Type WB, or Flexmaster Types 2 and 4 (not type 9).



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- 2) Flexible duct connected to insulated or lined duct shall also be insulated and shall be equivalent to Wiremold Type WK or Flexmaster Types 2 or 4 (not type 9), with 1-1/2" 3/4 lb. density fiberglass insulation and an aluminized reinforced vapor barrier.
  - 3) Submittals shall include data or number of polyester plies and minimum thickness of polyester core, in addition to other data listed above required to ensure that submitted product meets the requirements of these Specifications.
  - 4) If flex duct other than the model numbers of the vendors listed above is submitted, a sample of the flex duct shall be submitted to the Architect. The Architect shall have sole discretion in determining whether the submitted flex duct is equivalent to that of the named vendors above.
  - 5) Unless otherwise indicated, flexible duct shall not exceed 5'-0" long.
- e. Rigid PVC ductwork shall be thermally formed ASTM-D-1784-69 Class 12454-B with 3/16" thick wall.
- C. 2" and Lower Pressure Class Ductwork – Rectangular:
1. Ducts wider than 19" with more than 10 square feet of un-braced panel shall be beaded or cross-broken.
  2. Internal stiffening struts shall only be used upon prior written approval of the Architect.
  3. Make changes in duct size with tapered connections as required by SMACNA. Changes shall NOT exceed 30° from line of airflow. Take-off to the diffusers shall be 45° leading edge type or bellmouth type.
  4. Transverse joints shall be TDF/TDC or slip joints; use flat or standing seam according to SMACNA. Where the duct size requires a standing seam but space restrictions dictate flat seam, notify Architect prior to fabrication.
- D. 2" and Lower Pressure Class Ductwork – Round:
1. Joints:
    - a. Longitudinal joints shall be spiral seam, butt welded, lap and seam welded, or ACME lock-grooved seam. Snap lock seams shall be used on 1/2" w.g. pressure class duct only.
    - b. Transverse joints shall be beaded sleeve joint or other approved joints listed in SMACNA. Use three (3) or more sheetmetal screws at 15" uniform intervals along circumference of joints.
  2. Branch fittings shall be conical tee (Buckley or equal) or combination tee as shown in SMACNA.
- E. 3" and 4" Pressure Class Ductwork – Rectangular:
1. Joints: Joints shall be prefabricated type by TDC, TDF, or Ductmate. See "Prefabricated Joints" paragraph for specific requirements.
  2. Duct reinforcement spacing and type shall comply with SMACNA.
  3. Ductwork on both sides of transitions shall be run in same horizontal axis.
  4. Diverging section slope shall be 1-1/2" per foot or less if possible.
  5. Contraction section slope shall not exceed 7" per foot.

- 6. Takeoffs shall be 45° leading edge type except that bellmouths (Buckley or equal) may be used for takeoffs to terminal boxes if the distance between the box and point of takeoff is less than 8 feet.
- 7. Ducts with an aspect ratio greater than 3:1 shall be minimum of 18 gauge unless a thicker gauge is required by SMACNA.

F. 3" and 4" Pressure Class Ductwork – Flat Oval – Single Wall:

- 1. Joints:
  - a. Ducts shall have spiral lock seams or longitudinal seams. Seams and joints in fittings shall be continuously welded. If coating is damaged during welding, repair joints to prevent corrosion.
  - b. Transverse joints shall be slip or flanged.

G. 3" and 4" Pressure Class Ductwork – Round – Single Wall:

- 1. Joints:
  - a. Longitudinal seams shall be local spiral, lock longitudinal or butt welded longitudinal.
  - b. Transverse joints shall be slip joints. Draw band joints shall be used on longitudinal seam duct only. Loose flange Vanstone joints may be used on ducts over 36" in diameter.
  - c. Seams and joints in fittings shall be continuously welded. If coating is damaged during welding, repair joints to prevent corrosion.
- 2. Branch fittings shall be conical tee or combination tee as detailed in SMACNA.

H. Double Wall Ductwork:

- 1. Duct and fitting shall be United Sheetmetal Co., Acousti-K27, Type P or Semo consisting of:
  - a. External pressure-tight shell of zinc-coated steel.
  - b. Uniformly packed, 1" layer of fire resistant fibrous glass insulation with K-factor of 0.27 with Mylar or foil liner meeting 25/50 flame spread/smoke developed rating.
  - c. Internal perforated protective metal liner of zinc-coated steel, with holes sized and spaced to give acoustic impedance of noise reduction characteristic of Acousti-K27 duct.
- 2. Pressure shell of round duct shall be United or approved equal spiral pipe and pressure shell of fittings shall be zinc-coated steel, as follows:

Item	Size	Gauge of Pressure Shell
Duct	3" to 6"	26
	7" to 20"	24
	21" to 34"	22
	36" to 48"	20
Fitting	3" to 34"	20
	36" to 48"	18

- 3. Fittings shall be continuous, corrosion-resistant welds made by certified welders.
- 4. Joints between straight duct sections shall be made with pre-fabricated couplings with 4" shoulder inserted into duct.

I. Flexible Duct:

1. Flexible ductwork shall be Flexmaster Triple-Lock Buck Duct Flexible Air Duct (insulated or non-insulated) as manufactured by Buckley Associates, ATCO, or equal. Flexible duct, non-insulated, shall be Underwriters Laboratory Listed UL 181 Class 0 air duct and constructed in accordance with NFPA Standards 90A and 90B. It shall have a smoke/flame spread rating of 50/25.
  2. The duct shall be made from a tape of dead soft aluminum sheet, spiral wound into a tube and spiral corrugated to provide strength and stability. The joint shall consist of a triple lock mechanically performed without the use of adhesives to make a durable airtight seam. A double lock is not acceptable.
  3. Flexible duct connected to insulated or lined duct shall also be insulated. Flexmaster insulated flex shall have a gray Fire Retardant Polyethylene outer jacket with a 1/2 lb. density, 1-1/2" thick fiberglass insulation blanket, factory wrapped, providing a thermal performance of R-6 overall. Flexible Duct, insulated, shall be Underwriters Laboratory Listed and constructed in accordance with NFPA Standards 90A and 90B. It shall have a smoke/flame spread rating of 50/25.
  4. The flexible duct shall be per manufacturer's instructions.
  5. Flexible ductwork shall be rated at 12" positive pressure. Flexible ductwork from 3" to 16" in diameter shall have a negative pressure rating of 12". Flexible ductwork 18" to 20" in diameter shall have a negative pressure rating of 8".
  6. All flexible ductwork shall be individually boxed and labeled for delivery to the jobsite for maximum protection.
  7. Submittals shall include data on minimum thickness of aluminum core, in addition to other data listed above, required to ensure that submitted product meets the requirements of these Specifications.
  8. Provide sealing compound for installation. See further paragraphs in this Specification and details for other installation requirements.
  9. Flexible duct shall be limited to 5' length.
- J. Ceiling Radiation Dampers and Fire-Rated Blankets: For fire-rated ceiling assemblies, provide at all ceiling diffusers, registers and grilles: Radiation dampers (Nailor Industries Series 0700 or approved equal) and Fire Blanket (Nailor Industries 0725 or approved equal) or fire assembly: radiation damper and blanket already assembled Nailor or equal.
- K. Volume Dampers:
1. Provide manually adjustable rectangular parallel blade dampers for duct heights less than 12" with factory-installed locking hand quadrants extended 2" for all dampers installed in externally insulated duct:
    - a. On each supply, return and general duct take-off.
    - b. At each take-off to register, grille or diffuser (not all are shown on Drawings for clarity).
  2. Volume dampers shall be manufactured approximately 5/16" smaller in width and 1/8" smaller in height than size of duct in which they are installed; e.g., nominal damper size is 24" x 10"; actual size is approximately 23-11/16" x 9-7/8".
  3. Volume damper frames shall be constructed of #6063 extruded aluminum reinforced channel with minimum thickness of 0.050". Opposed damper blades shall be #6063 extruded aluminum with minimum thickness of 0.050" and shall include reinforcing ribs. Each blade shall be supported in

the damper frame by individual Teflon axle bearings, and shall be driven by stainless steel connecting slide linkage controlled by 3/8" square steel control shaft.

4. All required volume dampers may not be indicated on Drawings, but volume dampers shall be provided as necessary for systems balancing.
5. Dampers 12" and larger in height shall be opposed multi-blade type.
6. Where volume dampers are inaccessible, use locking type ceiling regulators and miter gear or worm gear for all horizontal dampers. Bearing coupling for bottom duct control may be used for shaft on vertical blade dampers. The 3/8" rod between ceiling regulator and damper shall be provided by Contractor.
7. Damper blades shall be two gauges heavier than adjoining ductwork, and shall be riveted to supporting rods. Hem over edges parallel to rods.
8. Brackets shall be galvanized metal, secured to ductwork with sheetmetal screw with locking quadrant arms (see Seal Class Section for additional requirements). Provide 2" handle extension for all dampers on externally insulated ductwork.
9. Note: All required volume dampers may not be indicated on Drawings but dampers shall be provided as necessary for system balancing.

L. Airflow Regulators:

1. Constant airflow regulators shall be by American Aldes Ventilation Corp. model # CAR-II, AAB model # ABV TROX VFL, or equivalent. Regulators shall operate on duct pressure and require no external power supply. Each regulator shall be preset and factory calibrated, requiring no field adjustment to the airflows as indicated on the plans. Regulators shall be rated for use in temperatures ranging from -25 F to 140 F.
2. Constant airflow regulators shall be capable of maintaining a constant airflow within +/-10% of the scheduled airflows rates. (15% for 50 cfm or less), within the operating range of 0.2 to 0.8 in. w.g. differential. And between 0.1 and 0.42 in. w.g. on low-pressure models (Car-II-LP).
3. Regulators shall be provided as an assembly consisting of a 94V-0 UL ABS plastic body housed within a round sleeve for mounting in a round duct. Each round sleeve must be fitted with a lip gasket to ensure perimeter air tightness with the interior surface of the duct.
4. All regulators must be classified per UL 2043 and carry the UL mark indicating compliance.
5. All regulators will require no maintenance.
6. Warranty for 5 years.
7. All regulators shall be installed per the manufacturer's requirements and in accordance with all local and codes. Ductwork must be tight.

M. Remote Control Operated Balancing Dampers:

1. Round remote control operated balancing dampers applicable for use in HVAC systems with velocities to 2,600 fpm by United Enertech model i-3, Young Regulators or equal as approved by engineer.
2. Submit manufacturer's product data including performance data.
  - a. Include differential pressure ratings and maximum system velocity.

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- b. Indicate materials, dimensions, construction, and installation details.
  - c. Include damper pressure drop data based on procedures performed in accordance with AMCA 500-D.
3. Ratings:
    - a. Temperature Rating 35°F to 120°F (2°C to 49°C)
    - b. Maximum Velocity: 2600 fpm (13.2 m/s)
    - c. Maximum Differential Pressure Rating: 3" w.g.
  4. Construction:
    - a. Frame: Min. 24 ga galvanized steel, 8" deep
    - b. Blade: Round, minimum 24 ga galvanized steel, mechanically fastened to blade
    - c. Axels: Zinc Plated Steel Pins
    - d. Bearings: Nylon 6/6 Molded synthetic
    - e. Mounting: Vertical and/or Horizontal
    - f. Actuator: DC voltage, Direct Drive, Electronic pulse
    - g. Remote: Portable hand held power pack with RJ-11 cable
    - h. Finish: Mill Galvanized
  5. Accessories and Options (Engineer to select and edit as required)
    - a. Custom RJ-11 cable length: \_\_\_\_\_ inches.
    - b. Aluminum construction
    - c. Stainless Steel construction
    - d. Oval damper in lieu of round
    - e. Choice of RJ-11 cable terminal points: J50, J100, or J150
  6. Installation
    - a. Install dampers at locations indicated in the drawings and in accordance with manufacturer's instructions.
    - b. Install dampers round and free from racking. Do not stretch or compress damper frame or sleeve into the opening or duct.
    - c. Handle dampers using the sleeve or frame. Do not move or lift the damper by the blades, cable, or actuator
    - d. Install remote options (if applicable) of Model J50, J100, or J150 Terminal points.
    - e. Connect RJ-11 cable from the damper to the female outlet, making sure cable is secured and cannot be pulled out of the terminal.
    - f. Coordinate power requirements with electrician.
- N. Automatic Dampers: Install automatic dampers furnished under Automatic Temperature Control Paragraph of this Section, as shown on Drawings, and as specified. Provide sealed wall penetrations for Seal Class A ductwork.
- O. Diffusers, Registers and Grilles:

1. Provide diffusers, registers and grilles for supply, return and exhaust outlets, of size, type and design shown on Drawings. Acceptable manufacturers shall be Anemostat, Krueger, Metal\*Aire, Price, or Titus.
2. Equipment shall be tested and rated per ASHRAE 91-70.
3. Equipment shall handle air quantities at operating velocities:
  - a. With maximum diffusion within space supplied or exhausted.
  - b. Without objectionable air movement as determined by Architect.
  - c. With sound pressure level not to exceed NC 30.
4. Supply, return and exhaust outlets shall have opposed blade volume dampers operable from front.
5. Supply registers shall have two (2) sets of directional control blades.
6. Diffusers within same room or area shall be of same type and style to provide Architectural uniformity.
7. Diffusers, registers and grilles shall be furnished with gaskets and installed with faces set level and plumb, tightly against mounting surface.
8. Finish shall be as directed by the Architect.
9. Coordinate diffusers, registers and grilles with ceiling and wall construction. Refer to Architectural Drawings for exact lengths and for framing and mitering arrangements that may differ from those shown on HVAC Drawings.

P. Branch Duct Take-off Fittings:

1. Contractor shall provide bellmouth take-offs at all branch duct locations.
2. Bellmouth fitting shall be provided with damper.
3. Bellmouths shall be constructed of heavy-duty galvanized steel. Bellmouths shall include an airtight neoprene gasket to ensure a tight fitting with minimal leakage. Pre-drilled holes shall be provided for quick mounting.
4. Standard damper hardware to be constructed of 26-gauge galvanized material with a quadrant damper and tight-fitting gasket to ensure minimal leakage at damper pivot points.
5. Optional heavy-duty hardware shall be provided at locations of higher static pressure where shown on the Drawings.
6. Ninety-degree (90°) take-offs are not permitted on this project.

## 2.2 ACOUSTICAL DUCT LINING

A. Provide 1" thick acoustical lining by Certain-teed, Knauf, Owens Corning or Manville for following ductwork:

1. Supply and return ductwork, including plenums for minimum of 20 feet from rooftop or air handling units (or to sound attenuator if attenuator is located further than 20 feet from fan). Exception: 3 feet before and 10 feet after humidifiers and dedicated life safety smoke exhaust systems.
2. Exhaust ductwork, including plenums, for minimum of 20 feet from fan inlet. Exceptions: kitchen

hood, dishwasher and fume hood system.

3. Low-pressure duct downstream from variable and constant volume boxes.
4. Sound attenuation boots.
5. Other ductwork indicated as lined on Drawings.
6. Increase duct dimensions to accommodate lining while maintaining inside clear dimensions shown on the Drawings.
7. Lining shall be as follows:

Lining for	Material	Minimum NRC	Maximum K-Factor At 75° F Mean
Low-pressure ductwork (below 4" S.P.)	Black, Matfaced, 2 lb. density, flexible glass	0.75	0.24
Medium and high-pressure ductwork (above 4" S.P.)	Black, Matfaced, 3 lb. density, rigid board	0.75	0.23

8. For all lined ductwork at the inlets and outlets of fans over 1 HP, and for all lined medium and high pressure ductwork (including plenums) within 20 feet from RTU's and AHU's provide a perforated aluminum (24 gauge) or galvanized liner (minimum 28 gauge), with 28% minimum free area on the side of the liner exposed to the moving airstream. Metal liner shall be held in place by welded pins spaced no more than 12" O.C.
9. Materials and installation shall meet following standards, as applicable:
  - a. NFPA-90A, UL723, NFPA-255.
  - b. SMACNA Duct Liner Applications Standard.
  - c. SMACNA Mechanical Fasteners Standard.
  - d. Adhesive and Sealant Council: Adhesives Standard for Duct Liner – ASC-A-7001A
  - e. ASTM E-84 fire hazard classifications of 25 flame spread, 50 smoke developed and 50 fuel contributed.
10. Duct liner shall be installed without interruptions or gaps, using 100% coverage of adhesive and mechanical fasteners. Mechanical fasteners shall be welded or secured mechanically to duct on 12" maximum centers.
11. Cut liner to ensure overlapped and compressed longitudinal joints at corners. Transverse joints in liner shall abut precisely. Seal joints against fiber entrainment with approved adhesive, as recommended by manufacturer. Use sheetmetal nosing at beginning of lining (in direction of flow) to prevent erosion.
12. The Contractor shall ensure the integrity of acoustical lining when slip-in duct heaters are installed; loose lining shall not flap about in the airstream. Secure edges of lining with sheetmetal nosing, where liner is interrupted to make room for slip in heaters.
13. Submit samples and catalog data for duct liner, mechanical fasteners and adhesives to Architect for approval.
14. Friction coefficient correction factor at 1000 FPM shall be no greater than 1.1. Liner shall be Certain-teed Ultra Liner, Knauf Duct Liner M or Johns Manville Linacoustic. Other liners from

these manufacturers with friction coefficient correction factors greater than listed above, are not acceptable.

15. Mylar used for vapor barrier shall meet ASTM E-84 classification.
16. Any cut liner due to duct take-offs and branches shall be totally sealed at edges (with sheetmetal nose pieces) to prevent entrainment of loose fibers.
17. Do not insulate lined duct.

### 2.3 DUCT INSULATION:

#### A. General:

1. Insulation shall be Certain-Teed, Knauf, Manville or Owens Corning. Install insulation, mastics, adhesives, coatings, covers, weather-protection and other work exactly as required by manufacturer's recommendations. Materials shall meet requirements of Adhesive and Sealant Council Standards and SMACNA.
2. Apply insulation after systems have been tested, proved tight and approved by Architect. Remove dirt, scale, oil, rust and other foreign matter prior to installation of insulation.
3. Leaks in vapor barrier or voids in insulation will not be accepted.
4. ASTM E-84 minimum fire hazard ratings shall be 25 flame-spread, 50 fuel contributed and 50 smoke developed.
5. Where ducts are insulated, flexible connections to ducts shall be insulated.
6. Insulate standing seams with same material and thickness as duct.
7. Acoustically lined ductwork shall not be insulated externally, except as noted otherwise.
8. Return ductwork in ceiling plenums shall not be insulated.
9. Insulation shall be continuous through wall and ceiling openings and in sleeves.
10. Transmission rates of vapor barriers shall not exceed 0.02 perms.
11. Do not insulate fibrous glass duct.

#### B. Concealed Rectangular, Flat Oval and Circular Ductwork:

1. Insulate supply and outside air ductwork and plena in concealed spaces and return ductwork not in ceiling plenum with 1-1/2" thick glass duct wrap; with foil-Kraft flame-resistant vapor barrier.
2. Insulation shall provide a minimum R-8 value when located in unconditioned spaces and a minimum R-12 value when located outside the building.
3. If insulation does not have pre-cut lap, make lapped butt joints by cutting 2" strip of insulation away from vapor barrier. Apply 6" strips of approved adhesive on 16" centers and wrap duct with insulation. Staple lapped joint with outward-clinching staples. Seal stapled joints airtight with approved matching pressure-sensitive tape.
4. For rectangular duct 24" or larger in any dimension, augment application method specified in item 3 with approved mechanical fasteners, such as weld pins with speed washers, on 18" centers on



bottom of duct.

5. Cover breaks in vapor material with patches of same material, secured with adhesive and staples. Seal staples with approved pressure sensitive tape.
6. Fill voids in insulation at jacket penetrations and seal with pressure sensitive tape.
7. Seal and flash terminations and punctures with fibrous glass cloth between two (2) coats of pressure sensitive tape.
8. Terminate vapor barrier and extend insulation at standoff brackets.

## 2.4 SLEEVES AND PENETRATIONS

### A. Duct Sleeves and Openings:

1. Sleeves through floors, through exterior structure, through fire-rated construction and through smoke partitions that require smoke dampers shall be Schedule 40 galvanized steel pipe for round duct and shall meet the SMACNA Fire Damper and Heat Stop Guide for rectangular ducts. Fireproof packing shall be applied to seal any openings between sleeve and wall. Materials shall maintain the fire rating of the wall, and shall be installed in accordance with the SMACNA Fire Damper and Heat Stop Guide.
2. Openings in walls, partitions and other fire-rated construction that do not require smoke dampers shall meet NFPA 90A, Section 3-3.8.
3. Materials for prepared openings in partitions shall match construction penetrated.

## 2.5 ESCUTCHEONS AND DUCT COLLARS

- A. Provide adjustable escutcheons on exposed piping that passes through finished floors, walls and ceilings. Escutcheons shall be chromium-plated cast brass, sized to cover sleeve opening and to accommodate pipe and insulation.
- B. Provide 4" wide, 20 gauge galvanized sheetmetal collars at sleeves and prepare openings, sized to cover entire duct penetration including sleeve and seal, and to accommodate duct and insulation as necessary. Edges shall have milled lips ground smooth. Paint to match finish of duct or as directed by the Architect.
- C. Provide #316 stainless steel/No. 4 finish collar for emergency generator exhaust piping which passes through exterior wall.

## 2.6 FILTERS MEDIUM EFFICIENCY, THROW AWAY TYPE

- A. Do not operate systems without design filters. Provide new filters before balancing. Provide spare set of filters.
- B. Provide dry type air filter gauge, with scale of 0 to 2" across filter. Gauge shall include appropriate static pressure taps, vent valves and tubing. Gauge shall be suitably marked to indicate when filter should be changed, and shall be Dwyer type or approved equal.
- C. Filters shall be Farr, Cambridge or AAF, as scheduled on Drawings. Filters shall be listed by Underwriters Laboratories, Class 2.
- D. Holding frames for filters shall be 16 gauge galvanized steel with polyurethane foam gaskets and

fasteners. Frame shall be Farr, Type 8, or equivalent by other named manufacturers.

## 2.7 PACKAGED, AIR COOLED, DX ROOFTOP UNIT

### A. General Requirements:

1. Provide where shown on Drawings, a completely factory assembled, piped, wired and tested, rooftop heating and cooling unit. Unit shall have a full charge of refrigerant, and compressor oil. The rooftop unit shall be shipped in one (1) piece and shall have a single point power connection.
2. Acceptable Manufacturers shall be: Carrier, McQuay, Trane, York. Provided that they meet the requirements of this specification and the performance requirements listed in the equipment schedules. Note particularly the following items.
  - a. The submitted rooftop unit must produce the CFM listed in the schedule, at the static pressure, external to the unit, listed in the schedule. This performance must be accomplished using equal or less fan horsepower than the scheduled unit and at an evaporator coil face velocity equal or less than the scheduled unit.
  - b. The discharge air temperatures listed in the schedule are at the discharge of the unit into the supply ductwork, NOT the discharge temperatures at the evaporator coil. These temperatures must be produced by the submitted unit. Draw through rooftop manufacturers must fully account for fan heat gain in determining their discharge temperatures.
  - c. The scheduled sensible and total loads, listed in the schedules, are base on actual calculation, not manufacturer's catalog data. Both loads must be met at the outdoor air and return air temperature, to the unit, listed in the schedules.
  - d. The rooftop unit shown on the Drawings has been coordinated with architectural and structural elements, and with electrical service requirements. If a different unit is submitted, ALL mechanical, electrical, architectural and structural modifications which are required shall be performed by the Mechanical Contractor, under the work of the mechanical section, under the original contract price.

B. Submittal Requirements: This paragraph supplements the "Submittals" paragraph in PART 1 of these Specifications. In addition to complying with all submittal requirements contained in PART 1, the rooftop unit submittal shall contain ALL performance and other items listed in the schedule, as well as:

1. The air temperatures, entering and leaving the evaporator coil.
2. The temperature gain in degrees, due to the return (or exhaust) and supply fan.
3. The component pressure drops of all items internal to the unit – i.e. coils, filters, dampers, furnaces, etc.

### C. Quality Assurance:

1. Rooftop unit shall be rated in accordance with ARI Standard 360. Unit shall be capable of starting and running at 115° F ambient outdoor temperature per the maximum load criteria of ARI Standard 360. Unit shall be capable of mechanical cooling down to 55° F ambient temperature.
2. Gas fired units shall be certified by AGA or UL as a total package.
3. Unit shall be designed to conform to ANSI B9.1 Safety Code and the National Electrical Code.
4. Unit casing shall be capable of withstanding Federal Test Method Standard 141 (Method 6061) 500 hour salt spray test.

5. Air cooled condenser coils shall be factory leak tested at minimum of 150 psig and pressure tested at 450 psig. Evaporator coils shall be factory pressure and leak tested at minimum 300 psig.
6. Insulation and adhesive shall meet NFPA 90A requirements for flame spread and smoke generation.
7. All fan shaft bearings shall have a life of 200,000 hours at design operating conditions in accordance with ANSI B3.15.

D. Equipment Requirements:

1. Unit Casing:

- a. Unit casing shall be constructed of galvanized steel, and be protected against corrosion to such an extent that salt spray test, referenced in the Quality Assurance paragraph above can be passed.
- b. Casing shall be weatherproof. If rooftop unit casing is found to leak after it is installed, within the guarantee period, then whatever modifications to the unit are required to make the casing watertight shall be made, under the work of the mechanical section, within the original contract price.
- c. Hinged, insulated, man-size access doors, which are capable of being secured and locked in the open position, shall be provided on both sides of the casing, to allow access to all fans and drives, coils and all filters. It shall not be necessary to remove any bolts to open the access doors. A hinged, lockable panel shall also be provided for the control cabinet. If this cabinet is external to the unit casing it shall be NEMA 3R (rainproof). All hinged panels shall be provided with suitable gasket to prevent moisture leakage. Easily removable man-sized access panels shall also be provided for the condensing unit section and the gas furnace (if provided).
- d. All interior surfaces exposed to the moving airstream shall be coated with insulation having R-Value equivalent to 3/4" glass fiber insulation. On units without internal casing sheetmetal liner, the glass fiber insulation shall be coated on the airstream side to minimize erosion. Insulation adhesive shall maintain satisfactory adhesion over a range of -20 to 180° F.
- e. Unit casing shall be equipped with lifting lugs to facilitate overhead rigging.

2. Fans:

a. Evaporator and Return/Exhaust Fans:

- 1) Evaporator and return/exhaust fans shall be statically and dynamically balanced.
- 2) Provide fixed pitch fan pulley and variable pitch motor pulley. The Mechanical Contractor shall provide, under the work of the mechanical section, a fixed pitch motor pulley. Pulley size shall be determined when balancing is complete. Pulley shall replace the variable pitch pulley, when balancing is complete. Provide fan and motor structural steel sled, such that motor position may be altered to adjust fan belt tension. Fan drive shall have a service factor of 150%.
- 3) Provide spring-type vibration isolators under the fan sled with a minimum of 90% isolation efficiency.
- 4) Fan shaft bearings shall be self-aligning, pillow-block type.
- 5) Condenser Fans: Condenser fans shall be direct-drive propeller type, statically and dynamically balanced with 3-phase motors. Fans shall discharge air vertically upwards and be protected by PVC coated steel wire safety guards.

3. Compressors and Refrigeration Components:
  - a. Compressors shall be reciprocating and shall be located for easy servicing. Compressors shall be equipped with cylinder unloading (minimum of 4 steps) and factory pre-piped hot gas bypass system to maintain capacity control at minimum cooling loads.
  - b. Semi-hermetic compressors shall be mounted on spring type isolators with a minimum isolation efficiency of 95%.
  - c. Each compressor shall be equipped with an automatically reversible oil pump, insert type crankcase heaters and suction and discharge service valves.
  - d. Unit shall be equipped with dual refrigeration circuits each containing, liquid line service valve, filter drier, sight glass, thermal expansion valve and fusible plug.
  - e. Maximum compressor operating speed shall be 1800 rpm.
  - f. Provide the following safety controls and equipment over-temperature, over-current, oil equalizer lines on circuits on dual compressors, high pressure and low pressure switches. Provide manufacturer's recommended time delay, to prevent compressor short cycling. Provide any additional safety controls recommended by manufacturer for proper operation, in addition to those listed above. See temperature control Drawings for any requirements for provision of auxiliary contacts.
4. Evaporator and Condenser Coils:
  - a. Evaporator coil shall be constructed of aluminum fins mechanically bonded to seamless copper tubes. Coils shall be full-face active type during full and part load conditions.
  - b. Condenser coils shall be constructed of aluminum fins mechanically bonded to seamless copper tubes.
5. Heating Section:
  - a. Gas Furnace:
    - 1) Gas furnaces shall be (single-stage) (two-stage). The burner shall be factory fired and adjusted for proper combustion.
    - 2) All gas piping shall enter the unit cabinet at single location. Provide ignition system, gas train and safety controls. Safety controls shall include: loss of airflow switch, temperature limit switches, flame rollout switch and pilot flame proving switches and any other controls required for proper system operation and code compliance. Provide redundant main gas valves and any other gas train components required by Owner's Insurer.
6. Filter Section: Filter section shall consist of a 2" thick, disposable glass fiber filters of commercially available sizes.
7. Automatic Temperature Controls:
  - a. For constant volume systems, provide electronic, programmable heating/cooling room thermostat with sub-base.
  - b. For VAV systems, provide microprocessor based control system to control discharge air temperature, economizer operation, night setback and morning warm-up. Provide self-contained controls to govern variable air volume system operation.
  - c. Equipment manufacturer's responsibilities for provision of automatic temperature control components and interface to ATC provided components are detailed on the Control Drawings which accompany these Specifications.
  - d. Control dampers shall be low leakage type with leakage not to exceed 3% leakage at 3" WC differential pressure when fully closed. Smoke dampers are to be supplied with seals which will withstand temperatures of 400° F.

- e. The means of supply fan capacity control shall not be discharge dampers. If two (2) motor combinations or two (2) speed motors are provided for the supply fans, they shall not be used without an additional means of capacity control such as inlet vanes.

8. Motors and Electrical Requirements:

- a. All unit power wiring shall enter the casing at a single location.
- b. Electrical control cabinet shall include the following items:
  - 1) Power terminal block.
  - 2) Power transformer switch 115 volt secondary and 115 volt control fuse.
  - 3) 24 volt control transformer and fuse.
  - 4) All necessary relays.
  - 5) 115 volt terminal strip.
  - 6) 24 volt terminal strip containing wired terminals for all controls, numbered in accordance with the wiring diagram.
  - 7) An isolated 24 volt field wiring terminal strip.
  - 8) An electrical print pocket which shall contain the electrical print and maintenance instructions.
- c. All fan motors shall be high efficiency type – see “Motor and Starter” paragraph of these Specifications for requirements.
- d. All power wiring shall be in conduit – no exposed wiring shall be permitted. All power or control wiring within the condenser section and any other wiring exposed to the elements shall be in vapor tight conduit.
- e. For VAV systems the unit manufacturer shall furnish, install and wire VFD’s in accordance with the paragraph in this specification.

E. Execution:

- 1. Startup of the rooftop unit shall be performed under the direct on-site supervision of a factory trained manufacturer’s representative. Startup shall not be performed exclusively by the Mechanical Contractor. See further requirements for startup under the Startup, Testing and Balancing Paragraph in PART 3 of these Specifications.
- 2. The Startup, Testing and Balancing paragraph in PART 3 of these Specifications contains requirements for two (2) meetings to be held in the Engineer’s Office between the Mechanical Contractor, the Balancing Contractor and the Automatic Temperature Control Contractor. The rooftop unit’s manufacturer’s representative shall attend both meetings.
- 3. The Startup, Testing and Balancing paragraph of PART 3 of these Specifications requires that the rooftop unit’s manufacturer’s representative be on-site during the time when those parts of the air system balancing and temperature control testing, which effect the rooftop unit takes place. See “PART 3” of these Specifications for specific requirements.

## 2.8 VIBRATION ISOLATION AND SEISMIC RESTRAINTS FOR HVAC SYSTEMS

A. General:

- 1. Intent:
  - a. All mechanical equipment, piping and ductwork as noted on the equipment schedule or in the

- specification shall be mounted on vibration isolators to prevent the transmission of vibration and mechanically transmitted sound to the building structure. Vibration isolators shall be selected in accordance with the weight distribution so as to produce reasonably uniform deflections.
- b. All isolators and isolation materials shall be of the same manufacturer and shall be certified by the manufacturer.
  - c. It is the intent of the seismic portion of this specification to keep all mechanical and electrical building system components in place during a seismic event.
  - d. All such systems must be installed in strict accordance with seismic codes, component manufacturer's recommendations and building construction standards. Whenever a conflict occurs between the manufacturer's recommendations or construction standards, the most stringent shall apply.
  - e. This specification is considered to be minimum requirements for seismic consideration and is not intended as a substitute for legislated, more stringent, national, state or local construction requirements (i.e. California Title 24, California OSHPD, Canadian Building Codes, or other requirements).
  - f. Any variance or non-compliance with these specification requirements shall be corrected by the contractor in an approved manner.
2. The work of this section includes but is not limited to the following:
- a. Vibration isolation elements.
  - b. Equipment isolation bases.
  - c. Piping flexible connections.
  - d. Seismic restraints for isolated and non-isolated mechanical and electrical items.
  - e. Certification of seismic restraint designs and installation supervision.
  - f. Certification of seismic attachment of housekeeping pads.
  - g. All Mechanical and Electrical systems. Equipment buried underground is excluded but entry of services through the foundation wall is included.
3. Qualifications:
- a. Only firms having five years' experience designing and manufacturing seismic devices shall be capable of work in this specification.
4. Definitions:
- a. Life Safety Systems:
    - 1) All systems involved with fire protection including sprinkler piping, fire pumps, jockey pumps, fire pump control panels, service water supply piping, water tanks, fire dampers and smoke exhaust systems.
    - 2) All systems involved with and/or connected to emergency power supply including all generators, transfer switches, transformers and all flow paths to fire protection and/or emergency lighting systems.
    - 3) All medical and life support systems.
    - 4) Fresh air relief systems on emergency control sequence including air handlers, conduit, duct, dampers, etc.
  - b. Positive Attachment:
    - 1) A positive attachment is defined as a cast-in anchor, a drill-in wedge anchor, a double sided beam clamp loaded perpendicular to a beam, or a welded or bolted connection to

structure. Single sided "C" type beam clamps for support rods of overhead piping, ductwork, fire protection, electrical conduit, bus duct, or cable trays, or any other equipment are not acceptable on this project as seismic anchor points.

- c. Transverse Bracing:
    - 1) Restraint(s) applied to limit motion perpendicular to the centerline of the pipe, duct or conduit.
  - d. Longitudinal Bracing:
    - 1) Restraint(s) applied to limit motion parallel to the centerline of the pipe, duct or conduit.
  - e. Failure:
    - 1) For the purposes of this project, failure is defined as the discontinuance of any attachment point between equipment or structure, vertical permanent deformation greater than 1/8" (3mm) and/or horizontal permanent deformation greater than 1/4" (6mm).
5. Submittals:
- a. Submittal material shall include copies of descriptive data for all products and materials including but not limited to the following:
    - 1) Descriptive Data:
      - a) Catalog cuts or data sheets on vibration isolators and specific restraints detailing compliance with the specification.
      - b) An itemized list showing the items to be isolated and/or seismically restrained, product type or model number to be used and loading and deflection data.
    - 2) Shop Drawings:
      - a) Submit fabrication details for equipment bases including dimensions, structural member sizes and support point locations.
      - b) Provide Drawings showing methods of suspension and support guides for conduit, piping, ductwork and ceiling hung equipment.
      - c) Where walls, floors, slabs or supplementary steel work are used for seismic restraint locations, details of acceptable attachment methods for ducts, conduit and pipe must be included and approved before the condition is accepted for installation. Restraint manufacturers' submittals must include spacing, static loads and seismic loads at all attachment and support points.
      - d) Provide specific details of seismic restraints and anchors; include number, size and locations for each piece of equipment.
      - e) Drawings showing methods for isolation of conduits, pipes and ductwork penetrating walls and floor slabs.
      - f) Specific details of restraints including anchor bolts for mounting and maximum loading at each location, for each piece of equipment and/or pipe and duct locations.
    - 3) Seismic Certification and Analysis:
      - a) Seismic restraint calculations must be provided for all connections of equipment to the structure. Calculations must be stamped by a registered professional engineer with at least five years of seismic design experience, licensed in the state of the job location.
      - b) All restraining devices shall have a preapproval number from California OSHPD or some other recognized government agency showing maximum restraint ratings. Preapprovals based on independent testing are preferred to preapprovals based on calculations. Where preapproved devices are not available, submittals based on

independent testing are preferred. Calculations (including the combining of tensile and shear loadings) to support seismic restraint designs must be stamped by a registered professional engineer with at least five years of seismic design experience and licensed in the state of the job location. Testing and calculations must include both shear and tensile loads as well as one test or analysis at 45 degrees to the weakest mode.

- c) Analysis must indicate calculated dead loads, static seismic loads and capacity of materials utilized for connections to equipment and structure. Analysis must detail anchoring methods, bolt diameter, embedment and/or welded length. All seismic restraint devices shall be designed to accept, without failure, the forces detailed in section 1.06 acting through the equipment center of gravity. Overturning moments may exceed forces at ground level.

6. Contractor's Responsibilities:

- a. Contractor to have the following responsibilities:
  - 1) Determine vibration isolation and seismic restraint sizes and locations per specifications.
  - 2) Provide and install isolation systems and seismic restraints as scheduled or specified.
  - 3) Guarantee specified isolation system deflection.
  - 4) Provide installation instructions, drawings and field supervision to assure proper installation and performance.
  - 5) Provide installation instructions, drawings and trained field supervision to insure proper installation and performance.
  - 6) Substitution of "Internally Isolated" mechanical equipment in lieu of the specified isolation of this section is acceptable.

7. Seismic Force Levels:

- a. Installations shall be designed to safely accept external forces determined in accordance with the International Building Code –2009, Section 16 in any direction for all rigidly supported equipment without failure and permanent displacement of the equipment. Seismic restraints shall not short circuit vibration isolation systems or transmit objectionable vibration or noise.

8. Project Record Documents:

- a. Submit under provision of Division 1.
- b. Record actual locations and installation of vibration isolators and seismic restraints including attachment points.

B. Products:

1. Manufacturers:

- a. Mason Industries Inc. (basis for model numbers listed below).
- b. Vibration Eliminator Co.
- c. Amber/Booth Co.

2. Product Descriptions:

- a. Vibration Isolators and Seismic Restraint Specifications:
  - 1) Specification 1 – Neoprene Pad:
    - a) Two layers of 3/4" (19mm) thick neoprene pad consisting of 2" (50mm) square waffle modules separated horizontally by a 16 (1.5mm) gauge galvanized shim. Load



distribution plates shall be used as required.

b) Pads shall be Type Super "W" as manufactured by Mason Industries, Inc.

2) Specification 2 – Bridge-Bearing Neoprene Mountings:

a) Bridge-bearing neoprene mountings shall have a minimum static deflection of 0.2" (5mm) and all directional seismic capability. The mount shall consist of a ductile iron casting containing two separated and opposing molded neoprene elements. The elements shall prevent the central threaded sleeve and attachment bolt from contacting the casting during normal operation. The shock absorbing neoprene materials shall be compounded to bridge-bearing specifications. Mountings shall have an Anchorage Preapproval "R" Number from OSHPD in the State of California verifying the maximum certified horizontal and vertical load ratings.

b) Mountings shall be Type BR as manufactured by Mason Industries, Inc.

3) Specification 3 – Bushing Assemblies:

a) Sheet metal panels shall be bolted to the walls or supporting structure by assemblies consisting of a neoprene bushing cushioned between 2 steel sleeves. The outer sleeve prevents the sheet metal from cutting into the neoprene. Enlarge panel holes as required. Neoprene elements pass over the bushing to cushion the back panel horizontally. A steel disc covers the inside neoprene element and the inner steel sleeve is elongated to act as a stop so tightening the anchor bolts does not interfere with panel isolation in 3 planes. Bushing assemblies can be applied to the ends of steel cross members where applicable. All neoprene shall be bridge bearing quality.

b) Bushing assemblies shall be type PB as manufactured by Mason Industries, Inc.

4) Specification 4 - Neoprene Bushing:

a) A one piece molded bridge bearing neoprene washer/bushing. The bushing shall surround the anchor bolt and have a flat washer face to avoid metal to metal contact.

b) Neoprene bushings shall be type HG as manufactured by Mason Industries, Inc.

5) Specification 5 – Spring Isolators:

a) Spring isolators shall be free standing and laterally stable without any housing and complete with a molded neoprene cup or 1/4" (6mm) neoprene acoustical friction pad between the baseplate and the support. All mountings shall have leveling bolts that must be rigidly bolted to the equipment. Spring diameters shall be no less than 0.8 of the compressed height of the spring at rated load. Springs shall have a minimum additional travel to solid equal to 50% of the rated deflection. Submittals shall include spring diameters, deflection, compressed spring height and solid spring height.

b) Mountings shall be Type SLF as manufactured by Mason Industries, Inc.

6) Specification 6 – Restrained Spring Mountings:

a) Restrained spring mountings shall have an SLF mounting as described in Specification 5, within a rigid housing that includes vertical limit stops to prevent spring extension when weight is removed. The housing shall serve as blocking during erection. A steel spacer shall be removed after adjustment. Installed and operating heights are equal. A minimum clearance of 1/2" (12mm) shall be maintained around restraining bolts and between the housing and the spring so as not to interfere with the spring action. Limit stops shall be out of contact during normal operation. Since housings will be bolted or welded in position there must be an internal isolation pad. Housing shall be designed to resist all seismic forces. Mountings shall have Anchorage Preapproval "R" Number from OSHPD in the state of California certifying the maximum certified horizontal and vertical load ratings.

- b) Mountings shall be SLR as manufactured by Mason Industries, Inc.
- 7) Specification 7 – Spring Mountings:
- a) Spring mountings as in specification 5 built into a ductile iron or steel housing to provide all directional seismic snubbing. The snubber shall be adjustable vertically and allow a maximum of 1/4" (6mm) travel in all directions before contacting the resilient snubbing collars. Mountings shall have an Anchorage Preapproval "R" number from OSHPD in the State of California verifying the maximum certified horizontal and vertical load ratings.
- b) Mountings shall be SSLFH as manufactured by Mason Industries, Inc.
- 8) Specification 8 – Air Springs:
- a) Air Springs shall be manufactured with upper and lower steel sections connected by a replaceable flexible nylon reinforced neoprene element. Air spring configuration shall be multiple bellows to achieve a maximum natural frequency of 3 Hz. Air Springs shall be designed for a burst pressure that is a minimum of three times the published maximum operating pressure. All air spring systems shall be connected to either the building control air or a supplementary air supply and equipped with three leveling valves to maintain leveling within plus or minus 1/8" (3mm). Submittals shall include natural frequency, load and damping tests performed by an independent lab or acoustician.
- b) Air Springs shall be Type MT and leveling valves Type LV as manufactured by Mason Industries, Inc.
- 9) Specification 9 – Restrained Air Springs:
- a) Restrained air spring mountings shall have an MT air spring as described in Specification 8, within a rigid housing that includes vertical limit stops to prevent air spring extension when weight is removed. The housing shall serve as blocking during erection. A steel spacer shall be removed after adjustment. Installed and operating heights are equal. A minimum clearance of 1/2" (12mm) shall be maintained around restraining bolts and between the housing and the air spring so as not to interfere with the air spring action. Limit stops shall be out of contact during normal operation. Housing shall be designed to resist all seismic forces.
- b) Mountings shall be SLR-MT as manufactured by Mason Industries, Inc.
- 10) Specification 10 – Hangers:
- a) Hangers shall consist of rigid steel frames containing minimum 1 1/4" (32mm) thick neoprene elements at the top and a steel spring with general characteristics as in specification 5 seated in a steel washer reinforced neoprene cup on the bottom. The neoprene element and the cup shall have neoprene bushings projecting through the steel box. To maintain stability the boxes shall not be articulated as clevis hangers nor the neoprene element stacked on top of the spring. Spring diameters and hanger box lower hole sizes shall be large enough to permit the hanger rod to swing through a 30o arc from side to side before contacting the rod bushing and short circuiting the spring. Submittals shall include a hanger drawing showing the 30o capability.
- b) Hangers shall be type 30N as manufactured by Mason Industries, Inc.
- 11) Specification 11 – Hangers:
- a) Hangers shall be as described in 10, but they shall be pre-compressed and locked at the rated deflection by means of a resilient seismic upstop to keep the piping or equipment at a fixed elevation during installation. The hangers shall be designed with a release mechanism to free the spring after the installation is complete and the hanger is subjected to its full load. Deflection shall be clearly indicated by means of a scale. Submittals shall include a drawing of the hanger showing the 30o capability.

- b) Hangers shall be type PC30N as manufactured by Mason Industries, Inc.

12) Specification 12 - Seismic Cable Restraints:

- a) Seismic Cable Restraints shall consist of galvanized steel aircraft cables sized to resist seismic loads with a minimum safety factor of two and arranged to provide all-directional restraint. Cables must be prestretched to achieve a certified minimum modulus of elasticity. Cable end connections shall be steel assemblies that swivel to final installation angle and utilize two clamping bolts to provide proper cable engagement. Cables must not be allowed to bend across sharp edges. Cable assemblies shall have an Anchorage Preapproval "R" Number from OSHPD in the State of California verifying the maximum certified load ratings.
- b) Cable assemblies shall be Type SCB at the ceiling and at the clevis bolt, SCBH between the hanger rod nut and the clevis or SCBV if clamped to a beam all as manufactured by Mason Industries, Inc.

13) Specification 13 – Seismic Solid Braces:

- a) Seismic solid braces shall consist of steel angles or channels to resist seismic loads with a minimum safety factor of 2 and arranged to provide all directional restraint. Seismic solid brace end connectors shall be steel assemblies that swivel to the final installation angle and utilize two through bolts to provide proper attachment. Seismic solid brace assembly shall have anchorage preapproval "R" number from OSHPD in the state of California verifying the maximum certified load ratings.
- b) Solid seismic brace assemblies shall be type SSB as manufactured by Mason Industries, Inc.

14) Specification 14 – Rod Clamp Assemblies:

- a) Steel angles, sized to prevent buckling, shall be clamped to pipe or equipment rods utilizing a minimum of three ductile iron clamps at each restraint location when required. Welding of support rods is not acceptable. Rod clamp assemblies shall have an Anchorage Preapproval "R" Number from OSHPD in the State of California.
- b) Rod clamp assemblies shall be Type SRC as manufactured by Mason Industries, Inc.

15) Specification 15 – Clevis Hanger Cross Brace:

- a) Pipe clevis cross bolt braces are required in all restraint locations. They shall be special purpose preformed channels deep enough to be held in place by bolts passing over the cross bolt. Clevis cross braces shall have an Anchorage Preapproval "R" Number from OSHPD in the State of California.
- b) Clevis cross brace shall be type CCB as manufactured by Mason Industries, Inc.

16) Specification 16 - All-Directional Seismic Snubbers:

- a) All-directional seismic snubbers shall consist of interlocking steel members restrained by a one-piece molded neoprene bushing of bridge bearing neoprene. Bushing shall be replaceable and a minimum of 1/4" (6mm) thick. Rated loadings shall not exceed 1000 psi (.7kg/mm<sup>2</sup>). A minimum air gap of 1/8" (3mm) shall be incorporated in the snubber design in all directions before contact is made between the rigid and resilient surfaces. Snubber end caps shall be removable to allow inspection of internal clearances. Neoprene bushings shall be rotated to insure no short circuits exist before systems are activated. Snubbers shall have an Anchorage Preapproval "R" Number from OSHPD in the State of California verifying the maximum certified horizontal and vertical load ratings.
- b) Snubber shall be Type Z-1225 as manufactured by Mason Industries, Inc.

17) Specification 17 - All-Directional Seismic Snubbers:

- a) All directional seismic snubbers shall consist of interlocking steel members restrained by shock absorbent rubber materials compounded to bridge bearing specifications. Elastomeric materials shall be replaceable and a minimum of 3/4" (19mm) thick. Rated loadings shall not exceed 1000 psi (.7kg/mm<sup>2</sup>). Snubbers shall be manufactured with an air gap between hard and resilient material of not less than 1/8" (3mm) nor more than 1/4" (6mm). Snubbers shall be installed with factory set clearances. The capacity of the seismic snubber at 3/8" (9mm) deflection shall be equal or greater than the load assigned to the mounting grouping controlled by the snubber multiplied by the applicable "G" force. Submittals shall include the load deflection curves up to 1/2" (12mm) deflection in the x, y and z planes. Snubbers shall have an anchorage preapproval "R" number from OSHPD in the state of California verifying the maximum certified horizontal and vertical load ratings.
- b) Snubbers shall be series Z-1011 as manufactured by Mason Industries, Inc.
- 18) Specification 18 – Stud Wedges:
- a) Stud wedge anchors shall be manufactured from full diameter wire, not from undersized wire that is "rolled up" to create the thread. The stud anchor shall also have a safety shoulder which fully supports the wedge ring under load. The stud anchors shall have an evaluation report number from the I.C.B.O Evaluation Service, Inc. verifying its allowable loads.
- b) Drill-in stud wedge anchors shall be type SAS as manufactured by Mason Industries, Inc.
- 19) Specification 19 – Female Wedge Anchors:
- a) Female wedge anchors are preferred in floor locations so isolators or equipment can be slid into place after the anchors are installed. Anchors shall be manufactured from full diameter wire, and shall have a safety shoulder to fully support the wedge ring under load. Female wedge anchors shall have an evaluation report number from the I.C.B.O Evaluation Service, Inc. verifying to its allowable loads.
- b) Drill-in female wedge anchors shall be type SAB as manufactured by Mason Industries, Inc.
- 20) Specification 20 – Equipment Bases:
- a) Vibration isolation manufacturer shall furnish integral structural steel bases. Rectangular bases are preferred for all equipment. Centrifugal refrigeration machines and pump bases may be T or L shaped where space is a problem. Pump bases for split case pump shall include supports for suction and discharge elbows. All perimeter members shall be steel beams with a minimum depth equal to 1/10 of the longest dimension of the base. Base depth need not exceed 14" (350mm) provided that the deflection and misalignment is kept within acceptable limits as determined by the manufacturer. Height saving brackets shall be employed in all mounting locations to provide a base clearance of 1" (25mm).
- b) Bases shall be type WF as manufactured by Mason Industries, Inc.
- 21) Specification 21 – Inertia Foundations:
- a) Vibration isolation manufacturer shall furnish rectangular steel concrete pouring forms for floating and inertia foundations. Bases for split case pumps shall be large enough to provide for suction and discharge elbows. Bases shall be a minimum of 1/12 of the longest dimension of the base but not less than 6" (150mm). The base depth need not exceed 12" (300mm) unless specifically recommended by the base manufacturer for mass or rigidity. Forms shall include minimum concrete reinforcing consisting of 1/2" (12mm) bars welded in place on 6" (150mm) centers running both ways in a layer 1 1/2" (38mm) above the bottom. Forms shall be furnished with steel templates to hold the anchor bolts sleeves and anchors while concrete is being poured. Height saving brackets shall be employed in all mounting locations to maintain a 1" (25mm)

clearance below the base. Wooden formed bases leaving a concrete rather than a steel finish are not acceptable.

- b) Base shall be type BMK or K as manufactured by Mason Industries, Inc.

22) Specification 22 – Curbs:

- a) Curb mounted rooftop equipment shall be mounted on spring isolation curbs. The lower member shall consist of a sheet metal Z section containing adjustable and removable steel springs that support the upper floating section. The upper frame must provide continuous support for the equipment and must be captive so as to resiliently resist wind and seismic forces. All directional neoprene snubber bushings shall be a minimum of 1/4" (6mm) thick. Steel springs shall be laterally stable and rest on 1/4" (6mm) thick neoprene acoustical pads. Hardware must be plated and the springs provided with a rust resistant finish. The curbs waterproofing shall consist of a continuous galvanized flexible counter flashing nailed over the lower curbs waterproofing and joined at the corners by EPDM bellows. All spring locations shall have access ports with removable waterproof covers. Lower curbs shall have provision for 2" (50mm) of insulation. The roof curbs shall be built to seismically contain the rooftop unit. The unit must be solidly fastened to the top floating rail, and the lower Z section anchored to the roof structure. Curb shall have anchorage preapproval "R" from OSHPD in the state of California attesting to the maximum certified horizontal and vertical load ratings.
- b) Curb shall be type RSC as manufactured by Mason Industries, Inc.

23) Specification 23 – Expansion Joints:

- a) Flexible spherical expansion joints shall employ peroxide cured EPDM in the covers, liners and Kevlar7 tire cord frictioning. Any substitutions must have equal or superior physical and chemical characteristics. Solid steel rings shall be used within the raised face rubber flanged ends to prevent pullout. Flexible cable bead wire is not acceptable. Sizes 2" (50mm) and larger shall have two spheres reinforced with a ductile iron external ring between spheres. Flanges shall be split ductile iron or steel with hooked or similar interlocks. Sizes 16" (400mm) to 24" (600mm) may be single sphere. Sizes 3/4" (19mm) to 1 2" (38mm) may have threaded two piece bolted flange assemblies, one sphere and cable retention. Connectors shall be rated at 250 psi (1.72MPa) up to 170o F (77oC) with a uniform drop in allowable pressure to 215 psi (1.48MPa) at 250o F (121oC) in sizes through 14" (350mm). 16" (400mm) through 24" (600mm) single sphere minimum ratings are 180 psi (1.24MPa) at 170o F (77oC) and 150 psi (1.03 MPa) at 250o F (121oC). Higher rated connectors may be used to accommodate service conditions. All expansion joints must be factory tested to 150% of rated pressure for 12 minutes before shipment. Safety factors to burst and flange pullout shall be a minimum of 3/1. Concentric reducers to the above ratings may be substituted for equal ended expansion joints.
- b) Expansion joints shall be installed in piping gaps equal to the length of the expansion joints under pressure. Control rods need only be used in unanchored piping locations where the manufacturer determines the installation exceeds the pressure requirement without control rods. If control rods are used, they must have 2" (12mm) thick Neoprene washer bushings large enough in diameter to take the thrust at 1000 psi (.7 kg/mm<sup>2</sup>) maximum on the washer area.
- c) Submittals shall include two test reports by independent consultants showing minimum reductions of 20 DB in vibration accelerations and 10 DB in sound pressure levels at typical blade passage frequencies on this or a similar product by the same manufacturer. All expansion joints shall be installed on the equipment side of the shut off valves.
- d) Expansion joints shall be SAFEFLEX SFDEJ, SFEJ, SFDCR or SFU and Control

Rods CR as manufactured by Mason Industries, Inc.

24) Specification 24 – Flexible Stainless Steel Hoses

- a) Flexible stainless steel hose shall have stainless steel braid and carbon steel fittings. Sizes 3" (75mm) and larger shall be flanged. Smaller sizes shall have male nipples. Minimum lengths shall be as tabulated:

Flanged		Male Nipples	
3 x 14	10 x 26	1/2 x 9	1 1/2 x 13
4 x 15	12 x 28	3/4 x 10	2 x 14
5 x 19	14 x 30	1 x 11	2 1/2 x 18
6 x 20	16 x 32	1 1/4 x 12	
8 x 22			

- b) Hoses shall be installed on the equipment side of the shut-off valves horizontally and parallel to the equipment shafts wherever possible.
- c) Hoses shall be type BSS as manufactured by Mason Industries, Inc.

25) Specification 25 - All-Directional Acoustical Pipe Anchor:

- a) All-directional acoustical pipe anchor, consisting of two sizes of steel tubing separated by a minimum 1/2" (12mm) thick 60 durometer neoprene. Vertical restraint shall be provided by similar material arranged to prevent vertical travel in either direction. Allowable loads on the isolation material should not exceed 500 psi (.35 kg/mm<sup>2</sup>) and the design shall be balanced for equal resistance in any direction.
- b) All-directional anchors shall be type ADA as manufactured by Mason Industries, Inc.

26) Specification 26 – Pipe Guides:

- a) Pipe guides shall consist of a telescopic arrangement of two sizes of steel tubing separated by a minimum 1/2" (12mm) thickness of 60 durometer neoprene. The height of the guides shall be preset with a shear pin to allow vertical motion due to pipe expansion or contraction. Shear pin shall be removable and reinsertable to allow for selection of pipe movement. Guides shall be capable of + 1 5/8" (41mm) motion, or to meet location requirements.
- b) Pipe guides shall be type VSG as manufactured by Mason Industries, Inc.

27) Specification 27 - Split Wall Seals:

- a) Split Wall Seals consist of two bolted pipe halves with minimum 3/4" (19mm) thick neoprene sponge bonded to the inner faces. The seal shall be tightened around the pipe to eliminate clearance between the inner sponge face and the piping. Concrete may be packed around the seal to make it integral with the floor, wall or ceiling if the seal is not already in place around the pipe prior to the construction of the building member. Seals shall project a minimum of 1" (25mm) past either face of the wall. Where temperatures exceed 240o F (115oC), 10# (4.5kg) density fiberglass may be used in lieu of the sponge.
- b) Seals shall be Type SWS as manufactured by Mason Industries, Inc.

28) Specification 28 - Horizontal Thrust Restraint:

- a) The horizontal thrust restraint shall consist of a spring element in series with a neoprene molded cup as described in specification 5 with the same deflection as specified for the mountings or hangers. The spring element shall be designed so it can be preset for thrust at the factory and adjusted in the field to allow for a maximum of 1/4" (6mm) movement at start and stop. The assembly shall be furnished with 1 rod and angle brackets for attachment to both the equipment and the duct work or the

equipment and the structure. Horizontal restraints shall be attached at the centerline of thrust and symmetrical on either side of the unit.

- b) Horizontal thrust restraints shall be type WBI/WBD as manufactured by Mason Industries, Inc.

C. Execution:

1. General:

- a. Vibration isolators and seismic restraint systems shall control excessive noise and vibration in the buildings due to the operation of machinery or equipment, and/or due to interconnected piping, ductwork, or conduit. [The installation of all vibration isolators and seismic restraint units, and associated hangers and bases, shall be under the direct supervision of the vibration isolation manufacturer's representative.]
- b. All vibration isolators and seismic restraint systems must be installed in strict accordance with the manufacturers written instructions and all certified submittal data.
- c. Installation of vibration isolators and seismic restraints must not cause any change of position of equipment, piping or ductwork resulting in stresses or misalignment.
- d. No rigid connections between equipment and the building structure shall be made that degrades the noise and vibration control system herein specified.
- e. The contractor shall not install any equipment, piping, duct or conduit that makes rigid connections with the building unless isolation is not specified. "Building" includes, but is not limited to, slabs, beams, columns, studs and walls.
- f. Coordinate work with other trades to avoid rigid contact with the building.
- g. Any conflicts with other trades that will result in rigid contact with equipment or piping due to inadequate space or other unforeseen conditions should be brought to the architects/engineers attention prior to installation. Corrective work necessitated by conflicts after installation shall be at the responsible contractor's expense.
- h. Bring to the architects/engineers attention any discrepancies between the specifications and the field conditions or changes required due to specific equipment selection, prior to installation. Corrective work necessitated by discrepancies after installation shall be at the responsible contractor's expense.
- i. Correct, at no additional cost, all installations that are deemed defective in workmanship and materials at the contractor's expense.
- j. Overstressing of the building structure must not occur because of overhead support of equipment. Contractor must submit loads to the structural engineer of record for approval. Generally bracing may occur from:
  - 1) Flanges of structural beams.
  - 2) Upper truss cords in bar joist construction.
  - 3) Cast in place inserts or wedge type drill-in concrete anchors.
- k. Specification 12 cable restraints shall be installed slightly slack to avoid short circuiting the isolated suspended equipment, piping or conduit.
- l. Specification 12 cable assemblies are installed taut on non-isolated systems. Specification 13 seismic solid braces may be used in place of cables on rigidly attached systems only.
- m. At locations where specification 12 or 13 restraints are located, the support rods must be braced when necessary to accept compressive loads with specification 14 braces.
- n. At all locations where specification 12 or 13 restraints are attached to pipe clevis's, the clevis

cross bolt must be reinforced with specification type 15 braces.

- o. Drill-in concrete anchors for ceiling and wall installation shall be specification type 18, and specification type 19 female wedge type for floor mounted equipment.
  - p. Vibration isolation manufacturer shall furnish integral structural steel bases as required. Independent steel rails are not permitted on this project. Each fan and motor assembly shall be supported on a single structural steel frame.
  - q. Hand built elastomeric expansion joints may be used when pipe sizes exceed 24" or specified movements exceed specification 23 capabilities.
  - r. Where piping passes through walls, floors or ceilings the vibration isolation manufacturer shall provide specification 27 wall seals.
  - s. Air handling equipment and centrifugal fans shall be protected against excessive displacement which results from high air thrust in relation to the equipment weight. Horizontal thrust restraint shall be specification type 28 (see selection guide).
  - t. Locate isolation hangers as near to the overhead support structure as possible.
  - u. [Provide resiliently mounted equipment, piping, and ductwork with seismic snubbers. Each inertia base shall have minimum of four seismic snubbers located close to isolators. Snub equipment designated for post disaster use to 0.05 inch (1.5 mm) maximum clearance. Other snubbers shall have clearance between 0.15 inch (4 mm) and 0.25 inch (7 mm).]
2. Vibration Isolation and Seismic Restraint Installation:
- a. Horizontal pipe isolation: The first three pipe hangers in the main lines near the mechanical equipment shall be as described in specification 11. Specification 11 hangers must also be used in all transverse braced isolated locations. Brace hanger rods with SRC clamps specification 14. Horizontal runs in all other locations throughout the building shall be isolated by hangers as described in specification 10. Floor supported piping shall rest on isolators as described in specification 6. Heat exchanger's and expansion tanks are considered part of the piping run. The first three isolators from the isolated equipment will have the same static deflection as specified for the mountings under the connected equipment. If piping is connected to equipment located in basements and hangs from ceilings under occupied spaces the first three hangers shall have 0.75" (19mm) deflection for pipe sizes up to and including 3" (75mm), 1 1/2" (38mm) deflection for pipe sizes up to and including 6" (150mm), and 2 1/2" (64mm) deflection thereafter. Hangers shall be located as close to the overhead structure as practical. Where piping connects to mechanical equipment install specification 23 expansion joints or specification 24 stainless hoses if 23 is not suitable for the service.
  - b. Riser isolation: Risers shall be suspended from specification 10 hangers or supported by specification 5 mountings, anchored with specification 25 anchors, and guided with specification 26 sliding guides. Steel springs shall be a minimum of 0.75" (19mm) except in those expansion locations where additional deflection is required to limit load changes to + 25% of the initial load. Submittals must include riser diagrams and calculations showing anticipated expansion and contraction at each support point, initial and final loads on the building structure, spring deflection changes and seismic loads. Submittal data shall include certification that the riser system has been examined for excessive stresses and that none will exist in the proposed design.
  - c. [Building expansion joints: Install swing joints at piping crossing expansion joints and brace piping either side of the expansion joint.]
  - d. Seismic Restraint of Piping:
    - 1) Seismically restrain all piping listed as a, b or c below. Use specification 12 cables if isolated. Specification 12 or 13 restraints may be used on unisolated piping.
      - a) Fuel oil piping, gas piping, medical gas piping, and compressed air piping that is 1" (25mm) I.D. or larger.



- b) Piping located in boiler rooms, mechanical equipment rooms, and refrigeration equipment rooms that is 1 1/4" (32mm) I.D. and larger.
  - c) All other piping 2 1/2" (64mm) diameter and larger.
  - 2) Transverse piping restraints shall be at 40' (12m) maximum spacing for all pipe sizes, except where lesser spacing is required to limit anchorage loads.
  - 3) Longitudinal restraints shall be at 80' (24m) maximum spacing for all pipe sizes, except where lesser spacing is required to limit anchorage loads.
  - 4) Where thermal expansion is a consideration, guides and anchors may be used as transverse and longitudinal restraints provided they have a capacity equal to or greater than the restraint loads in addition to the loads induced by expansion or contraction.
  - 5) For fuel oil and all gas piping transverse restraints must be at 20' (6m) maximum and longitudinal restraints at 40' (12m) maximum spacing.
  - 6) Transverse restraint for one pipe section may also act as a longitudinal restraint for a pipe section of the same size connected perpendicular to it if the restraint is installed within 24" (600mm) of the elbow or TEE or combined stresses are within allowable limits at longer distances.
  - 7) Hold down clamps must be used to attach pipe to all trapeze members before applying restraints in a manner similar to clevis supports.
  - 8) Branch lines may not be used to restrain main lines.
  - 9) Cast iron pipe of all types, glass pipe and any other pipes joined with a four band shield and clamp assembly in Zones 2B, 3 and 4 shall be braced as in sections 3.2.D.2 and 3. For Zones 0, 1 and 2A, 2 band clamps may be used with reduced spacings of 1/2 of those listed in sections 3.2.D.2 and 3.
- e. Vibration Isolation of Ductwork:
- 1) All discharge runs for a distance of 50' (15m) from the connected equipment shall be isolated from the building structure by means of specification 10 hangers or specification 5 floor isolators. Spring deflection shall be a minimum of 0.75" (19mm).
  - 2) All duct runs having air velocity of 1000 fpm (5 m/s) or more shall be isolated from the building structure by specification 11 hangers or specification 5 floor supports. Spring deflection shall be a minimum of 0.75" (19mm).
  - 3) Flexible duct connections shall be provided at inlet and discharge ducts. Refer to Section 15910.
- f. Seismic Restraint of Ductwork:
- 1) Seismically restrain all duct work with specification 12 or 13 restraints as listed below:
    - a) Restrain rectangular ducts with cross sectional area of 6 sq.ft. (.5 m<sup>2</sup>) or larger.
    - b) Restrain round ducts with diameters of 28" (700mm) or larger.
    - c) Restrain flat oval ducts the same as rectangular ducts of the same nominal size.
  - 2) Transverse restraints shall occur at 30' (9m) intervals or at both ends of the duct run if less than the specified interval. Transverse restraints shall be installed at each duct turn and at each end of a duct run.
  - 3) Longitudinal restraints shall occur at 60' (18m) intervals with at least one restraint per duct run. Transverse restraints for one duct section may also act as a longitudinal restraint for a duct section connected perpendicular to it if the restraints are installed within 4' (1.2m) of the intersection of the ducts and if the restraints are sized for the larger duct. Duct joints shall conform to SMACNA duct construction standards.

- 4) The ductwork must be reinforced at the restraint locations. Reinforcement shall consist of an additional angle on top of the ductwork that is attached to the support hanger rods. Ductwork is to be attached to both upper angle and lower trapeze.
  - 5) A group of ducts may be combined in a larger frame so that the combined weights and dimensions of the ducts are less than or equal to the maximum weight and dimensions of the duct for which bracing details are selected.
  - 6) Walls, including gypsum board non-bearing partitions, which have ducts running through them may replace a typical transverse brace. Provide channel framing around ducts and solid blocking between the duct and frame.
  - 7) Chimneys and stacks passing through floors are to be bolted at each floor level or secured above and below each floor with riser clamps and specification type 13 for seismic solid brace restraints.
  - 8) Chimneys and stacks running horizontally to be braced every 30' with specification type 12 seismic cable restraints or specification type 13 for seismic solid brace restraints.
- g. Seismic Restraint of Electrical Services:
- 1) All electrical conduit 2 1/2" (64mm) in diameter and larger shall be restrained with specification type 12 seismic cable restraints or specification type 13 for seismic solid brace restraints.
  - 2) All electrical bus ducts, cable trays and ladder trays shall be restrained with specification type 12, seismic cable restraints or specification 13 seismic solid brace restraints.
  - 3) Transverse restraints shall occur at 30' (9m) intervals or both ends if the electrical run is less than the specified interval. Transverse restraints shall be installed at each electrical services turn and at each end of the electric run.
  - 4) Longitudinal restraints shall occur at 60' (9m) intervals with at least one restraint per electric run. Transverse restraints for one electric section may also act as a longitudinal restraint for a duct for an electric section connected perpendicular to it if the restraints are installed within 4' (1.2m) of the intersection of the electric run and if the restraints are sized for the larger electric run.
  - 5) All rigid floor mounted equipment must have a resilient media between the equipment mounting hole and the anchor bolt. Anchor bolts shall be designed in accordance with section 1.9 seismic forces. Neoprene bushings shall be specification type 4 and anchor bolts shall be specification type 18 or 19.
  - 6) Wall mounted panels shall be mounted with specification type 3 bushings. Floor mounted panels shall be mounted on specification type 4 bushings. Anchor bolts shall be specification type 18 or 19.
- h. All fire protection piping shall be braced in accordance with NFPA 13 and 14.
- i. Vibration Isolation and Seismic Restraint of Mechanical Equipment
- 1) All mechanical equipment shall be vibration isolated and seismically restrained as per the schedules in part 3.5 of this specification.
  - 2) Equipment mounted on housekeeping pads: Pads shall be properly doweled or expansion shielded to deck to meet acceleration criteria.
  - 3) Requirements for installation on concrete inertia bases shall be as follows:
    - a) Minimum operating clearance between concrete inertia and base and housekeeping pad or floor shall be 2".
    - b) The equipment structural steel or concrete inertia base shall be placed in position and supported temporarily by blocks or shims, as appropriate, prior to the installation of the machine or isolators.

- c) The isolators shall be installed without raising the machine and frame assembly.
- d) After the entire installation is complete and under full operational load, the isolators shall be adjusted so that the load is transferred from the blocks to the isolators. When all isolators are properly adjusted, the blocks or shims shall be barely free and shall be removed.
- e) Install equipment with flexibility in wiring connection.
- f) Verify that all installed isolator and mounting systems permit equipment motion in all directions. Adjust or provide additional resilient restraints to flexibly limit start-up equipment lateral motion to 1/4".
- g) Prior to start-up, clean out all foreign matter between bases and equipment. Verify that there are no isolation short circuits in the base, isolators, or seismic restraints.

### 3. Seismic Restraint Exclusions:

- a. General: All mechanical and electrical components and systems that are considered exempt from the requirement for seismic restraint, in accordance with The International Building Code – 2003, Section 1621, shall not require seismic restraint.
- b. Piping:
  - 1) Piping in boiler and mechanical rooms less than 1 1/4" (32mm) inside diameter.
  - 2) All other piping less than 2 1/2" (64mm) inside diameter.
  - 3) All piping suspended by individual hangers 12" (300mm) or less as measured from the top of the pipe to the bottom of the support where the hanger is attached. However, if the 12" (300mm) limit is exceeded by any hanger in the run, seismic bracing is required for the run.
  - 4) The 12" (300mm) exemption applies for trapeze supported systems if the top of each item supported by the trapeze qualifies.
- c. Ductwork:
  - 1) Rectangular and square ducts that are less than 6 square feet in cross sectional area.
  - 2) Oval ducts that are less than 6 square feet (.5m<sup>2</sup>) in cross sectional area based on nominal size.
  - 3) Round duct less than 28" (.5m<sup>2</sup>) in diameter.
  - 4) All duct suspended by hangers 12" (300mm) or less in length as measured from the top of the duct to the point of attachment to the structure. Hangers must be attached within 2" (50mm) of the top of the duct with a minimum of two #10 sheet metal screws. If the 12" (300mm) limit is exceeded by any hanger in the run, seismic bracing is required for the run.
- d. Electrical:
  - 1) All conduit less than 2 1/2" (64mm) diameter suspended by individual hanger rods.
  - 2) All conduits suspended by individual hangers 12" (300mm) or less as measured from the top of the conduit to the bottom of the support where the hanger is attached. However, if the 12" (300mm) limit is exceeded by any hanger in the run, seismic bracing is required for the run.
  - 3) The 12" (300mm) exemption applies for trapeze supported systems if the top of each item supported by the trapeze qualifies.

4. Inspection:
  - a. Examine systems under provisions of Division 1.
  - b. On completion of installation of all vibration isolation devices herein specified, the local representative shall inspect the completed system and report in writing any installation error, improperly elected isolation devices, or other faults in the system that could affect the performance of the system. Contractor shall submit a report to the Owner, including the manufacturers representatives' final report, indicating all isolation reported as properly installed or requiring correction, and include a report by the Contractor on steps taken to properly complete the isolation work.

5. Schedules:

SPECIFICATION SELECTION GUIDE	ISOLATION, DEFLECTION AND SEISMIC RESTRAINT CRITERIA FOR SOLID CONCRETE FLOORS 4" AND THICKER (NOTE 7)										
	Ground Supported Slab or Basement		20' Floor Span Possible Floor Defl. – 0.67"		30' Floor Span Possible Floor Defl. – 1.0"		40' Floor Span Possible Floor Defl. – 1.33"		50' Floor Span Possible Floor Defl. – 1.67"		
	Isol. & Seismic Spec.	Isol. Defl.	Isol. & Seismic Spec.	Isol. Defl.	Isol. & Seismic Spec.	Isol. Defl.	Isol. & Seismic Spec.	Isol. Defl.	Isol. & Seismic Spec.	Isol. Defl.	
<b>REFRIG. MACHINES</b>											
<b>Absorption Machines</b>	2-23	0.35	6-23	0.75	6-23	0.75	6-23	1.5	6-23	1.5	
<b>Centrifugal Chillers or Heat Pumps</b>											
Cooler Condenser Mounted Hermetic Compressors	2-20-23	0.35	6-20-23	0.75	6-20-23	1.5	6-23	1.5	6-20-23	2.5	
Cooler Condenser Alongside Hermetic Compressor	2-23	0.35	6-23	0.75	6-23	1.5	6-23	1.5	6-23	2.5	
Open Type Compressor (note 3)	2-23	0.35	6-23	0.75	6-23	1.5	6-20-23	1.5	6-20-23	2.5	
<b>Refrig. Reciprocating Compressors</b>											
500 rpm to 750 rpm	6-23	0.75	6-23	1.5	6-23	1.5	6-20-23	2.5	6-20-23	3.5	
751 rpm and Over	6-23	0.75	6-23	0.25	6-23	1.5	6-20-23	2.5	6-20-23	3.5	

SPECIFICATION SELECTION GUIDE	ISOLATION, DEFLECTION AND SEISMIC RESTRAINT CRITERIA FOR SOLID CONCRETE FLOORS 4" AND THICKER (NOTE 7)										
	Ground Supported Slab or Basement		20' Floor Span Possible Floor Defl. – 0.67"		30' Floor Span Possible Floor Defl. – 1.0"		40' Floor Span Possible Floor Defl. – 1.33"		50' Floor Span Possible Floor Defl. – 1.67"		
	Isol. & Seismic Spec.	Isol. Defl.	Isol. & Seismic Spec.	Isol. Defl.	Isol. & Seismic Spec.	Isol. Defl.	Isol. & Seismic Spec.	Isol. Defl.	Isol. & Seismic Spec.	Isol. Defl.	
<b>Reciprocating Chillers or Heat Pumps</b>											
500 rpm to 750 rpm	6-23	0.75	6-23	1.5	6-23	1.5	6-20-23	2.5	6-20-23	3.5	
751 rpm and Over	6-23	0.75	6-23	0.75	6-20-23	1.5	6-20-23	2.5	6-20-23	3.5	
<b>PACKAGED STEAM GENERATIONS (Boilers)</b>											
	2-24	0.35	6-24	0.75	6-24	0.75	6-24	1.5	5,23,24	2.5	
<b>PUMPS</b>											
<b>Closed Coupled</b>											
Thru 5 hp	2-21-23	0.35	5-16- 21-23	0.75	5-16- 21-23	0.75	5-16- 21-23	1.5	5-16- 21-23	1.5	
7 ½ hp and Larger	5-16- 21-23	0.75	5-16- 21-23	0.75	5-16- 21-23	1.5	5-16- 21-23	1.5	5-16- 21-23	2.5	
<b>Base Mounted (note 2)</b>											
Thru 60 hp	5-16- 21-23	0.75	5-16- 21-23	0.75	5-16- 21-23	1.5	5-16- 21-23	1.5	5-16- 21-23	2.5	
75 hp and Larger	5-16- 21-23	0.75	5-16- 21-23	1.5	5-16- 21-23	2.5	5-16- 21-23	2.5	5-16- 21-23	3.5	
<b>FACTORY ASSEMBLED H &amp; V UNITS</b>											
Curb Mounted Roof Top Units			22	1.0	22	2.5	22	2.5	22	2.5	
<b>Suspended Units (for Fan Heads see Blowers Guide)</b>											
Thru 5 hp	10-12	1.0	10-12	1.0	10-12	1.0	10-12	1.0	10-12	1.0	
7 ½ hp and Larger – 275 rpm to 400 rpm	10-12	1.5	10-12	1.5	10-12	1.5	10-12	1.5	10-12	1.5	

SPECIFICATION SELECTION GUIDE	ISOLATION, DEFLECTION AND SEISMIC RESTRAINT CRITERIA FOR SOLID CONCRETE FLOORS 4" AND THICKER (NOTE 7)									
	Ground Supported Slab or Basement		20' Floor Span Possible Floor Defl. – 0.67"		30' Floor Span Possible Floor Defl. – 1.0"		40' Floor Span Possible Floor Defl. – 1.33"		50' Floor Span Possible Floor Defl. – 1.67"	
	Isol. & Seismic Spec.	Isol. Defl.	Isol. & Seismic Spec.	Isol. Defl.	Isol. & Seismic Spec.	Isol. Defl.	Isol. & Seismic Spec.	Isol. Defl.	Isol. & Seismic Spec.	Isol. Defl.
7 ½ hp and Larger – 401 rpm and Over	10-12	1.0	10-12	1.0	10-12	1.0	10-12	1.5	10-12	2.5
<b>Floor Mounted Units (for Fan Heads see Blowers Guide)</b>										
Thru 5 hp	2	0.35	7	0.75	7	0.75	7	0.25	7	0.75
7 ½ hp and Larger – 275 rpm to 400 rpm	2	0.35	7	1.5	7	1.5	7	1.5	7	1.5
7 ½ hp to 40 hp – 401 rpm and Over	2	0.35	7	0.75	7	0.75	7	1.5	5-16-20	2.5
50 hp and Larger – 401 rpm and Over	2	0.35	7	0.75	7	1.5	5-16-20	2.5	5-16-20	3.5
<b>AIR COMPRESSOR</b>										
<b>Tank Mounted Type</b>	5-16- 21-24	0.75	5-16- 21-24	0.75	5-16- 21-24	1.5	5-16- 21-24	2.5	5-16- 21-24	3.5
<b>V – W Type</b>	5-16- 21-24	0.75	5-16- 21-24	0.75	5-16- 21-24	1.5	5-16- 21-24	2.5	5-16- 21-24	3.5
<b>Horz, Vert, 1 or 2 Cylinders</b>										
275 rpm to 499 rpm	5-16- 21-24	2.5	5-16- 21-24	2.5	5-16- 21-24	2.5	5-16- 21-24	3.5	5-16- 21-24	3.5
500 rpm to 800 rpm	5-16- 21-24	1.5	5-16- 21-24	1.5	5-16- 21-24	2.5	5-16- 21-24	3.5	5-16- 21-24	3.5

SPECIFICATION SELECTION GUIDE	DEFLECTION AND MOUNTING CRITERIA FOR SOLID CONCRETE FLOORS 4" OR THICKER (NOTE 7)				
	Ground Supported Slab or Basement	20' Floor Span Possible Floor Defl. – 0.67"	30' Floor Span Possible Floor Defl. – 1.0"	40' Floor Span Possible Floor Defl. – 1.33"	50' Floor Span Possible Floor Defl. – 1.67"

	Engr Spec	Min Static Defl (in) (note 1)	Engineer Specifications and Minimum Static Deflection as tabulated below (note 1)
<b>Blowers</b>			
Utilities Set			
Floor Mounted (note 5)	2	0.35	Spec 7 for 0.75" and 1/5" deflection and Spec 5-20-16 for over 1.5" deflection with deflection from Blower Minimum Deflection Guide, but not to exceed 2.5"
Roof Mounted			Spec 5-21-16 with deflection from Blower Minimum Deflection Guide. If roof will not handle concrete base load use Spec 6 for 0.75 and 1.5" deflection and Spec 6-20 for over 1.5" deflection
Suspended Unit (note 5)			Spec 10-12 with deflection from Blower Minimum Deflection Guide, not to exceed 2.5" deflection
Centrifugal Blowers (note 6)	2-21	0.35	Spec 5-21-16 with deflection from Blower Minimum Deflection Guide
Fan Heads			
Floor Mounted	2-28	0.35	Spec 7-28 if 0.75" or 1.5" deflection or Spec 5-20-16-28 for deflection over 1.5" to 4.5" from Blower Minimum Deflection Guide.
Suspended Units			Spec 10-12-28 with deflection from Blower Minimum Deflection Guide
Tubular Centrifugal and Axial Fans			
Suspended Units			Spec 10-12 with deflection from Blower Minimum Deflection Guide, Spec 10-12-28 for over 4" static pressure
Floor Mounted with Motor on/in Fan Casing	2	0.35	Spec 7 for 0.75" to 1.5" deflection and Spec 5-20-16 for over 1/5" deflection with deflection from Blower Minimum Deflection Guide, Spec 5-21-16 or 5-16-28 for over 4" static pressure
Floor Mounted Arrangement 1 or any Separately Mounted Motor	2-21	0.35	Spec 5-21-16 with deflection from Blower Minimum Deflection Guide
<b>Cooling Towers &amp; Condensing Units</b>	2	0.35	Spec 6 with deflection from Blower Minimum Deflection Guide

<b>Blower Minimum Deflection Guide</b>					
<b>Fan Speed RPM</b>	<b>Required Deflection for Ground Supported Slab or Basement</b>	<b>Required Deflection for 20' Floor Span</b>	<b>Required Deflection for 30' Floor Span</b>	<b>Required Deflection for 40' Floor Span</b>	<b>Required Deflection for 50' Floor Span</b>

500 and up	0.35"	0.75"	1.5"	2.5"	3.5"
375-499	0.35"	1.5"	2.5"	3.5"	3.5"
300-374	0.35"	2.5"	2.5"	3.5"	3.5"
225-299	0.35"	3.5"	3.5"	3.5"	3.5"
175-225	0.35"	3.5"	4.5"	4.5"	4.5"

When blowers are 60 HP or larger, select deflection requirements for next larger span. A minimum of 2.5" should be used unless larger deflections are called for on the chart or these fans are located in the lowest sub-basement or on a slab on grade.

6. Notes:

- a. Minimum deflection called for in this specification are not 'nominal' but certifiable minimums. The 0.75", 1.5", 2.5", 3.5", and 4.5" minimums should be selected from manufacturer's nominal 1", 2", 3", 4" and 5" series respectively. Air spring isolation specifications 8 & 9 may be substituted for steel springs above in highly sensitive noise free locations.
- b. Vacuum, Condensate or Boiler Feed Pumps shall be mounted with their tanks on a common spec. 21 base with deflections as specified for base mounted pumps.
- c. The base described in specification 20 is used under the drive side. Individual mountings as described in specification 6 are used under the Cooler and Condenser.
- d. This type of compressor is highly unbalanced and sometimes requires inertia bases weighing 5 to 7 times equipment weight to reduce running motion.
- e. Limit deflection f or utility sets 18" wheel diameter and smaller to 1 1/2".
- f. **FLOATING CONCRETE INERTIA BASES.** Floating concrete inertia bases do not reduce vibration transmitted to the structure through the mountings. These bases will reduce vibratory motion, provide a very rigid machine base and minimize spring reactions to fan thrust. Engineers preferring steel bases rather than the concrete mentioned above in specification 5-21 should change the designation to 5-20. Concrete is preferred for all fans operating at static pressure above 4" and on roof tops.
- g. **LIGHT FLOOR CONSTRUCTION.** When floors or roofs are lighter than 4" solid concrete a localized mass shall be introduced under the vibration mountings in the form of a sub-base. This sub-base should be 12" thick and 12" longer and wider than the mechanical equipment above it. When this mass is provided the 30' minimum static deflection requirements will suffice even in longer bays. The mass is also useful for unusually large bays over 50'. When floors are lighter than the 4" concrete or the location is in a particularly sensitive area and the mass described above cannot be introduced, select deflection requirements for the next larger span.
- h. For equipment where increased resiliency and decreased accelerations are required change specification 16 snubbers to specification 17 snubbers.

2.9 AUTOMATIC TEMPERATURE CONTROLS

A. Roof Top Unit Controls

- 1. Unit shall be completely factory wired with necessary controls and contactor pressure lugs or terminal block for power wiring. Unit shall provide an external location for mounting a fused disconnect device.
- 2. Trane Concierge controls shall be provided for all 24 volt control functions. The resident control algorithms shall make all heating, cooling, and/or ventilating decisions in response to electronic signals from sensors measuring indoor and outdoor temperatures. The control algorithm maintains accurate temperature control, minimizes drift from set point, and provides better building comfort.



A centralized control shall provide anti-short cycle timing and time delay between compressors to provide a higher level of machine protection.

## 2.10 SEQUENCE OF OPERATIONS

### A. Rooftop Air Handling Units [RTU]

1. Building Automation System Interface: The Building Automation System (BAS) shall send the controller Occupied Bypass, Morning Warmup, Night Purge, Pre-Cool, Occupied / Unoccupied and Heat / Cool modes. If a BAS is not present, or communication is lost with the BAS, the controller shall operate using default modes and setpoints. The BAS shall also send the controller a relative humidity setpoint, and damper minimum position.
2. Emergency Stop: When contact closure at terminals TOAU-9 & 10 are open, the unit operation shall be in Alarm Status and an alarm shall be generated. Unit shall revert to normal operation upon closure of OAU-TS 9 and 10. Important: Cycling power to unit may not resolve alarm condition.
3. Occupied Start Sequence: Powering unit initializes via a 3-minute process. Occupied mode shall enable via BAS signal or contact closure across enable terminals on customer supplied field wiring terminal board.
  - a. When enabled in the occupied mode, the outdoor air and return air damper shall be commanded to preset occupied position. The supply fan shall be commanded to start and modulate to a preset signal of 50% (50-100% adj.). A differential pressure switch shall monitor the differential pressure across the indoor fan. If after 30 seconds the indoor fan-proving switch does not prove flow, the fan shall be commanded off and signal an alarm. Once fan status is established, for 5 minutes to allow the temperatures inside the unit to normalize, the unit shall be allowed to open its dampers and operate its heating and cooling.
4. Occupied Cooling Mode Enable: When cooling mode is enabled, the unit uses the discharge air temperature cooling setpoint and sensor to calculate active temperature.
5. Occupied Cooling Mode: On a call for cooling, the compressor(s) shall be staged to maintain the active cool temperature setpoint. To prevent excessive cycling, compressor staging includes an interstage timer to allow an additional compressor to start every 3 minutes.
  - a. During cooling, the compressor staging calculation monitors Evaporator Coil Leaving Air Temperature and compares to the Cooling Coil Leaving Air Temperature Setpoint. As the temperature approaches 52.0 deg. F (adj.) leaving the evaporator coil, the demand for cooling shall be reduced. If economizing is enabled the outside air damper shall modulate to maintain the occupied space temperature setpoint.
  - b. Compressor speed is modulated, independently of the cooling staging calculation, to maintain the Active Coolcoil Control Temperature to the Active Coolcoil Control Setpoint. The speed calculation also monitors the Evaporator Leaving air temperature against Cooling Coil Leaving Air Leaving Air Low Limit Setpoint 45.0 deg. F (adj.). As the leaving the evaporator coil temperature approaches 45.0 deg. F (adj), the speed shall be reduced even if the active Coolcoil temperature is above the active Coolcoil temperature setpoint. If economizing is enabled the outside air damper shall modulate to maintain the occupied space temperature setpoint.
6. Occupied Heating Mode: During Heating Mode, the unit shall modulate the heating output to maintain the discharge air temperate at the discharge air setpoint active. Hot gas reheat is disabled when heating is active. The unit shall prevent the discharge air temperature from rising above the maximum discharge air heating setpoint 125.0 deg. F. In the event the discharge air

- temperature rises above the discharge air high temperature cutout (135.0 deg. F), the unit shall be shut down and require a manual reset.
- a. A call for heat initiates a purge cycle, the purge fan starts and set to high speed for 60 seconds, then returns to low speed. Heat stage 1 shall be enabled and modulated to maintain the discharge air temperature at the discharge air temperature setpoint. When the Gas valve opens 20% or more and heat enabled, the purge fan shall ramp up to high speed. On a continued call for heating, additional stages of heat shall be enabled and stage on and off, while the stage 1 modulates.
  - b. If a gas valve status failure occurs when heat is running, a local heat failure alarm is generated triggering the ignition process. The gas heat shall be locked out if the local heat failures are greater than 3 tries in a 4 hour period.
7. Unoccupied Start Sequence: When unoccupied mode enabled, the outdoor air damper shall be commanded to close and return dampers to open; the supply fan VFD shall be commanded to start and a preset signal of 50% (50-100% adj.) is sent as the supply fan VFD or ECM. A differential pressure switch shall monitor the differential pressure across the fan. If the switch does not open within 60 seconds (adj.) after a request for fan operation a fan failure alarm shall be annunciated at the BAS, the unit shall stop, requiring a manual reset. On units is equipped with more than two compressors, only stage 1 and 2 enabled during unoccupied modes.
  8. Unoccupied Cooling Mode: During unoccupied cooling mode outdoor air conditions are ignored and only space temperature used in control decisions. Unoccupied cooling mode initialized when no call for unoccupied dehumidification or unoccupied heating is present and the active space temperature rises above the unoccupied space cooling setpoint (80 Def F Adj.). Control shall remain in cooling mode until the active space temperature drops below the unoccupied cooling setpoint minus the unoccupied offset.
    - a. Note: In unoccupied cooling mode, only stages 1 and 2 are active stages. If economizing is enabled the outside air damper shall modulate to maintain the occupied space temperature setpoint.
  9. Unoccupied Heating Mode: When the space temperature is below the Unoccupied Heating Setpoint of 60.0 deg. F (adj.), a night heat cool command shall be initiated and the unit shall enter heat mode. The outdoor air damper shall remain closed and the modulating gas heat shall continue to raise the discharge air temperature to a maximum of 90.0 deg. F and continue to supply heated 90.0 deg. F air. Unoccupied heating is disabled when the space temperature rises + 4.0 deg. F (adj.) above the unoccupied heating setpoint.
  10. Demand Defrost Control: Outdoor coil defrosting occurs only when operating in DX heating mode with outdoor ambient temperature below 52.0 deg. F and the outdoor coil temperature below 35.0 deg. F. The first defrost cycle after power-up is initiated based on 30 minutes operating time at the required conditions. Twelve minutes after completion of the defrost cycle, the temperature difference between the outdoor coil and outdoor air is calculated resulting in a Clean Coil Delta T (DT) and is used as an indicator of unit performance at dry coil conditions. Over time, as moisture and frost accumulate on the coil, the coil temperature shall drop, increasing the temperature difference. When the temperature difference between the outdoor coil and outdoor air reaches 1.8 x DT, a defrost cycle is initiated. While defrosting, the reversing valve(s) are in the cooling position, outdoor fan(s) are off, outdoor damper closes, return damper opens, the supply fan runs at minimum, and the compressor(s) continue to operate. If the optional return damper is not installed, the outdoor damper shall remain open. The defrost cycle is terminated when the coil temperature rises high enough to indicate that the frost has been eliminated. Termination of the defrost cycle includes a "soft start" delay. At the end of each defrost cycle, the outdoor fan comes on 5 seconds before the reversing valve is de-energized to reduce noise.
  11. Optimal Stop: The BAS shall monitor the scheduled unoccupied time, occupied setpoints and space temperature to calculate when the optimal stop occurs. When the optimal stop mode is active the unit controller shall maintain the space temperature to the space temperature offset

setpoint.

12. Occupied Cool Mode Enable: Occupied cooling is enabled when the outdoor air temperature is above the outdoor air temperature setpoint (75.0 deg. F, Adj.). Unit shall locked into cooling mode and disregard the space temperature setpoint or BAS commands. When the outdoor air temperature is below the outdoor air cooling setpoint minus 2.0 deg. F, control shall be allowed to switch between heating and cooling mode.
13. Unoccupied Heat / Cool Mode Enable: The unit ignores the outdoor air conditions when determining the Night Heat/Cool Mode.
14. Discharge Air Temperature Reset Control: The unit shall maintain the space temperature setpoints based on the heating or cooling mode of the unit, by resetting the Discharge Air Temperature Setpoint calculated by comparing the Active Space Temperature against the Active Space Temperature Setpoint. The BAS communicated value will take priority over the locally calculated value.
15. Occupied Economizer Enable: Free cooling mode is enabled when the Outdoor Air Temperature is cooler than 5.0 deg. F below the Discharge Air Cooling Setpoint Active and the unit is in Economizer Mode. During Free Cooling Mode, mechanical cooling is locked out and the dampers shall modulate to maintain the Discharge Air Cooling Setpoint.
16. Occupied Economizer: Economizer is field adjustable between Enthalpy or Dry Bulb with the binary value Economizer Control Type (defaulted from factory as enthalpy). Enthalpy economizer mode is enabled based on outdoor air enthalpy, return air enthalpy, and outdoor air temperature.
  - a. Economizer mode is enabled when the outdoor air enthalpy drops below return air enthalpy and continues until outdoor air enthalpy rises above return air enthalpy by 3 btu/lb or when the outdoor air temperature rises above 80.0 deg. F.
  - b. If the Outdoor Air Temperature is more than 5.0 deg. F below the Occupied Cooling Setpoint, then the DX cooling shall be locked out and the dampers shall modulate to maintain the Occupied Cooling Setpoint. If the Outdoor Air Temperature is above Occupied Cooling Setpoint point by a deadband of 1.0 deg. F, then the outdoor air damper shall open to the Maximum Damper Position and allow DX cooling to stage, as necessary.
17. Occupied Ventilation Mode: Ventilation mode is enabled base on space temperature and outdoor air temperature. Operation in Ventilation Mode is enabled when the space temperature is between the Occupied Cooling Setpoint and the Occupied Heating Setpoint, and the outdoor temperature is between the Outdoor Air Cooling Setpoint and the Outdoor Air Heating Setpoint. Operation in Ventilation Mode continues until conditions call for dehumidification or when the space and outdoor air temperature fall outside of those two conditions.
  - a. During Ventilation Mode both cooling and heat shall be locked out and the outdoor air damper shall modulate to maintain the Occupied Cooling Setpoint (if equipped with optional modulating dampers).
18. Supply Fan Control: The supply fan shall be enabled while in the occupied mode and cycled on during the unoccupied mode. When enabled the outdoor air damper shall be commanded to open. Outdoor air damper end switch closure shall initialize the indoor fan start sequence by sending a preset run signal (50 - 100% adj.) to the indoor fan. A differential pressure switch across the fan shall monitor the differential pressure. After initializing the indoor fan, if the pressure switch does not prove flow within 60 seconds (adj.) a fan failure alarm shall be annunciated and the unit shall be disabled, requiring a manual reset.
19. Filter Status: A differential pressure switch shall monitor the differential pressure across the filter.

If the switch closes for 2 minutes during fan operation a filter maintenance alarm shall be annunciated at the BAS.

B. Variable Volume Terminal Box [VVT]

1. Building Automation System Interface: The Building Automation System (BAS) shall send the controller Occupied and Unoccupied commands. The BAS may also send a Heat/Cool mode, priority shutdown commands, space temperature and/or space temperature setpoint. If communication is lost with the BAS, the VAV controller shall operate using its local setpoints.
2. Occupancy Mode: The occupancy mode shall be communicated or hardwired to the controller via a binary input. Valid occupancy modes for the unit shall be:
  - a. Occupied: Normal operating mode for occupied spaces or daytime operation. When the unit is in the occupied mode the VAV shall maintain the space temperature at the active occupied heating or cooling setpoint. Applicable ventilation and airflow setpoints shall be enforced. The occupied mode shall be the default mode of the VAV.
  - b. Unoccupied: Normal operating mode for unoccupied spaces or nighttime operation. When the unit is in unoccupied mode the VAV controller shall maintain the space temperature at the stored unoccupied heating or cooling setpoint regardless of the presence of a hardwired or communicated setpoint. When the space temperature exceeds the active unoccupied setpoint the VAV shall modulate fully closed.
  - c. Occupied Bypass: Mode used to temporarily place the unit into the occupied operation. Tenants shall be able to override the unoccupied mode from the space sensor. The override shall last for a maximum of 4 hours (adj.). The tenants shall be able to cancel the override from the space sensor at any time. During the override the unit shall operate in occupied mode.
3. Heat/Cool Mode: The Heat/Cool mode shall be set by a communicated value or automatically by the VAV controller. In standalone or auto mode the VAV controller shall compare the primary air temperature with the configured auto changeover setpoint to determine if the air is "hot" or "cold". Heating mode it implies the primary air temperature is hot. Cooling mode implies the primary air temperature is cold.
  - a. Heat/Cool Setpoint: The space temperature setpoint shall be determined either by a local (e.g., thumbwheel) setpoint, the VAV default setpoint or a communicated value. The VAV shall use the locally stored default setpoints when neither a local setpoint nor communicated setpoint is present. If both a local setpoint and communicated setpoint exist, the VAV shall use the communicated value.
4. Cooling Mode: When the unit is in cooling mode, the VAV controller shall maintain the space temperature at the active cooling setpoint by modulating the vav damper between the active cooling minimum airflow setpoint to the maximum cooling airflow setpoint with the fan off. Based on the VAV controller occupancy mode, the active cooling setpoint shall be one of the following:
 

a. Setpoint	Default Value
1) Occupied Cooling Setpoint	74.0 deg. F
2) Unoccupied Cooling Setpoint	85.0 deg. F
3) Occupied Standby Cooling Setpoint	78.0 deg. F
4) Occupied Min Cooling Airflow Setpoint	See VAV Schedule
5) Occupied Max Cooling Airflow Setpoint	See VAV Schedule
5. The VAV shall use the measured space temperature and the active cooling setpoint to determine the requested cooling capacity of the unit. The outputs will be controlled based on the unit configuration and the requested cooling capacity.

6. Ventilation Control (Fixed): When the unit is in unoccupied mode, the ventilation airflow setpoint shall be zero. When the unit is in occupied mode, the ventilation airflow setpoint shall equal the design outdoor airflow (see VAV schedule). The current ventilation airflow setpoint shall be communicated to the BAS for control of the system outdoor-air intake.
7. Space Sensor Failure: If there is a fault with the operation of the zone sensor an alarm shall be annunciated at the BAS. Space sensor failure shall cause the VAV to drive the damper to minimum air flow if the VAV is in the occupied mode, or drive it closed if the VAV is in the unoccupied mode.

## PART 3 EXECUTION

### 3.1 COMMISSIONING OF EQUIPMENT AND SYSTEMS

- A. Coordinate with the North Kingstown School Department Commissioning Agent (CxA) for the commissioning of the work of this specification section. The Contractor(s) providing the work of this specification section shall be available before construction, during construction, and at the end of construction to assist the CxA in the commissioning process. Assistance shall include demonstrating proper operation, calibration, and adjustment of the work of this specification section, as necessary for the CxA to verify that the equipment and systems are working properly and in accordance to the construction documents.
- B. Where the commissioning process reveals, as determined by the CxA, equipment and/or systems that are not operating properly or are not in accordance to the Construction Documents, such equipment and systems shall be repaired and/or adjusted until they are operating properly and are in accordance to the Construction Documents.
- C. Prior to final commissioning, submit documentation indicating that the Contractor(s) providing work of this section have verified the following:
  1. That equipment and systems of this specification section have been started up and tested in accordance to the manufacturer's installation manuals. Where either the manufacturer's installation manuals or the equipment submittals include manufacturer's start-up sheets, such documentation shall be completed, signed, and dated by the Contractor(s) performing the start-up.
  2. That equipment and systems of this specification section have been tested and balanced by the testing and balancing agency.

### 3.2 SPECIAL RESPONSIBILITIES

- A. Coordination: Cooperate and coordinate with work of other Sections in executing work of this Section.
  1. Perform work such that progress of entire project including work of other Sections shall not be interfered with or delayed.
  2. Provide information as requested on items furnished under this Section which shall be installed under other Sections.
  3. Obtain detailed installation information from manufacturers of equipment provided under this Section.
  4. Obtain final roughing dimensions or other information as needed for complete installation of items

furnished under other Sections or by Owner.

5. Keep fully informed as to shape, size and position of openings required for material or equipment to be provided under this and other Sections. Give full information so that openings required by work of this Section may be coordinated with other work and other openings and may be provided for in advance. In case of failure to provide sufficient information in proper time, provide cutting and patching or have same done, at own expense and to full satisfaction of Architect.
6. Provide information as requested as to sizes, number and locations of concrete housekeeping pads necessary for floor-mounted vibrating and rotating equipment provided under this Section.
7. Notify Architect of location and extent of existing piping, ductwork and equipment that interferes with new construction. In coordination with and with approval of Architect, relocate piping, ductwork and equipment to permit new work to be provided as required by Contract Documents. Remove non-functioning and abandoned piping, ductwork and equipment as directed by Architect. Dispose of or store items as requested by Architect.

B. Installation Only Items:

1. Where this Contractor is required to install items which it does not purchase, it shall coordinate their delivery and be responsible for this unloading from delivery vehicles and for their safe handling and field storage up to the time of installation. This trade shall be responsible for:
  - a. Any necessary field assembly and internal connections, as well as mounting in place of the items, including the purchase and installation of all dunnage supporting members and fastenings necessary to adapt them to architectural and structural conditions.
  - b. Their connection to building systems including the purchase and installation of all terminating fittings necessary to adapt and connect them to the building system.
2. This Contractor shall carefully examine such items upon delivery. Claims that any of these items have been received in such condition that their installation will require procedures beyond the reasonable scope of work of this Contractor will be considered only if presented in writing within one (1) week of their date of delivery. Unless such claims have been submitted this Contractor shall be fully responsible for the complete reconditioning or replacement of the damaged items.

C. Maintenance of equipment and Systems: Maintain HVAC equipment and systems until Final Acceptance. Ensure adequate protection of equipment and material during delivery, storage, installation and shutdown delays pending final test of systems and equipment because of seasonal conditions. Do not use boilers before providing water treatment where required; this includes use of boilers for temporary heat or for testing.

D. Use of Premises: Use of premises shall be restricted as directed by Architect and as required below:

1. Remove and dispose of dirt and debris, and keep premises reasonably clean. Upon completion of work, remove equipment and unused material. Put building and premises in neat and clean condition and do cleaning and washing required to provide acceptable appearance and operation of equipment, to satisfaction of Architect and as specified under CLEANING paragraph.
2. It shall be this trade's responsibility to store his material in a manner that will maintain an orderly clean appearance. If stored on-site in open or unprotected areas, all equipment and material shall be kept off the ground by means of pallets or racks, and covered with tarpaulins.
3. Do not interfere with functions of existing sewers and gas mains. Extreme care shall be observed to prevent debris from entering ductwork. Confer with Architect as to disruption of heating services or other utilities due to testing or connection of new work to existing. Interruption of heating services shall be performed at time of day or night deemed by Architect to provide minimum interference with normal operation. Obtain Architect's approval of the method proposed

for minimizing service interruption.

E. Surveys and Measurements:

1. Base measurements, both horizontal and vertical, on reference points established by Contractor and be responsible for correct laying out of work.
2. In event of discrepancy between actual measurements and those indicated, notify Architect in writing and do not proceed with work until written instructions have been issued by Architect.

F. Airbound Coils: If, after plant is in operation, any coils or other apparatus are stratified or air bound (by vacuum or pressure), they shall be re-piped with new approved and necessary fittings, air vents or vacuum breakers at no extra cost. If connections are concealed in furring, floors or ceilings this trade shall bear all expenses of tearing up and refinishing construction and finish, leaving same in as good condition as before it was disturbed.

### 3.3 MATERIALS AND WORKMANSHIP

A. Work shall be neat and rectilinear. Ductwork and piping shall run concealed except in mechanical rooms and areas where no hung ceiling exists. Install material and equipment as required by manufacturers. Installation shall operate safely and without leakage, undue wear, noise, vibration, corrosion or water hammer. Work shall be properly and effectively protected, and pipe and duct openings shall be temporarily closed to prevent obstruction and damage before completion.

1. Except as specified otherwise, material and equipment shall be new. Provide supplies, appliances and connections necessary for complete and operational installation. Provide components required or recommended by OSHA and applicable NFPA documents.
2. References to manufacturers and to catalog designation are intended to establish standards of quality for materials and performance but imply no further limitation of competitive bidding.
3. Finish of materials, components and equipment shall be as approved by Architect and shall be resistant to corrosion and weather as necessary.
4. Owner will not be responsible for material and equipment before testing and acceptance.

### 3.4 CONTINUITY OF SERVICES

- A. Do not interrupt existing service without Owner's approval.
- B. Schedule interruptions in advance, according to Owner's instructions. Submit, in writing, with request for interruption, methods proposed to minimize length of interruption.
- C. Interruptions shall be scheduled at such times of day and work so that they have minimal impact on Owner's operations.

### 3.5 TAGS

A. Upon completion of work, attach engraved laminated tags to all valves (listed in the valve directory called for in the "Bulletins, Manuals and Instructions" paragraph of these Specifications) and all pieces of HVAC equipment (including but not limited to pumps, fans, air handlers, coils and all other equipment listed in the HVAC Schedules). Valve tags shall have black characters on white face, consecutively numbered and prefixed by letter "V". Equipment tags shall have black characters on white face with labels corresponding to drawing schedule numbers.

- B. Embossed or engraved aluminum or brass tags may be substituted if desired. Tags shall be at least 1/8" thick.
- C. Valve tags shall be at least 1" in diameter with numerals at least 3/8" high and attached by "S" hooks or chains. Equipment tags shall be at least 2" diameter securely attached to apparatus.
- D. Provide manufacturers equipment nameplates, catalog numbers and rating identification securely attached to electrical and mechanical equipment with screws or rivets. Adhesives or cements will not be permitted.

### 3.6 DUCT IDENTIFICATION

- A. Ductwork shall be stenciled at each junction or branch takeoff, at least once in each room, and at intervals not longer than 20 feet. Stencil shall clearly identify duct service ("S" for supply; "R" for return; "X" for exhaust), area served by branch, and arrow indicating direction of flow.

### 3.7 ACCESS AND ACCESS PANELS

- A. Provide proper access to materials and equipment that require inspection, replacement, repair or service and coordinate their delivery with the installing Trade. If proper access cannot be provided, confer with Architect as to best method of approach for minimizing effect of reduced access which may result.
- B. Coordinate and prepare a location, size and function schedule of access panels required to fully service equipment and deliver to a representative of the installing Trade. Furnish and install distinctively colored buttons (color as selected by Architect) in finished ceiling to identify all access panels.
- C. Furnish access panels for installation under other Sections where fire dampers, volume dampers, controls, shut-off valves, control valves, check valves or other items installed under this Section require access and are concealed in floor, wall, furred space or above ceiling. Access panels shall be by Milcor, Knapp, Nystrom or Inland Steel; coordinate selection with other Sections supplying similar access panels.
- D. Ceilings consisting of lay-in or removable splined tiles do not require access panels and dampers, splitters or test hole openings above ceiling shall have location marked with thumb tack on finished ceiling panel. Location shall be noted on record Drawings.
- E. Access panels shall have same fire-rating classification as surface penetrated.
- F. Panels shall be at least 12" x 12"; access panels at equipment (VAV boxes, fan boxes and others) shall be 18" x 18".

### 3.8 PENETRATIONS AND SLEEVES

- A. General:
  - 1. Provide pipe and duct sleeves and packing materials as specified and as shown on Drawings at penetrations of foundations, walls, slabs (except on-grade), partitions and floors. Sleeves shall meet NFPA-101 requirements and materials requirements of PART 2 or this Section.
  - 2. Coordinate work carefully with architectural and structural work. Set sleeves in forms before concrete is poured. Provide core drilling as necessary if walls are poured, or otherwise constructed, without sleeves and a wall penetration is required. Provide core drilling as required for penetrations of existing construction. Do not penetrate structural members without Architect's approval.



3. Sleeves for insulated pipe and duct in non-fire rated construction shall accommodate continuous insulation without compression. Sleeves and/or penetrations in fire-rated construction shall be packed with fire-rated material which shall maintain the fire rating of the wall. Seal ends of penetrations to provide continuous vapor barrier where insulation is interrupted. See "PART 2" of these Specifications for requirements for packing materials.
4. Sleeves through floor shall be water-tight and shall extend 2" above floor surface.

B. Pipe Sleeves:

1. Annular space between pipe and sleeve shall be at least 1/4".
2. Sleeves are not required for slabs-on-grade unless specified otherwise.
3. Sleeves and packing materials, through rated fire walls and smoke partitions shall maintain fire rating of construction penetrated.
4. Do not support piping risers on sleeves.

C. Duct Sleeves and Prepared Openings:

1. Provide duct sleeves for round ducts 15" and smaller; provide prepared, framed openings for round ducts larger than 15" and for square, rectangular and flat oval ducts, except as specified otherwise. Sleeves shall meet SMACNA requirements.
2. Provide sleeves for ducts through 1, 2, or 3-hour fire-rated construction and smoke partitions, regardless of size and shape of ducts. Sleeves shall maintain fire rating of construction penetrated. Sleeve and seal materials, construction and clearances shall meet requirements of SMACNA Fire Damper and Heat Stop Guide for Air Handling Systems.
3. Prepared openings shall be framed to provide 1" clearance between framing and duct or duct insulation.

D. Installation Testing, Listings and Approvals:

1. Installation shall meet material manufacturer's recommendations exactly, particularly as regarding safety, ventilation, removal of foreign materials and other details of installation. Dam openings as recommended. Remove flammable materials used for damming and forming seals in fire-rated construction.
2. Sleeve penetration methods shall be water and gas-tight and shall meet requirements of ASTM E-119 Standard Methods of Fire Tests of Building Construction and Materials.
3. Fire-stop penetration seal methods and materials shall be FM-approved and UL-listed as applicable.
4. Inspect foamed sealants to ensure manufacturer's optimum cell structure and color ranges.

### 3.9 ANCHORS AND INSERTS

- A. Inserts shall be iron or steel of type to receive machine bolt head or nut after installation. Inserts shall permit adjustment of bolt in one (1) horizontal direction and shall develop strength of bolt when installed in properly cured concrete.
- B. Provide anchors as necessary for attachment of equipment supports and hangers.

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### 3.10 INSTALLATION OF EQUIPMENT

- A. Avoid interference with structure and with work of other trades, preserving adequate headroom and clearing doors and passageways to satisfaction of Architect and in accordance with code requirements. Installation shall permit clearance for access to equipment for repair, servicing and replacement.
- B. Install equipment so as to properly distribute equipment loads on building structural members provided for equipment support under other Sections. Roof-mounted equipment shall be installed and supported on structural steel provided under other Sections.
- C. Provide suspended platforms, strap hangers, brackets, shelves, stands or legs as necessary for floor, wall or ceiling mounting of equipment provided under this Section (e.g. heating and ventilating units, fans, ducts and piping) as indicated on Drawings and in Specifications.
- D. Provide steel supports and hardware for proper installation of hangers, anchors, guides, etc.
- E. Provide cuts, weight and other pertinent data required for proper coordination of equipment support provisions and installation.
- F. Structural steel and hardware shall conform to Standard Specifications of ASTM; use of steel and hardware shall conform to requirements of Section 5 of Code of Practice of American Institute of Steel Construction.
- G. Verify site conditions and dimensions of equipment to ensure access for proper installation of equipment without disassembly which will void warrantee. Report in writing to Architect, prior to purchase or shipment of equipment involved, on conditions which may prevent proper installation.

### 3.11 PAINTING

- A. Equipment installed under this Section shall have shop coat of non-lead gray paint. Hangers and supports shall have one (1) coat of non-lead red primer. Machinery such as pumps, fans, etc., shall be stenciled with equipment name. Stencil shall be at least 6" high for large equipment, 2" high for small equipment. Finish painting, including painting of various piping and duct systems, shall be done under other Sections.
- B. Note requirements for Architect's approval invoked under paragraph 3.03 MATERIALS AND WORKMANSHIP regarding finish of material and equipment which are visible or subject to corrosive or atmospheric conditions.

### 3.12 EXPANSION PROVISIONS

- A. Installation of piping must allow for expansion using offsets, loops, expansion joints, etc., as shown and as necessary to prevent undue strain. Take-offs from mains to runouts shall not have less than three (3) elbow swing.
- B. Mains and risers with loops or offsets shall be securely anchored to structure so as to impart expansion towards loops or offsets. Anchors shall be constructed of heavy forged wrought iron, secured to pipe and to structure. Provide vibration isolation as required.
- C. Provide pipe alignment guides as required to guide expanding to move freely from anchor points toward expansion joints, offsets, etc.
- D. The used of expansion compensator sleeve devices such as Metraflex HP series shall be allowed for up to 4-inch compression provided the expected longitudinal contraction is properly applied to the devices being proposed for use.

### 3.13 CLEANING

#### A. Ductwork:

1. New ductwork shall be shipped from the shop to the job site with the ends of the ducts sealed tight with heavy duty plastic to prevent dirt, water or other elements from entering the ducts while in transport to the job site.
2. At the end of each working day all open ends of ducts that have been hung in place shall be re-covered with the plastic material to prevent the entry of foreign objects, dirt or debris into the ducts.
3. All ducts shall be cleaned of dirt and any other foreign matter if it should accumulate on or in the ducts prior to start-up and testing of the new HVAC systems. If the ducts do need to be blown clean, cheesecloth shall be placed over the outlet air openings, and the rooftop unit(s) serving the ducts shall be provided with temporary filters.

#### B. Piping:

1. Furnish pipe cleaning chemicals, chemical feed equipment, materials and labor necessary to clean piping.
2. Permanently install necessary chemical injection fittings complete with stop valves.
3. After chilled water, heating hot water, condenser water, steam and condensate piping have been pressure tested and approved for tightness, clean and flush piping specified under WATER TREATMENT paragraph.
4. Maintain continuous blow-down and make-up, as required during flushing operation.
5. Equipment: After completion of project, clean the exterior surface of equipment included in this section, including concrete residue.

### 3.14 STARTUP, TESTING, ADJUSTING AND BALANCING FOR HVAC

#### A. General:

1. References:
  - a. AABC – National Standards for Total System Balance.
  - b. ADC – Test Code for Grilles, Registers, and Diffusers.
  - c. ASHRAE 111 – Practices for Measurement, Testing, Adjusting, and Balancing of Building Heating, Ventilating, Air Conditioning and Refrigeration Systems.
  - d. NEBB – Procedural Standards for Testing, Adjusting, and Balancing of Environmental Systems.
  - e. SMACNA – HVAC Systems Testing, Adjusting, and Balancing.
2. Qualifications:
  - a. Agency: Company specializing in the testing, adjusting, and balancing of systems specified in this section with minimum three years documented experience certified by AABC. Any of the following agencies shall be considered acceptable to perform the work of this section:
    - 1) Air Solutions and Balancing, LLC

- 
- 2) Design Flow Associates, LLC
  - 3) J.F. Coffey and Associates, Inc.
  - 4) Kevin S. Cox Associates, Inc.
  - 5) American Test and Balance, Inc.
  - 6) Milarmer Associates, Inc.
  - b. Perform work under supervision of AABC Certified Test and Balance Engineer or NEBB Certified Testing, Balancing and Adjusting Supervisor.
3. Pre-Balancing Conference:
    - a. Convene one week prior to commencing work of this section, under the provisions of Division 1.
- B. Examination:
1. Verify that systems are complete and operable before commencing work. Ensure the following conditions:
    - a. Systems are started and operating in a safe and normal condition.
    - b. Control systems are installed complete and operable.
    - c. Proper thermal overload protection is in place for electrical equipment.
    - d. Ductwork systems:
      - 1) Final filters are clean and in place. If required, install temporary media in addition to final filters.
      - 2) Duct systems are clean of debris.
      - 3) Fans are rotating correctly.
      - 4) Dampers are in place and open.
      - 5) Air coil fins are cleaned and combed.
      - 6) Access doors are closed and duct end caps are in place.
      - 7) Air inlets and outlets are installed and connected.
      - 8) Duct system leakage is minimized.
    - e. Piping systems:
      - 1) Hydronic systems are flushed, filled, tested and vented.
      - 2) Pumps are rotating correctly.
      - 3) Proper strainer baskets are clean and in place.
      - 4) Service and balance valves are open.
  2. Submit field reports. Report defects and deficiencies noted during performance of services which prevent system balance.
  3. Beginning of work means acceptance of existing conditions.
- C. Preparation:
1. Provide instruments required for testing, adjusting, and balancing operations. Make instruments available to Owner to facilitate spot checks during testing.

2. Provide additional balancing devices as required.

D. Installation Tolerances:

1. HVAC Systems: Adjust to within plus or minus 10 percent of design for supply and return systems and plus or minus 10 percent of design for exhaust systems.
2. Air Outlets and Inlets: Adjust outlets and inlets in space to within plus or minus 10 percent of design.
3. Hydronic Systems: Adjust to within plus or minus 10 percent of design.

E. Adjusting:

1. Ensure recorded data represents actual measured or observed conditions.
2. Permanently mark settings of balancing devices allowing settings to be restored. Set and lock memory stops.
3. After adjustment, take measurements to verify balance has not been disrupted or that such disruption has been rectified.
4. Leave systems in proper working order, replacing belt guards, closing access doors, closing doors to electrical switch boxes, and restoring thermostats to specified settings.

F. Sequencing:

1. All systems providing both heating and cooling shall be balanced in both modes of operation.
2. For all systems provide initial balancing to tolerances indicated in this section. After initial balancing readjust systems as directed by engineer and owner as necessary to achieve uniform space temperatures free from objectionable drafts and noises.

G. Air System Procedure:

1. Adjust equipment and distribution systems to provide required or design air quantities.
2. Make air quantity measurements in ducts by Pitot tube traverse of entire cross sectional area of duct.
3. Measure and record air quantities at air inlets and outlets.
4. Use volume control devices to regulate air quantities only to extent that adjustments do not create objectionable air motion or sound levels. Adjust air volume by adjusting duct internal devices such as dampers and splatters. Do not utilize opposed blade dampers at air inlets and outlets.
5. Vary total system air quantities by adjusting sheave position or replacing fixed sheaves with larger or smaller diameter sheaves at each fan. Provide replacement fixed ratio sheaves and belts after final balancing selected to achieve design airflows. Vary branch air quantities by damper regulation.
6. Measure and record static air pressure conditions at air supply and exhaust units, including filter and coil pressure drops, and total pressure across the fan. Make allowances for 50 percent loading of filters.

7. Adjust settings and minimum setpoints for motorized and backdraft dampers to design conditions.
8. Measure and record temperature conditions across dampers to check leakage.
9. Where modulating dampers are provided, take measurements and balance at extreme conditions.
10. [Balance variable volume systems at maximum air flow rate, full cooling, and at minimum air flow rate, full heating.]
11. Measure and record building static pressure and adjust supply, return, and exhaust air systems to provide required relationship between each to maintain approximately 0.05 inches (12.5 Pa) positive static pressure near the building entries.
12. [For variable air volume system powered units set volume controller to air flow setting indicated. Confirm connections properly made and confirm proper operation for automatic variable air volume temperature control.]
13. Measure and record inlet and outlet temperatures at each air supply unit at full cooling and heating capacity.
14. Prepare system pressure profiles: On schematic fan system diagrams, show STATIC pressure readings taken at following points.
  - a. Fan discharge
  - b. Fan discharge plenum or main duct in fan room
  - c. Fan inlet plenum
  - d. Inlet and outlet plenum space on each side of each heating coil, cooling coil and filter
  - e. Return air/outside air mixing plenum
  - f. Duct or plenum immediately behind outside air louver
  - g. Return/exhaust fan inlet
  - h. Return/exhaust fan outlet
  - i. Each main branch duct takeoff at each floor
  - j. Within 3 feet of last supply air outlet connection in most remote duct.
15. Check multi-zone units for cooling, then heating, then modulating.
16. On fan powered VAV boxes, adjust air flow switches for proper operation.

#### H. Water System Procedure:

1. Adjust water systems to provide required or design quantities.
2. Use calibrated Venturi tubes, orifices, or other metered fittings and pressure gages to determine flow rates for system balance. Where flow metering devices are not installed, base flow balance on temperature difference across various heat transfer elements in the system.
3. Adjust systems to provide specified pressure drops and flows through heat transfer elements prior to thermal testing. Perform balancing by measurement of temperature differential in conjunction with air balancing.
4. Balance systems with automatic control valves fully open to heat transfer elements.

5. Balance water distribution systems by means of balancing cocks, valves, and fittings. Do not use service or shut-off valves for balancing unless indexed for balance point. Measure and record flows at each balancing device.
  6. Measure and record inlet and outlet temperatures at heat transfer elements and at cooling and heating plants at full cooling and heating capacity.
  7. Where available pump capacity is less than total flow requirements or individual system parts, full flow in one part may be simulated by temporary restriction of flow to other parts.
- I. Schedules:
1. Equipment requiring Testing, Adjusting, and Balancing including but not limited to:
    - a. Packaged Roof Top Heating/Cooling Units
    - b. Air Terminal Units
- J. Report Forms:
1. Forms shall include the following:
    - a. Title Page:
      - 1) Name of Testing, Adjusting, and Balancing Agency
      - 2) Address of Testing, Adjusting, and Balancing Agency
      - 3) Telephone number of Testing, Adjusting, and Balancing Agency
      - 4) Project name
      - 5) Project location
      - 6) Project Architect
      - 7) Project Engineer
      - 8) Project Contractor
      - 9) Project altitude
      - 10) Report date
    - b. All equipment shall include:
      - 1) Manufacturer
      - 2) Model/Size
      - 3) Identification/Number
      - 4) Serial Number
    - c. Summary Comments:
      - 1) Design versus final performance
      - 2) Notable characteristics of system
      - 3) Description of systems operation sequence
      - 4) Summary of outdoor and exhaust flows to indicated amount of building pressurization
      - 5) Nomenclature used throughout report
      - 6) Test conditions

- 
- d. Instrument List:
    - 1) Instrument
    - 2) Manufacturer
    - 3) Model number
    - 4) Serial number
    - 5) Range
    - 6) Calibration date
  - e. Electric Motors: (data for single and multispeed motors)
    - 1) Manufacturer
    - 2) Model/Frame
    - 3) HP/BHP/efficiency
    - 4) Phase, voltage, amperage; nameplate, actual, no load
    - 5) RPM
    - 6) Service factor
    - 7) Starter size, rating, heater elements
    - 8) Sheave Make/Size/Bore
  - f. V-Belt Drive:
    - 1) Identification/location
    - 2) Required driven RPM
    - 3) Driven sheave, diameter and RPM
    - 4) Belt, size and quantity
    - 5) Motor sheave diameter and RPM
    - 6) Center to center distance, maximum, minimum, and actual
  - g. Air Handling Units/ Rooftop Units:
    - 1) Location
    - 2) Arrangement/Class/Discharge
    - 3) Air flow, specified and actual
    - 4) Return air flow, specified and actual
    - 5) Outside air flow, specified and actual
    - 6) Total static pressure (total external), specified and actual
    - 7) Inlet pressure
    - 8) Discharge pressure
    - 9) Sheave Make/Size/Bore
    - 10) Number of Belts/Make/Size
    - 11) Fan RPM
  - h. Return Air/Outside Air Data:
    - 1) Identification/location
    - 2) Design air flow



- 3) Actual air flow
  - 4) Design return air flow
  - 5) Actual return air flow
  - 6) Design outside air flow
  - 7) Actual outside air flow
  - 8) Return air temperature
  - 9) Outside air temperature
  - 10) Required mixed air temperature
  - 11) Actual mixed air temperature
  - 12) Design outside/return air ratio
  - 13) Actual outside/return air ratio
- i. Exhaust/Supply Fan Data:
- 1) Location
  - 2) Air flow, specified and actual
  - 3) External static pressure, specified and actual
  - 4) Inlet pressure
  - 5) Discharge pressure
  - 6) Fan RPM
- j. Duct Traverse:
- 1) System zone/branch
  - 2) Duct size
  - 3) Area
  - 4) Design velocity
  - 5) Design air flow
  - 6) Test velocity
  - 7) Test air flow
  - 8) Duct static pressure
  - 9) Air temperature
  - 10) Air correction factor
- k. Duct Leak Test:
- 1) Description of ductwork under test
  - 2) Duct design operating pressure
  - 3) Duct design test static pressure
  - 4) Duct capacity, air flow
  - 5) Maximum allowable leakage duct capacity times leak factor
  - 6) Test apparatus
    - a) Blower

- b) Orifice, tube size
- c) Orifice size
- d) Calibrated
- 7) Test static pressure
- 8) Test orifice differential pressure
- 9) Leakage
- I. Terminal Unit Data:
  - 1) Type, constant, variable, single, dual duct
  - 2) Location
  - 3) Size
  - 4) Minimum static pressure
  - 5) Minimum design air flow
  - 6) Maximum design air flow

END OF SECTION 23 00 00

**SECTION 23 08 00 - HVAC SYSTEMS COMMISSIONING****PART 1 - GENERAL****1.1 RELATED DOCUMENTS**

- A. Drawings and General Provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

**1.2 RELATED SECTIONS**

- A. Division 23 – Heating, Ventilating and Air Conditioning
- B. Section 019113 – General Commissioning Requirements

**1.3 REQUIRMENTS**

- A. The Commissioning process requires the participation of Division 23, Mechanical, to ensure that all systems fulfill the functional and pre-functional requirements set forth in these construction documents. The general commissioning requirements and coordination are detailed in Section 019113. Division 23, HVAC, shall fulfill commissioning responsibilities assigned to division 23 in accordance with Section 019113.

**PART 2 - PRODUCTS (NOT USED)****PART 3 - EXECUTION****3.1 PRE-FUNCTIONAL CHECKLISTS**

- A. Pre-functional checklists assist in the process to document that the equipment and systems are installed properly.
- B. The contractor will be provided with construction checklists from the CA for completion. The contractor shall complete the checklists as provide the CA with completed copies in accordance with 019113.
- C. See attached for a sample pre-functional performance test checklist, attached is included only to provide sample of a typical process and scope.

**3.2 FUNCTIONAL PERFORMANCE TESTING**

- A. Intent of functional performance testing is to prove thru functional test procedures proper system operation.
- B. The contractor will be provided with functional performance test procedures to perform while CA witnesses. The contractor shall perform functional tests in accordance with 019113.
- C. See attached for a sample functional performance test checklist, attached is included only to provide sample of a typical process and scope.

### 3.3 PREFUNCTIONAL CHECKLISTS AND FUNCTIONAL PERFORMANCE TESTING

- A. Pre-Functional Checklists and Functional performance testing procedures will be performed on the following system types. (Pre-Functional and Functional performance testing requirements are in addition to and do not replace any testing required elsewhere in Division 23 or by applicable codes.) Equipment specifically marked as such below shall be provided with start-up of equipment by factory-authorized service representative.

1. Packaged Rooftop Units and associated factory controls.

### 3.4 SAMPLE CHECKLISTS

- A. See Attached.

END OF SECTION 23 08 00

# Contractor Checklist and Functional Test Procedures

## AIR HANDLING UNITS

### 1. Participants

Discipline	Name	Company
CxA	_____	_____
Mechanical	_____	_____
Controls	_____	_____
TAB	_____	_____
Plumbing	_____	_____
Electrical	_____	_____
	_____	_____
	_____	_____
Date Returned to CxA _____		

### 2. Prerequisite Checklist

Check	Description
<input type="checkbox"/>	The above equipment and systems integral to them are complete and ready for functional testing.
<input type="checkbox"/>	All control system functions for this and all interlocking systems are programmed and operable per contract documents, including final setpoints and schedules with debugging, loop tuning, and sensor calibrations completed.
<input type="checkbox"/>	Test and balance completed and approved for the hydronic systems and terminal units connected
<input type="checkbox"/>	All A/E punch list items for this equipment corrected.
<input type="checkbox"/>	Safeties and operating ranges reviewed. Schedules and reviewed <ul style="list-style-type: none"><li>This checklist does not take the place of the manufacturer's recommended checkout and startup procedures.</li><li>Items that do not apply shall be noted with the reasons on this form (N/A = not applicable, BO = by others).</li><li>Contractor's assigned responsibility for sections of the checklist shall be responsible to see that checklist items by their subcontractors are completed and checked off.</li></ul>

### 3. Installation Checks

Check if Okay. Enter comment or note number if deficient.

Check	Equip Tag→	AHU's	Comments
<b>Cabinet and General Installation</b>			
Permanent labels affixed, including for fans		<input type="checkbox"/>	
Casing condition good: no dents, leaks, door gaskets installed		<input type="checkbox"/>	
Access doors close tightly - no leaks		<input type="checkbox"/>	
Boot between duct and unit tight and in good condition		<input type="checkbox"/>	
Vibration isolation equipment installed & released from shipping locks		<input type="checkbox"/>	
Maintenance access acceptable for unit and components		<input type="checkbox"/>	
Thermal insulation properly installed and according to specification		<input type="checkbox"/>	
Instrumentation installed according to specification (thermometers, pressure gages, flow meters, etc.)		<input type="checkbox"/>	
Clean up of equipment completed per contract documents		<input type="checkbox"/>	
Filters installed and replacement type and efficiency permanently affixed to housing--construction filters removed		<input type="checkbox"/>	
Unit Configuration is correct		<input type="checkbox"/>	
<b>Valves, Piping and Coils</b>			
Pipe fittings complete and pipes properly supported		<input type="checkbox"/>	
Pipes properly labeled		<input type="checkbox"/>	
Pipes properly insulated		<input type="checkbox"/>	
Strainers in place and clean		<input type="checkbox"/>	
Piping system properly flushed		<input type="checkbox"/>	
No leaking apparent around fittings		<input type="checkbox"/>	
All coils are clean, and fins are in good condition		<input type="checkbox"/>	
Condensate drains with P-trap or capped where appropriate		<input type="checkbox"/>	
Valves properly labeled		<input type="checkbox"/>	
Valves installed in proper direction		<input type="checkbox"/>	
OSAT, MAT, SAT, RAT, hot water, chilled water supply sensors properly located and secure (related OSAT sensor shielded)		<input type="checkbox"/>	
Sensors calibrated		<input type="checkbox"/>	
Isolation valves installed per drawings		<input type="checkbox"/>	
<b>Fans and Dampers</b>			
Supply fan and motor alignment correct		<input type="checkbox"/>	
Supply fan belt tension & condition good		<input type="checkbox"/>	
Supply fan area clean		<input type="checkbox"/>	
Supply fan and motor properly lubricated		<input type="checkbox"/>	
Return fan and motor aligned		<input type="checkbox"/>	
Return fan belt tension & condition good		<input type="checkbox"/>	
Return fan area clean		<input type="checkbox"/>	
Return fan and motor lube lines installed and lubed		<input type="checkbox"/>	
Filters clean and tight fitting		<input type="checkbox"/>	
Filter pressure differential measuring device installed and functional (magnahelic, inclined manometer, etc.)		<input type="checkbox"/>	
All dampers close tightly		<input type="checkbox"/>	
All damper linkages have minimum play		<input type="checkbox"/>	

Check if Okay. Enter comment or note number if deficient.

Check	Equip Tag→	AHU's	Comments
Low limit freeze stat sensor located to deal with stratification & bypass		<input type="checkbox"/>	
<b>Ducts</b>			
Ducts properly insulated		<input type="checkbox"/>	
Duct joint sealant properly installed		<input type="checkbox"/>	
No apparent severe duct restrictions		<input type="checkbox"/>	
Turning vanes in square elbows as per drawings		<input type="checkbox"/>	
OSA intakes located away from pollutant sources & exhaust outlets		<input type="checkbox"/>	
Balancing dampers installed as per drawings and TAB's site visit		<input type="checkbox"/>	
<b>Electrical and Controls</b>			
Power disconnects in place and labeled		<input type="checkbox"/>	
Safeties in place and operable		<input type="checkbox"/>	
Control system interlocks hooked up and functional		<input type="checkbox"/>	
Smoke detectors in place		<input type="checkbox"/>	
All control devices wiring complete		<input type="checkbox"/>	
Service light if provided is operational		<input type="checkbox"/>	

**The checklist items all successfully completed for given trade**  YES  NO

#### 4. Operational Checks

Check if Okay. Enter comment or note number if deficient.

Check	Equip Tag→	AHU's	Comments
<b>General Findings</b>			
<b>Operation of Dampers and Valves</b>			
Dampers stroke fully without binding and spans calibrated and BAS reading site verified.		<input type="checkbox"/>	
Valves stroke fully and easily, and spanning is calibrated.		<input type="checkbox"/>	
Valves verified to not be leaking through coils when closed at normal operating pressure.		<input type="checkbox"/>	
<b>Operator Station Display to read as follows:</b>			
System graphic		<input type="checkbox"/>	
System On/Off indication		<input type="checkbox"/>	
System Occupied/Unoccupied mode		<input type="checkbox"/>	
System supply fan On/Off indication		<input type="checkbox"/>	
Return exhaust fan status On/Off indication		<input type="checkbox"/>	
Outside air temp indication		<input type="checkbox"/>	
Outside air humidity indication		<input type="checkbox"/>	
Outside air enthalpy calculation		<input type="checkbox"/>	
Supply air temperature		<input type="checkbox"/>	
Supply air temperature setpoint		<input type="checkbox"/>	
Return air temperature		<input type="checkbox"/>	
Damper positioning (%)		<input type="checkbox"/>	
Supply static pressure setpoint		<input type="checkbox"/>	

Check if Okay. Enter comment or note number if deficient.

Check	Equip Tag➔	AHU's	Comments
Supply static pressure		<input type="checkbox"/>	
Hot water coil valve position		<input type="checkbox"/>	
Chilled water coil valve position		<input type="checkbox"/>	
Space/average space temperature		<input type="checkbox"/>	
CO2 indication and setpoint		<input type="checkbox"/>	
All alarm indications		<input type="checkbox"/>	

**The checklist items all successfully completed for given trade  YES  NO**

## 5. Functional Testing Record

### Air Handling Units

Test#	Mode ID	Test Procedure	Expected Response	Pass Y/N	Note
1	Unoccupied Mode	Using BMS put unit into unoccupied mode. Using the trend log features ensure the following occurs	OA temp is above 40°F. - Verify Outside Air and Exhaust Dampers are Closed and return air damper is open, HW/CHW coil valves are closed		
			OA temp is below 40°F – The HW heating coil valve is 25% open subject to safeties.		
		Unit in unoccupied with a call for heat – If Average temperature drops 2 degrees below the unoccupied heating setpoint of 60°F (adj)	OA damper shall remain closed. Subject to safeties, supply fan shall cycle, and 3-way valve shall open based on call for heat from space sensor. Once space temp is 1°F above unoccupied setpoint, the supply fan shuts down. Ensure areas with perimeter radiation use radiant heat as 1 <sup>st</sup> stage if applicable		
2	Morning Warm-up	Set up trends for morning warm up status, heating control valve temperature, discharge air temperature and supply fan status	Check trending to verify that the warmup cycle is occurring prior to the occupied mode enable. OA dampers remain closed, SF starts, and HW valve opens 100%. The supply fan VFD shall modulate to maintain static pressure setpoint.		
3	Occupied, Fan On	Return unit to occupied mode using BMS.	Outside, return and relief damper opens to minimum position, supply fan and return fan start (once OA damper is proven open), RA damper modulates inverse of OA damper.		
4	Supply Fan and Return Fan Control	Using BMS set unit to occupied mode	Supply fan starts and runs continuously during occupied times. Return fan VFD shall track the supply fan by an adjustable offset as determined by the balancer.		
		Manually fail the supply fan and return fan	Verify an alarm is generated at the BMS		
5	Economizer Control	Simulate a situation, using the BMS controls where the unit is looking for cooling and the OA enthalpy is less than 22 btu/lb.	HW valve closed, OA damper modulates to 100% open.		
6	Chilled Water-Cooling Coil	With a need for cooling, set the enthalpy setpoint below the actual OA enthalpy	The Chilled water-cooling coil shall open, and cool air shall be delivered		
		Create a situation where there is a need for cooling, the economizer damper is at 100% open and the cooling setpoint is not satisfied	The economizer damper shall remain 100% open and the chilled water-cooling coil valve shall open. Cool air shall be delivered.		
7	Hot Water Heating Coil	In occupied mode, with fan running, raise the space temperature setpoint	Verify the hot water coil valve modulates to satisfy the heating requirement. (Ensure the system resets Supply air temperature to maintain space temp (adj.))		



Test#	Mode ID	Test Procedure	Expected Response	Pass Y/N	Note
8	Smoke Control	Simulate a smoke condition	Verify the duct smoke detectors will send a signal to stop the fans and close the OA dampers		
9	Freeze Condition	Manually simulate a freeze condition at the low limit duct thermostat	Verify the supply fan stops, OA dampers close, heating coil valve opens (when temp falls below 40°F) and an alarm is sent to the BMS		
		Manually reset the alarm	The alarm shall be cleared, and the units shall be capable of restarting		
10	Filter Switch	Simulate a dirty filter condition	Ensure that the BMS reports an alarm		
11	Demand Control Ventilation (CO <sub>2</sub> Override)	Simulate a CO <sub>2</sub> level beyond the adjustable setpoint	The outside air damper shall be allowed to modulate past minimum position until the CO <sub>2</sub> concentration has fallen below setpoint		

**The functional tests have all passed for given trade**  YES  NO

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**SECTION 26 00 00 – ELECTRICAL****PART 1 GENERAL****1.1 GENERAL REQUIREMENTS AND REFERENCES**

- A. Include “General Requirements” and applicable parts of Division 1 as part of this section.
- B. Examine all other sections of the Specifications for requirements which affect work under this Section whether or not such work is specifically mentioned in this section. Where paragraphs of this section conflict with similar paragraphs of Division 1, requirements of this section shall prevail.
- C. Coordinate work with that of all other trades affecting, or affected by work of this section. Cooperate with such trades to assure the steady progress of all work under the Contract.
- D. The Subcontractor shall be responsible for filing all documents, payment of all fees, and securing of all inspections and approvals necessary for the work of this section.

**1.2 DEFINITIONS**

- A. As used in this section, “provide” means “furnish and install”, and “POS” means “Provided Under Other Sections”.
- B. As used in the Drawings and Specifications for Electrical work, certain non-technical words shall be understood to have specific meanings as follows, regardless of indications to the contrary in the General Conditions of other documents governing the Electrical work.
  - 1. “Furnish” means: Purchase and deliver to the project site complete with every necessary appurtenance and support, all as part of the Electrical work. Purchasing shall include payment of all sales taxes and other surcharges as may be required to assure that purchased item(s) are free of all liens, claims, or encumbrances.
  - 2. “Install” means: Unload at the delivery point at the site and perform every operation necessary to establish secure mounting and correct operation at the proper location in the project, all as part of the Electrical work.
  - 3. “Provide” means: “Furnish” and “Install”.
  - 4. “New” means: Manufactured within the past two (2) years and never before used.
- C. Except where modified by a specific notation to the contrary, it shall be understood that the indication and/or description of any electrical item in the Drawings or Specifications for Electrical work carries with it the instruction to furnish, install and connect the item as part of the Electrical work, regardless of whether or not this instruction is explicitly stated.
- D. It shall be understood that the Specifications and Drawings for Electrical work are complimentary and are to be taken together for a complete interpretation of the Electrical work except that indications on the Drawings, which refer to an individual element of work, take precedence over the Specifications where they conflict.

**1.3 SCOPE**

- A. Perform work and provide material and equipment as shown on Drawings and as specified or indicated in this Section of the Specifications. Completely coordinate work of this Section with work of other trades and provide a complete and fully functional installation.

- 
1. Interior secondary distribution systems including overcurrent and switching devices, panelboards, raceways, cables, wiring, junction and pull boxes, wireways, and all other components required for complete electrical distribution system.
  2. All lighting systems (indoor and outdoor, normal, night, emergency and exit) including all fixtures, lamps, mounting accessories, switches, controls, outlets, wiring, raceways, and all other components and fittings required for a complete lighting system.
  3. Grounding and bonding of all electrical systems and equipment.
  4. Fire alarm system complete with all devices and wiring.
  5. Wiring devices (switches and receptacles) complete with associated wallplates.
  6. Power wiring to HVAC, plumbing and fire protection equipment.
  7. Testing of all electrical systems.
  8. Coordination between electrical and other trades.
  9. All other systems hereinafter specified or indicated on the Contract Drawings, complete, leaving ready an electrical system in perfect operating condition.
  10. All required staging and scaffolding of any height.
- B. Drawings and Specifications form complimentary requirements; provide work specified and not shown, and work shown and not specified as though explicitly required by both. Although work is not specifically shown or specified, provide supplementary or miscellaneous items, appurtenances, devices and materials obviously necessary for a sound, secure and complete installation.
- C. Before submitting bid, visit and carefully examine site to identify existing conditions and difficulties that will affect work of this Section. No extra payment will be allowed for additional work caused by unfamiliarity with site conditions that are visible or readily construed by an experienced observer. Site visit is particularly important because this is renovation work.
- D. Before starting work in a particular area of the project, visit site and examine conditions under which work must be performed including preparatory work done under other Sections or Contracts or by Owner. Report conditions that might affect work adversely in writing through Contractor to Architect. Do not proceed with work until defects have been corrected and conditions are satisfactory. Commencement of work shall be construed as complete acceptance of existing and preparatory work.
- 1.4 RELATED WORK UNDER OTHER SECTIONS
- A. The following items are not included in this section and will be performed under the designated sections.
1. Temporary Facilities.
  2. Earthwork: Excavation and backfill.
  3. Concrete:
    - a. Equipment foundations.
    - b. Housekeeping pads.
    - c. Concrete encasement for conduit banks.
    - d. Light pole bases.
    - e. Rebar for items "a, b, c & d" above.
  4. Masonry: All openings in masonry walls.
  5. Waterproofing, Dampproofing and Caulking.
  6. Roofing and Flashing.

7. Painting: All painting except as specified herein.
8. Finish Carpentry and Millwork.
9. Steel Doors and Frames.
10. Finish Hardware.
11. Elevators and Lifts.
12. Fire Protection.
13. Plumbing.
14. HVAC.
15. Kitchen equipment.
16. Laboratory equipment.
17. Hospital equipment.
18. Irrigation equipment.

#### 1.5 REGULATORY REQUIREMENTS

- A. Comply with all applicable Federal and State laws, and all Local Codes, By-laws and Ordinances.
- B. Where provisions of the Contract Documents conflict with any codes, rules or regulations, the latter shall govern. Where the contract requirements are in excess of applicable codes, rules or regulations, the contract provisions shall govern unless the Architect rules otherwise.
- C. Request inspections from Authorities having jurisdiction, obtain all permits and pay for all fees and inspection certificates as applicable and/or required. All permits and certificates shall be turned over to the Owners at the completion of the work. Copies of permits shall be given to the resident engineer prior to the start of work.
- D. Unless otherwise specified or indicated, materials and workmanship and equipment performance shall conform with the latest edition of the following standards, codes, Specifications, requirements and regulations:
  1. State Building Code.
  2. State Electrical Code.
  3. National Fire Protection Association (NFPA).
  4. Local Town Regulations and By-Laws.
  5. Underwriter's Laboratories, Inc. (UL).
  6. National Electrical Manufacturer's Association (NEMA).
  7. American National Standards Institute (ANSI).
- E. All Electrical work shall meet or exceed any other state and local codes and/or Authorities having jurisdiction including all other standards indicated herein.

#### 1.6 SUBMITTALS

- A. This paragraph shall supplement Division 1.
- B. Definitions:
  1. Shop Drawings: Information prepared by the Contractor to illustrate portions of the work in more detail than shown in the Contract Documents.
  2. Coordination Drawings: Detailed, large-scale layout Shop Drawings showing HVAC, Electrical, Plumbing and Fire Protection work superimposed to identify conflicts and ensure inter-coordination of Mechanical, Electrical, Architectural, Structural and other work.
  3. Manufacturer's Product Data: Information prepared by the manufacturer which depicts standard equipment.

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C. Submittals, Procedures and Format:

1. Review submittal packages for compliance with Contract Documents and then submit to Architect for review. Submit transparency and two (2) blue or black-line reproductions of each Shop Drawing larger than 8-1/2" x 11". Submit eight (8) sets of each smaller shop drawing. After review, transparency original of each large Shop Drawing and six (6) sets of each small shop drawing will be returned with reviewer's marks. Electronically submitted shop drawings are acceptable.
2. Each Shop Drawing shall indicate in title block, and each Product Data package shall indicate on cover sheet, the following information:
  - a. Title.
  - b. Name and location of project.
  - c. Names of Architect, Engineer, Contractor and Subcontractor(s).
  - d. Names of Manufacturer, Supplier, Vendor, etc.
  - e. Date of submittal.
  - f. Whether original submittal or resubmitted.
3. Shop Drawings and/or Manufacturer's Product Data shall contain detailed dimensional Drawings, accurate and complete description of materials of construction, manufacturer's published performance characteristics and capacity ratings (performance data alone is not acceptable), electrical requirements and wiring diagrams. Drawings shall clearly indicate location (terminal block or wire number), voltage and function for all field terminations, and other information necessary to demonstrate compliance with all requirements of Contract Documents.

D. Acceptable Manufacturers:

1. The Architect's Mechanical/Electrical design for each project is based on the single manufacturer listed in the schedule or shown on the Drawings. In Division 16 of these Specifications certain "Alternate Manufacturers" are listed as being acceptable. These are acceptable only if, as a minimum, they:
  - a. Meet all performance criteria listed in the schedules and outlined in the Specifications.
  - b. Have identical operating characteristics to those called for in the Specifications.
  - c. Fit within the available space it was designed for, including space for maintenance and component removal, with no modifications to either the space or the product. Clearances to walls, ceilings and other equipment will be at least equal to those shown on the Contract Documents. The fact that a manufacturer's name appears as acceptable shall not be taken to mean the Architect has determined that the manufacturer's products will fit within the available space. This determination is solely the responsibility of the Contractor.
  - d. For equipment mounted in areas where structural matters are a consideration, the products must have a weight no greater than the product listed in the schedules or Specifications.
  - e. Products must adhere to all architectural considerations including, but not limited to, being the same size and of the same physical appearance as scheduled or specified products.

E. Substitutions: Substitution of products by manufacturers other than those listed shall only be done in accordance with subparagraph "F" "Substitutions and Deviations".

F. Substitutions and Deviations:

1. Deviations from the Contract Documents and the substitution of materials or equipment relative to the "Acceptable Manufacturers" referred to above shall be requested individually in writing whether deviations result from field conditions, standard shop practice, or other cause. Submit letter with transmittal of Shop Drawings which flags the substitution or deviation to the attention of the Architect. The letter shall describe changes in the system shown and physical characteristics (connections to adjacent materials, electrical services, service access requirements, and other characteristics), and differences in operating characteristics or cycles.

2. Without letters flagging the substitution or deviation to the Architect, it is possible that the Architect may not notice such substitution or deviation or may not realize its ramifications. Therefore, if such letters are not submitted to the Architect, the Contractor shall hold the Architect and his consultants harmless for any and all adverse consequences resulting from the deviations being implemented. Adverse consequences shall include, but not be limited to, excessive noise, excessive maintenance, shortened longevity, spatial coordination problems, and inadequate performance versus scheduled design. This shall apply regardless of whether the Architect has reviewed or approved Shop Drawings containing the deviation, and will be strictly enforced.
3. Do not request substitute materials or equipment unless identical material or equipment has been operated successfully for at least three (3) consecutive years. Such materials and equipment shall be a regular cataloged item shown in the current catalog of the manufacturer. When deviation or substitution is permitted, coordinate fully with related changes to Architectural, Structural, Plumbing, Fire Protection, Mechanical, and other work. Ensure that related changes necessary for coordination of substituted items are made within the Contract Price. Assume full responsibility for safety, operation and performance of the altered system. Any extra costs incurred to the project based on the use of alternate manufacturers shall be borne by the Contractor who has requested the substitution.
4. Substitutions of equipment, systems, etc. requiring approval of local Authorities must comply with such regulations and be filed by the Contractor (should filing be necessary).
5. Consideration will not be given to claims that the substituted item meets the performance requirements with lesser construction. Performance, as delineated in schedules and in the Specifications, shall be interpreted as minimum performance.
6. Approval of proposed deviations or substitutions, if any, will be made at discretion of Architect.
7. If equipment is proposed for substitution that is not tested and rated according to industry-wide standards, the Architect shall have the right to have performance tests completed, at the Contractor's expense, to confirm the manufacturer's performance claims.

G. Submittal Notations: Submittals will be returned from the Architect marked as illustrated below:

<input type="checkbox"/> NO EXCEPTION TAKEN	<input type="checkbox"/> ACCEPTED AS NOTED
<input type="checkbox"/> NOT ACCEPTED	<input type="checkbox"/> REVISE AND RESUBMIT

1. Checking is only for general conformance with the design concept of the project and general compliance with the information given in the Contract Documents. Any action shown is subject to the requirements of the Drawings and Specifications. Contractor is responsible for dimensions which shall be confirmed and correlated at the job site; fabrication process and techniques of construction; coordination of his work with that of all other trades; and the satisfactory performance of his work.

H. Schedule: Incorporate the Shop Drawing review period into the construction schedule so that work is not delayed. Contractor shall assume full responsibility for delays caused by not incorporating the following Shop Drawing review time requirements into his project schedule. Allow at least ten (10) working days, exclusive of transmittal time, for review each time Shop Drawing is submitted or resubmitted with the exception that fifteen (15) working days, exclusive of transmittal time, are required for the following:

1. Motor control wiring diagram submittals.
2. Short circuit and coordination studies.
3. Coordination Drawings, if required by this Specification.



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4. If more than five (5) Shop Drawings of this trade are received in one (1) calendar week.
  - I. List of Proposed Equipment and Materials: Within four (4) weeks after Award of Contract and before ordering materials or equipment, submit a complete list of proposed materials and equipment and indicate manufacturer's names and addresses. No consideration will be given to partial lists submitted out of sequence.
  - J. Responsibility:
    1. The intent of submittal review is to check for capacity, rating, and certain construction features. Contractor shall ensure that work meets requirements of the Contract Documents regarding information that pertains to fabrication processes or means, methods, techniques, sequences and procedures of construction; and for coordination of work of this and other Sections. Work shall comply with submittals marked "REVIEWED" to extent that they agree with the Contract Documents. Submittal review shall not diminish responsibility under this Contract for dimensional coordination, quantities, installation, wiring, supports and access for service, nor the shop drawing errors or deviations from requirements of the Contract Documents. The Architect's noting of some errors while overlooking others will not excuse the Contractor for proceeding in error. Contract Document requirements are not limited, waived, nor superseded in any way by review.
    2. Inform Subcontractors, Manufacturers, Suppliers, etc. of scope and limited nature of review process and enforce compliance with the Contract Documents.
  - K. Material and equipment requiring Shop Drawing and/or Manufacturer's Data Submittals shall include but not be limited to:
    1. Light fixtures.
    2. Overcurrent and switching devices.
    3. Wiring devices and wall plates.
    4. Fire alarm system with wiring diagram and schedule.
    5. Wiring and cables.
    6. Conduit.
    7. Boxes and fittings.
    8. Safety switches.

#### 1.7 SURVEYS AND MEASUREMENTS

- A. Base all required measurements, both horizontal and vertical, on reference points established by the General Contractor and be responsible for the correct laying out of the Electrical work. In the event of a discrepancy between actual measurements and those indicated, notify the General Contractor in writing. Do not proceed with the work required until written instructions have been issued by the General Contractor.

#### 1.8 COORDINATION

- A. HVAC, Plumbing, Fire Protection, and Electrical Drawings are diagrammatic. They indicate general arrangements of Mechanical and Electrical systems and other work. They do not show all offsets required for coordination nor do they show the exact routings and locations needed to coordinate with Structural and other trades and to meet Architectural requirements.
- B. Work shall be performed in cooperation with other trades on the project and so scheduled as to allow speedy and efficient completion of the work.
- C. Furnish to other trades advance information on locations and sizes of all frames, boxes, sleeves and openings needed for their work. Furnish information and Shop Drawings necessary to allow trades affected by the work to install their work properly and without delay.

- D. In all spaces, prior to installation of visible material and equipment, including access panels, review Architectural Drawings for exact locations and where not definitely indicated, request information from Architect. Where the Electrical work shall interfere with the work of other trades, assist in coordinating the space conditions to make satisfactory adjustments before installation. Without extra cost to the Owners, make reasonable modifications to the work as required by normal Structural interferences. Pay the General Contractor for additional openings, or relocating and/or enlarging existing openings through concrete floors, walls, beams and roof required for any work which was not properly coordinated. Maintain maximum headroom at all locations. All piping, duct, conduit, and associated components to be as tight to underside of structure as possible.
- E. If any Electrical work has been installed before coordination with other trades so as to cause interference with the work of such trades, all necessary adjustments and corrections shall be made by the trades involved without extra cost to the Owners.
- F. Where conflicts or potential conflicts exist and engineering guidance is desired, submit sketch of proposed resolution to Architect for review and approval.
- G. Protect all materials and work of other trades from damage which may be caused by the Electrical work, and repair all damages without extra cost to the Owners.

#### 1.9 MECHANICAL AND ELECTRICAL COORDINATION

- A. The HVAC Subcontractor shall furnish and install various electrical items relating to the heating and ventilating equipment and control apparatus. The Electrical Subcontractor shall be required to connect power wiring to this equipment unless noted otherwise.
- B. The HVAC and Electrical Subcontractors shall coordinate their respective portions of the work, as well as the electrical characteristics of the heating, ventilating and air conditioning equipment.
- C. All power wiring and local disconnect switches will be provided by the Electrical Subcontractor for the line voltage power. All control and interlocking wiring shall be the responsibility of the HVAC Subcontractor.
- D. 120V and above power wiring sources extended and connected to HVAC control panels, transformers and switches shall be the responsibility of the Electrical Subcontractor. All low voltage thermostat, and any switch wiring shall be the responsibility of the HVAC Subcontractor.
- E. Temperature control and equipment wiring shall be installed by the Heating and Ventilating Subcontractor.
- F. Pipe heat tracing shall be furnished and installed by the Plumbing Subcontractor. Power connections shall be by the Electrical Subcontractor.
- G. The Electrical Subcontractor will provide all magnetic starters except those furnished as an integral part of packaged equipment.

#### 1.10 INSTALLATION REQUIREMENTS

- A. The arrangement of all Electrical work shown on the Drawings is diagrammatic only and indicates the minimum requirements of the work. Conditions at the building including actual measurements shall determine the details of the installation. All work shall be laid out and installed so as to require the least amount of cutting and patching.
- B. Review the Architectural Drawings and Specifications before ordering any material and equipment. Any discrepancies shall be brought to the attention of the Architect for his determination prior to proceeding with the work.

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### 1.11 TYPICAL DETAILS

- A. Typical details where shown on the Drawings shall apply to each and every item of the project where such items are applicable. They are not repeated in full on the Drawings, which in many cases are diagrammatic only, but with the intention that such details shall be incorporated in full. Any alternate method proposed for use by the Contractor shall have the prior approval of the Architect.

### 1.12 SLEEVES, INSERTS

- A. Furnish and install all sleeves, inserts, anchor bolts and similar items to be set into masonry or concrete, as required for Mechanical and Electrical work. Internal diameter of sleeve ball shall be 1/2" larger than the outside diameter of the pipe or insulation covered line passing through it.

### 1.13 CORING, DRILLING

- A. Core, cut and/or drill all small holes 4.5" diameter or less in walls, floors and ceiling required for the installation of sleeves, supports, and conduit for the Electrical work.

### 1.14 FIRESTOPPING, SMOKEPROOFING AND WATERPROOFING

- A. All penetrations made through fire rated assemblies (structures or partitions) shall be completely and properly fire sealed with the appropriate firestop systems installed in accordance with the Manufacturer's recommendations. The firestop material UL listed fire rating shall match or exceed the fire rated assemblies. Verify with Architect if project is utilizing a specified product. If not, provide product manufactured by Hilti, Nelson or STI.
- B. Provide waterproofing of all materials which penetrate a floor, exterior wall, slab or roof. All sleeves shall extend a minimum of 3 inches above floor or roof. All penetrations thru building foundation walls shall utilize Link-Seal products or approved equal.

### 1.15 ACCESSIBILITY

- A. Install all work such that parts requiring periodic inspection, operation, maintenance and repair are readily accessible.
- B. Furnish all access panels appropriate to particular conditions, to be installed by trades having responsibility for the construction of actual walls, floors or ceilings at required locations.

### 1.16 SUPPLEMENTARY SUPPORTING STEEL

- A. Provide all supplementary (non-structural) steelwork required for mounting or supporting equipment and materials.
- B. Steelwork shall be firmly connected to building construction as required. Locations and methods of attachment shall be approved by the Architect.
- C. Steelwork shall be of sufficient strength to allow only minimum deflection in conformity with manufacturer's published requirements.
- D. All supplementary steelwork shall be installed in a neat and workmanlike manner parallel to floor, wall and ceiling construction: all turns shall be made at forty-five and ninety degrees, and/or as dictated by construction and installation conditions.
- E. All manufactured steel parts and fittings shall be galvanized.

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### 1.17 TOOLS AND EQUIPMENT

- A. Provide all tools and equipment required for the fabrication and installation of the Mechanical and Electrical equipment at the site.

### 1.18 PORTABLE AND DETACHABLE PARTS

- A. Contractors shall retain in their possession all portable and/or detachable parts and portions of materials, devices, equipment, etc. necessary for the proper operation and maintenance of the Mechanical and Electrical systems until final completion of the work, at which time they shall be handed over to the Owners.

### 1.19 RECORD DRAWINGS, PROJECT CLOSEOUT

- A. As work progresses and for the duration of Contract, maintain a complete and separate set of prints of Contract Drawings at job site at all times. Record work completed and all changes from original Contract Drawings clearly and accurately including work installed as a modification or addition to the original design. Work shall be updated on a weekly basis and shall be made available for review by Architect. Failure to perform this work shall be reason for withholding requisition payments. In addition, take photographs of all concealed equipment in gypsum board ceilings, shafts, and other concealed, inaccessible work. At completion of work, make copies of photographs with written explanation on back. These shall become part of Record Documents.
- B. At completion of work prepare a complete set of Record Drawings utilizing AutoCAD produced drawings showing all systems as actually installed, including all fire alarm and electrical circuitry. Submit three (3) sets of prints to Architect for comments as to compliance with this section.
- C. The Architect will not certify the accuracy of the Record Drawings. This is the sole responsibility of the Electrical Contractor.
- D. This trade shall submit the Record Drawings for approval by the Fire and Building Departments in a form acceptable to the departments, when required by the jurisdiction.
- E. Record Drawings shall show record condition of details, sections, riser diagrams, control changes and corrections to schedules. Schedules shall show actual manufacturer, make and model numbers of final equipment installation.

### 1.20 GUARANTEE/WARRANTY

- A. Guarantee and 24 Hour Service:
  - 1. Guarantee Work of this Section in writing for not less than one (1) year following the date of acceptance by the Owner. If the equipment is used for temporary power etc, prior to acceptance by the Owner, the bid price shall include an extended period of warranty covering the one (1) year of occupancy, starting from the date of acceptance by the Owner. The guarantee shall repair or replace defective materials, equipment, workmanship and installation that develop within this period, promptly and to the Architect's satisfaction and correct damage caused in making necessary repairs and replacements under guarantee within Contract Price.
  - 2. In addition to guarantee requirements of Division 1 and of Subparagraph A above, obtain written equipment and material warranties offered in manufacturer's published data without exclusion or limitation, in Owner's name.
  - 3. Upon receipt of notice from the Owner of failure of any part of the systems or equipment during the warranty period, the affected part or parts shall be replaced by this Contractor without any reimbursement.

4. Replace material and equipment that require excessive service during guarantee period as defined and as directed by Architect.
5. Provide 24 hour service beginning on the date the project is accepted by the Owner, whether or not fully occupied, and lasting until the termination of the guarantee period. Service shall be at no cost to the Owner. Service can be provided by this Contractor or a separate service organization. Choice of service organization shall be subject to Architect and Owner approval. Submit name and a phone number that will be answered on a 24 hour basis each day of the week, for the duration of the service.
6. Submit copies of equipment and material warranties to Architect before final payment.
7. At end of guarantee period, transfer manufacturer's equipment and material warranties still in force to Owner.
8. This paragraph shall not be interpreted to limit Owner's rights under applicable codes and laws and under this Contract.
9. PART 2 paragraphs of this Specification may specify warranty requirements that exceed those of this paragraph. Those paragraphs shall govern.
10. Use of systems provided under this Section for temporary services and facilities shall not constitute Final Acceptance of Work by Owner, and shall not initiate the guarantee period.
11. Provide manufacturer's engineering and technical staff at site to analyze and rectify problems that develop during guarantee period immediately. If problems cannot be rectified immediately to Owner's satisfaction, advise the Architect in writing, describe efforts to rectify situation, and provide analysis of cause of problem. The Architect and/or Engineer will direct course of action.

#### 1.21 OPERATING, INSTRUCTION AND MAINTENANCE MANUALS

- A. Refer to Division 1 – CONTRACT CLOSEOUT for submittal procedures pertaining to operating and maintenance manuals.
- B. Each copy of the approved operating and maintenance manual shall contain copies of approved Shop Drawings, equipment literature, cuts, bulletins, details, equipment and engineering data sheets and typewritten instructions relative to the care and maintenance for the operation of the equipment, all properly indexed. Each manual shall have the following minimum contents:
  1. Table of Contents.
  2. Introduction:
    - a. Explanation of manual and its purpose and use.
    - b. Description of the electrical systems.
    - c. Safety precautions necessary for equipment.
    - d. Illustrations, schematics and diagrams.
    - e. Installation drawing.
  3. Maintenance:
    - a. Maintenance and lubricating instructions.
    - b. Replacement charts.
    - c. Trouble-shooting charts for equipment components.
    - d. Testing instructions for each typical component.
    - e. Two (2) typed sets of instructions for ordering spare parts. Each set shall include name, price, telephone number and address of where they may be obtained.
  4. Manufacturer's Literature:

- a. The equipment for which Shop Drawings have been submitted and approved.

## 1.22 SERVICE CHARACTERISTICS

- A. Secondary Building Voltage: 120/208 three phase.
- B. All equipment and wiring shall be suitable for the applied voltage.

## 1.23 QUALITY ASSURANCE

- A. The requirements of the State Building Code and Local regulations establish the minimum acceptable quality of workmanship and materials, and all work shall conform thereto unless more stringent requirements are indicated or specified herein.
- B. All work shall comply with the latest editions of the codes as referenced herein.
- C. Follow manufacturer's directions for articles furnished, in addition to directions shown on Drawings or specified herein.
- D. Protect all work, materials, and equipment from damage during process of work. Replace all damaged or defective work, materials and equipment without additional cost to the Owner.
- E. All equipment and materials for permanent installation shall be the products of recognized manufacturers and shall be new.
- F. Equipment and materials shall:
  - 1. Where normally subject to Underwriters Laboratory Inc. listing or labeling services, be so listed and labeled.
  - 2. Be without blemish or defect.
  - 3. Not be used for temporary light and power purposes.
  - 4. Be in accordance with the latest applicable NEMA standards.
  - 5. Buy products which will meet with the acceptance of all Authorities having jurisdiction over the work. Where such acceptance is contingent upon having the products examined, tested and certified by Underwriters or other recognized testing laboratory, the product shall be so examined, tested and certified.
- G. Except for conduit, conduit fittings, outlet boxes, wire and cable, all items of equipment or material of one generic type shall be the product of one manufacturer throughout.
- H. For items which are to be installed but not purchased as part of the Electrical work, the Electrical work shall include:
  - 1. The coordination of their delivery.
  - 2. Their unloading from delivery trucks driven into any point on the property line at grade level.
  - 3. Their safe handling and field storage until the time of permanent placement in the project.
  - 4. The correction of any damage, defacement or corrosion to which they may have been subjected. Replacement, if necessary, shall be coordinated with the Contractor who originally purchased the item.

5. Field erection and internal wiring as necessary for their proper operation.
6. Mounting in place, including the purchase and installation of all dunnage, supporting members, and fastenings, necessary to adapt them to architectural and structural conditions.
- I. Items which are to be installed but not purchased as part of the electric work shall be carefully examined upon delivery to the project. Claims that any of these items have been received in such condition that their installation will require procedures beyond the reasonable scope of the electric work will be considered only if presented in writing within one (1) week of the date of delivery to the project of the items in question. The electric work includes all procedures, regardless of how extensive, necessary to put into satisfactory operation, all items for which no claims have been submitted as outlined above.

#### 1.24 DELIVERY, STORAGE AND HANDLING

- A. All materials for the work of this section shall be delivered, stored and handled so as to preclude damage of any nature. Manufactured materials shall be delivered and stored in their original containers, plainly marked with the products' and manufacturer's name. Materials in broken containers or in packages showing watermarks or other evidence of damage, shall not be used and shall be removed from the site.

#### 1.25 TEMPORARY POWER AND LIGHTING

- A. The Electrical Subcontractor shall furnish and install feeders of sufficient size from the Utility Company's power lines for the electric light and power requirements for the building while under construction and until the permanent feeders and related equipment have been installed and are in operation. Temporary lighting shall be based on a minimum of one watt per square foot covering each and every square foot of floor area in the building. Sufficient wiring, lamps, and outlets shall be installed to insure proper lighting in all rooms, space, stairwells, and corridors. Minimum sized lamp used shall be 100 watt. Where higher lighting intensities are required by Federal or State Standards of Laws or otherwise specified, the above specified wattage shall be increased to provide these increased intensities.
- B. All necessary transformers, meters, cables, panelboards, switches, temporary lamp replacements and accessories required for the temporary light and power installation shall be provided by the Electrical Subcontractor.
- C. The Electrical Subcontractor shall provide and maintain on each floor of the building, a feeder or feeders of sufficient capacity for the requirements of the entire floor and he shall provide a sufficient number of outlets, located at convenient points so that extension cords of not over 50 feet in length will reach all work requiring temporary light or power.
- D. The Electrical Subcontractor shall install and maintain the wiring and accessories for the offices of the General Contractor and the Clerk of the Works as specified in the contract form.
- E. All temporary Electrical work shall meet the requirements of the National Electrical Code Article 590 Temporary Wiring, the Local Utility Company, and all Federal Standards and Laws.
- F. All temporary wiring and accessories thereto installed by the Electrical Subcontractor shall be removed after their purposes have been served.
- G. The General Contractor will pay for the cost of electric energy consumed by himself and by all of his Subcontractors, unless otherwise indicated.
- H. All lamps installed in permanent lighting fixtures and used for lighting during construction shall be replaced by the Electrical Subcontractor just prior to date of Use and Occupancy or Final Acceptance.

- I. Provide all temporary lighting and power required above during the normal working hours of the project or a total of ten (10) hours per normal working day; Saturdays, Sundays and legal holidays are excluded. The ten hours per day shall include manning the temporary power and lighting 1/2 hour before and 1/2 hour after a normal eight (8) hour working day. In addition to the above, provide and maintain, to the satisfaction of the local Authorities having jurisdiction, all temporary lighting and power that may be required for safety purposes. The Electrical Subcontractor will be compensated by the General Contractor for any additional standby time, materials or equipment required by the General Contractor or other Subcontractors beyond the normal working hours, as defined above.

#### 1.26 STAGING AND SCAFFOLDING

- A. Provide staging and scaffolding for all the work of this section complying with Division 1 requirements.

#### 1.27 EXTRA MATERIALS

- A. Furnish extra materials as indicated below that match products installed, are packaged with protective covering for storage, and are identified with labels clearly describing contents.
  1. 10% of each total lamps installed.
  2. 10% of each total circuit breakers installed.
  3. 10% of each total fuses installed.
  4. Ten (10) toggle switches and duplex receptacles.
  5. 10% of total audio/visual appliances installed.
  6. 10% of each total pull stations and smoke detectors installed.

#### 1.28 SEISMIC REQUIREMENTS

- A. Equipment and work shall meet the restraint requirements for the designated Seismic Design category. This shall include all installation and connections of material and equipment to the building structure. Refer to Structural Drawings for Seismic Design category and ASCE7 for electrical requirements.

#### 1.29 PHASING, DEMOLITION AND MAINTAINING EXISTING SERVICES

- A. During the execution of the work, required relocation, etc., of existing equipment and systems in the existing building areas where new work is to be installed or new connections are scheduled to be made, shall be performed by the Electrical Subcontractor, as required by job conditions and as determined by the Architect in the field, to facilitate the installation of the new system, while demolition, relocation work or new tie ins will be performed. Outages required for construction purposes shall be scheduled for the shortest practical period of time, in coordination with the Owner's designated representative, for specified, mutually agreeable periods of time, after each of which the interruption shall cease and the service shall be restored. This procedure shall be repeated to suit the Owner's working schedule, as many times as required until all work is completed. Any outages of service shall be approved by the Owner, prior to commencing the work. No outages or shutdowns of service shall occur without the written authorization of the Owner prior to commencing the work. Give notice of any scheduled shutdowns, a minimum of two (2) weeks in advance. Owner shall make their best efforts to meet this request without adversely affecting the electric service to the existing building.
- B. Prior to any deactivation and relocation or demolition work, consult the Drawings and arrange a conference with the Architect and Owner's representative in the field to inspect each of the items to be deactivated, removed or relocated. Care shall be taken to protect all equipment designated to be relocated and reused or to remain in operation and be integrated with the new systems.
- C. All deactivation, relocation and temporary tie-ins of electrical systems and equipment shall be provided by the Electrical Subcontractor. All demolition and removal of electrical systems and equipment designed to be demolished shall be provided by the Electrical Subcontractor. Place all demolished electrical materials except hazardous materials (PCB lighting ballasts, fluorescent lamps, etc.) as



determined by the Authority Having Jurisdiction in General Contractor's dumpster. All hazardous electrical materials shall be legally disposed of by the Electrical Subcontractor.

- D. The Owner reserves the right to inspect the material scheduled for removal and salvage any items he deems usable as spare parts.
- E. Phasing:
  - 1. The Electrical Subcontractor shall construct the subject project in phases as directed by the Architect to suit the project progress schedule, as well as the completion date of the project.
  - 2. For additional information related to phasing, review the General Conditions and Supplementary Conditions and the Architectural Drawings.

## PART 2 – PRODUCTS

### 2.1 GENERAL

- A. Product Specifications are written in such a manner so as to specify what materials may be used in a particular location or application and therefore do not indicate what is not acceptable or suitable for a particular location or application. As an example: Non-metallic sheathed cable is not specified; therefore it is not acceptable.
- B. For purpose of establishing a standard of quality and not for purposes of limiting completion, the basis of this Specification is upon specified models and types of equipment and materials, as manufactured by specified manufacturers.
- C. In all cases, standard cataloged materials and systems have been selected. Materials such as lighting fixtures specially manufactured for this particular project, and not part of a manufacturer's standard product line, will not be acceptable. In the case of systems, the system components shall be from a single source regularly engaged in supplying such systems. A proposed system made up of a collection of various manufacturers products will be unacceptable.
- D. Where Specifications list manufacturers names and/or "as approved" or "equal approved by Designer", other manufacturers equipment will be considered if equipment meets Specification requirements and has all features of the specified items as are considered essential by the Architect.
- E. All materials shall be new and shall be UL listed.

### 2.2 RACEWAYS AND FITTINGS

- A. Raceways – General:
  - 1. No raceway shall be used smaller than 3/4" diameter. No conduit shall have more than three (3) 90° bends in any one run, and where necessary, pull boxes shall be provided.
  - 2. Rigid metal conduit (RMC) conforming to, and installed in accordance with, Article 344 of NFPA 70 shall be heavy wall zinc coated steel conforming to American Standard Specifications C80-1 and may be used for service work, exterior work, slab work, and below grade level slab, wet locations, and in mechanical rooms and where raceway may be subjected to mechanical damage, i.e., loading docks, workshops, etc.
  - 3. Intermediate metal conduit (IMC) conforming to, and installed in accordance with Article 342 of NFPA 70 shall be zinc coated steel and may be used in all areas similar to RMC.

4. Thin wall conduit (EMT), conforming to, and installed in accordance with, Article 358 of NFPA 70 shall be zinc coated steel, conforming to industry standards, may be used in masonry block walls, stud partitions, above furred ceilings where exposed but not subject to mechanical damage, and shall be used for fire alarm work.
5. Flexible metal conduit (FMC) conforming to, and installed in accordance with Article 348 of NFPA 70 shall be used for connections to recessed light fixtures, vibrating equipment and motors. All FMC shall be secured and supported in accordance with Article 348 of NFPA 70.
6. Liquidtight flexible metal conduit (LFMC) conforming to, and installed in accordance with Article 350 of NFPA 70 shall be used for connections to light fixtures, vibrating equipment and motors. All LFMC shall be secured and supported in accordance with Article 350 of NFPA 70. If used on roof applications, all LFMC shall be supported by sleepers approved by the Architect prior to installation.
7. Rigid non-metallic conduit may be used at the Contractor's option for underground electric and telephone services outside the foundation wall and shall be polyvinyl chloride (PVC) schedule 40 or 80, 90° C. If option of rigid non-metallic conduit is exercised, underground runs outside the foundation wall shall be concrete encased at Contractor's expense. Schedule 40/80 conduit shall be installed in conformance with Article 352 of NFPA 70. Use of type EB or A PVC conduit is not allowed.
8. PVC Schedule 40 may also be used for below grade slab circuits within building confines. Below slab rigid non-metallic conduits do not require concrete encasement. Rigid non-metallic conduits shall not be used in slabs. Rigid steel elbows or stubs shall be used for penetrations from below slab or through exterior walls into building. PVC shall not be installed within building. Raceways and fittings shall be produced by same manufacturer. All PVC conduit shall comply with ANSI/UL 651.
9. Where indicated on the project drawings provide color coded EMT as follows:
  - a. Red – Fire and Emergency Systems.
  - b. Blue – Video, Network and Data Communication.
  - c. Green – Hospital and Healthcare.
10. Acceptable Manufacturers:
  - a. Wheatland Tube Company
  - b. Allied Tube
  - c. Western Tube & Conduit
  - d. Carlon
  - e. Perma-Cote Supreme
  - f. Cantex
11. Fittings:
  - a. Provide insulated bushings on all raceways that house conductors #4 AWG or larger at all threaded fittings no matter what the size of the conductor.
  - b. Manufacturer's standard fittings shall be used for raceway supports.
  - c. Expansion Fittings: Expansion fittings shall be used where structural and concrete expansion joints occur and shall include a ground strap.
  - d. Couplings for rigid metal conduit and IMC shall be threaded type. Provide insulated bushings.
  - e. All fittings for EMT conduit shall be steel. No die-cast fittings are allowed. Set screw and compression connectors are allowed.
  - f. Threadless fittings for EMT shall be watertight compression type. Set-screw type fittings are not acceptable. All fittings shall be concrete tight. No die-cast fittings allowed.
  - g. Cable supports in vertical raceways shall be of the split wedge type. Armored cable supports for vertical runs to be of wire mesh basket design.
  - h. Wall entrance seals shall be equal to O.Z. Gedney type "WSK" or Link-Seal.

- i. Couplings, elbows and other fittings used with rigid nonmetallic raceways shall be of the solvent cemented type to secure a waterproof installation.
- j. Acceptable manufacturers:
  - 1) O.Z. Gedney
  - 2) Crouse Hinds
  - 3) American Fittings
  - 4) Hubbell
  - 5) Thomas & Betts

### 2.3 WIRING MATERIALS

- A. Building Wire and Cable shall be copper with 600V insulation, THWN for branch circuitry and XHHW for feeders.
- B. Conductors shall be of soft drawn 98% minimum conductivity properly refined copper, solid construction where No. 10 AWG and smaller, stranded construction where No. 8 AWG and larger.
- C. Exterior of wires shall bear repetitive markings along their entire length indicating conductor size, insulation type and voltage rating.
- D. Exterior of wires shall be color coded, so as to indicate a clear differentiation between each phase and between each phase and neutral. In all cases, grounded neutral wires and cables shall be identified by the colors "white" or "gray". In sizes and insulation types where factory applied colors are not available, wires and cables shall be color coded by the application of colored plastic tapes in overlapping turns at all terminal points, and in all boxes in which splices are made. Colored tape shall be applied for a distance of 6 inches along the wires and cables, or along their entire extensions beyond raceway ends, whichever is less.
- E. Final connections to motors shall be made with 18" of neoprene sheathed flexible conduit.
- F. Minimum branch circuit conductor size shall be No. 12 AWG installed in conduit. Motor control circuit wiring shall be minimum No. 14 AWG installed in conduit.
- G. Fire alarm and security system wiring shall be per manufacturer's recommendations.
- H. Other wires and cables required for the various systems described elsewhere in this section of the Specifications shall be as specified herein, as shown on the Contract Drawings, or as recommended by the manufacturer of the specific equipment for which they are used, all installed in conduit.
- I. Metal clad sheathed cable NFPA 70, type MC may be used for branch circuitry where shown and where run concealed and not subject to physical damage. All type MC cable used shall contain a full size insulated ground conductor. All conductors shall be copper. All type MC cable insulation used shall have voltage rating of 600 volts, shall have a temperature rating of 75° C, and shall be thermoplastic material. Armor material shall be steel and armor design shall be interlocked metal tape. Fire alarm rated MC cable may be used for fire alarm work where concealed and acceptable to the Local Authority Having Jurisdiction.
- J. Non-metallic sheathed cable (type "NM") shall consist of a factory-assembled 2 or 3 conductor cable, with ground wire minimum size of #14. Conductor insulation shall be rated for 600 volts. Cables and installation shall comply with Article 334 of The National Electric Code and shall be UL approved. All type "NM" cables shall have a temperature rating of 90° C and shall be Thermo Plastic material. Provide 14 gauge wire on 15 amp circuits, 12 gauge wire on 20 amp circuits. Type "NM" cables shall be installed only within dwelling units
- K. Wiring materials except MI cable shall be manufactured by Southwire, Prysmian, General Cable, or equal.

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## 2.4 OUTLET, JUNCTION, PULL BOXES AND WIRING TROUGHS FOR ALL SYSTEMS

### A. Outlets:

1. Each outlet in wiring or raceway systems shall be provided with an outlet box to suit conditions encountered. Boxes installed in normally wet locations shall be of cast-metal type having hubs. Concealed boxes shall be cadmium plated or zinc coated sheet metal type. Old work boxes with Madison clamps are not allowed in new construction.
2. Each box shall have sufficient volume to accommodate number of conductors in accordance with requirements of NFPA 70. Boxes shall not be less than 1-1/2" deep unless shallower boxes are required by structural conditions and are specifically approved by Architect. Ceiling and bracket outlet boxes shall not be less than 4" octagonal except that smaller boxes may be used where required by particular fixture to be installed. Flush or recessed fixtures shall be provided with separate junction boxes when required by fixture terminal temperature requirements. Switch and receptacle boxes shall be 4" square or of comparable volume.
3. Acceptable Manufacturers:
  - a. Appleton
  - b. Crouse Hinds
  - c. Steel City
  - d. RACO

- B. Pull and Junction Boxes: Where necessary to terminate, tap off, or redirect multiple raceway runs or to facilitate conductor installation, furnish and install appropriately designed boxes. Boxes shall be fabricated from code gauge steel assembled with corrosion resistant machine screws. Box size shall be as required by Code. Where intermediate cable supports are necessary because of box dimensions, provide insulated removable core brackets to support conductors. Junction boxes are to be equipped with barriers to separate circuits. Where splices are to be made, boxes shall be large enough to provide ample work space. All conductors in boxes are to be clearly tagged to indicate characteristics. Boxes shall be supported independently of raceways. Junction boxes in moist or wet areas shall be galvanized type. Boxes larger than 4 inches square shall have hinged covers. Boxes larger than 12 inches in one dimension will be allowed to have screw fastened covers, if a hinged cover would not be capable of being opened a full 90 degrees due to installation location.

## 2.5 WIRING DEVICES

- A. Provide wiring device type plates for all wall-mounted devices. All wall plates shall be smooth high impact nylon for all areas, color as directed by the Architect. Provide galvanized steel for all Utility, Electric and Mechanical Rooms.
- B. Wiring devices standard for the project (i.e., with no specific type indicated) shall conform to the following:
1. Visible part colors of wiring devices shall be as directed by the Architect for all areas. Provide brown devices for all Utility, Electrical and Mechanical rooms.
  2. Exclude compact or "despard" type devices.
- C. Wiring device switches shall be toggle type, A.C. quiet design, specification grade, 20 amps on 120 volt circuits. Switches shall be mounted 48" to center line above finished floor unless noted otherwise.
1. Single pole switch shall be equal to Hubbell No. 1221.
  2. Double pole switch shall be equal to Hubbell No. 1222.
  3. Three-way switch shall be equal to Hubbell No. 1223.
  4. Four-way switch shall be equal to Hubbell No. 1224.
  5. Single pole pilot light switch shall be equal to Hubbell No. HBL 1221PL.

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6. Equivalent 277 volt 20 amp switches shall be used where required.
- D. Standard duplex convenience receptacles shall be 125 volt, 20 amps, three wire (two circuit wires plus ground), "U-bar" ground NEMA slot configuration 5-20R, specification grade. Receptacles shall be mounted 18" to center line above finished floor unless noted otherwise.
    1. Equal to Hubbell No. 5362.
    2. Where indicated on plans provide receptacles with ground fault current interrupters, UL Class A; 20A, 125V to be equal to Hubbell No. GF5362. All GFI receptacles shall be self-testing type in compliance with UL 943.
  - E. Non-standard convenience receptacles and special purpose power supply receptacles shall be as listed on plans.
  - F. Devices and device plates for flush wall devices which are not integrally equipped with same, shall be as directed by the Architect.
  - G. For unfinished spaces, plates for surface-mounted wall devices which are not integrally equipped with same, shall be galvanized sheet steel, formed raised type which does not overlap box. Where for switches, such plates shall have toggle guards.
  - H. Where more than one wiring device is indicated in the same location, the devices shall be mounted in gang under a common wall plate.
  - I. Mount duplex convenience and power receptacles vertically with grounding posts at top of device unless otherwise indicated. Locate grounding post to left when horizontal mounting is indicated.
  - J. Wiring devices and associated hardware shall be manufactured by Leviton, Hubbell or Pass and Seymour.

## 2.6 GROUNDING REQUIREMENTS

- A. Ground all systems and equipment in accordance with best industry practice, the requirements of NFPA 70, Article 250 and the following:
  1. The ground bus of the main switchboard shall be connected to the main grounding electrode specified below by means of insulated conductors run in conduit.
    - a. Metal underground water pipes.
    - b. Metal frame of building.
    - c. Concrete encased electrode.
    - d. Rod and pipe electrodes.
    - e. Ground ring.
  2. Provide grounding bonds between all metallic conduits of the light and power system which enter and leave cable chambers or other non-metallic cable pulling and splicing boxes. Accomplish this by equipping the conduits with bushings of the grounding type individually cross connected.
  3. Bond metallic conduits containing grounding electrode conductors and main bonding conductors to the ground bus service enclosure and/or grounding electrode at both ends of each run utilizing grounding bushings and jumpers.
  4. Provide grounding bonds for all metallic conduits of the light and power system which terminate in pits below equipment for which a ground bus is specified. Accomplish this by equipping the conduits with bushings of the grounding type connected individually to the ground bus.

5. Provide supplementary ground bonding where metallic conduits terminate at metal clad equipment (or at the metal pull box of equipment) for which a ground bus is specified. Accomplish this by equipping the conduits with bushings of the grounding type connected individually by means of jumpers to the ground bus. Exclude the jumpers where directed. This exclusion will be required where an isolated ground for electronic equipment is to be maintained.
6. Each grounding type bushing shall have the maximum ground wire accommodation available in standard manufacture for the particular conduit size. Connection to bushing shall be with wire of this maximum size.
7. Bonding conductors on the load side of the service device and equipment grounding conductors shall be sized in relation to the fuses or trip size of the overcurrent device supplying the circuit.
8. The central equipment for the fire protective alarm system and telephone system shall have its grounding terminal connected to the grounding electrode by means of a No. 6 green coded insulated conductor, run in 3/4" conduit. Utilize a ground clamp of a type specifically manufactured for the purpose.

2.7 PHASING AND COLOR CODING

- A. The insulation or covering of each wire or cable shall be color coded so as to provide for circuit identification as specified below:

120/208 V Circuits	Phase Circuits
Black	A
Red	B
Blue	C
White	Neutral
Green	Equipment Ground

- B. Color coding shall be achieved by one of the following methods:
1. The insulation or covering shall be coded during manufacture by use of one of the following methods:
    - a. Colored compounds.
    - b. Colored coatings.
  2. In sizes and insulation types where factory applied colors are not available, wires and cables shall be color coded by the application of colored plastic tapes in overlapping turns at all terminal points, and in all boxes in which splices are made.
- C. The same colored cable shall be connected to the same phase throughout the project.
- D. In general, building load centers and panelboards shall be phased "A", "B", "C", left to right. The neutral, although it may be in different locations for different equipment, shall be identified.

2.8 ENCLOSURES FOR INDIVIDUALLY MOUNTED OVERCURRENT AND SWITCHING DEVICES

- A. Construction shall be NEMA Class I, where installed indoors.
- B. Construction shall be NEMA Class IIIR, where installed outdoors, in mechanical rooms, in locations defined as damp or wet by NFPA 70 or where indicated as weatherproof.
- C. Operating handles shall be front or side type to accommodate hand access space and flush or surface mounting requirements.

- D. Each shall be equipped with padlock for locking operating handle in the open position.

## 2.9 LOAD CENTERS

- A. Provide "load center" type panels for dwelling unit branch circuit wiring. Load center panels shall consist of factory completed dead front assemblies of back pans, main buses, overcurrent switching units, sheet metal cabinets and flush style trims with door. They shall be designed so that switching and overcurrent devices can be replaced without disturbing adjacent units and without removing the main bus connectors, and so that circuits may be charged without machine drilling or tapping.
- B. Bus bars for their mains shall be of aluminum having current capacities as indicated and sized for such capacities in accordance with Underwriter Laboratory standards. Unless otherwise noted, full size neutral bars shall be included. Phase bussing shall be full height without reduction and shall have this for single pole branches arranged for sequence phasing of the branch circuit devices.
- C. A ground bus with terminal space for each branch circuit shall be provided for each load center. Each ground bus shall be of the same material as the phase and neutral buses.
- D. Load centers shall be provided with surface or flush trims as indicated. Flush trims shall overlap cabinets by at least 1/2" on all sides.
- E. Cabinets and trims for load centers shall accommodate and conform to the following limiting dimensions:
1. Maximum overall width – 14-1/2".
  2. Maximum overall depth – 3-3/4".
- F. Hinged locking doors covering all switching device handles shall be included in all panel trims.
- G. Branch circuit breakers load centers shall be plug-on type.
- H. Load centers shall be manufactured by Siemens, Eaton, Square D, or General Electric.

## 2.10 CARTRIDGE FUSES

- A. Cartridge fuses shall be as follows:
1. Provide a complete set of fuses for each item of fusible type equipment. Fusible equipment furnished by other contractors will be complete with fuses.
  2. Secondary system fuses, rated at 600 volts or less, shall be UL listed and constructed in conformance with the applicable standards set forth by NEMA and ANSI. All fuses of a particular class shall be of same manufacturer.
  3. Regardless of actual fault current, they shall, at full recovery voltage, be capable of safely interrupting fault currents of 200,000 amperes RMS symmetrical or 340,000 amperes RMS asymmetrical, deliverable at the line side of the fuse.
  4. Circuits 0-600 amperes shall be protected by the equal of Bussman "Low Peak" current limiting fuses, LPN-RK (250 volts), LPS-RK (600 volts), UL class RK-1.
  5. Fuses shall be suitable for application to fuse gaps which reject other types of fusing.
  6. Supply 10% spare fuses of each size and type 60 amps and less. Supply three (3) spare fuses for each size and type over 60 amps.
- B. Cartridge fuses shall be manufactured by Bussman, Gould or EFCO.

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## 2.11 MOTOR CONTROLS

### A. Disconnect Switches:

1. Disconnect (safety) switches shall conform to industrial standards of NEMA, be UL listed and shall be heavy-duty type, quick-make, quick-break type with interlocking cover mechanism and provisions for padlocking switch handle in "OFF" position. Three (3) pole toggle switches are not acceptable as substitute for disconnect switches.
2. Disconnect switches shall be of fused or un-fused type as indicated with number of disconnecting poles indicated. The grounded conductor shall not be switched. Switches shall be for use with current limiting fuses with rejection type fuse clips and those shall be horsepower rated.
3. Enclosures shall be of proper NEMA type for the intended location and shall be phosphate coated or equivalent code gauge galvanized sheet steel with gray baked enamel finish.
4. Acceptable Manufacturers:
  - a. Eaton
  - b. Siemens
  - c. Square D
  - d. General Electric

### B. Combination Starter: Provide combination starters where indicated on the plans.

### C. Motor Control Circuitry:

1. Except as noted below, select materials exactly as specified for feeders. Utilize No. 12 A.W.G. THWN conductors throughout minimum.
2. Motor control circuit wires may be run in the same conduit as the wires of motor power circuits; however, exclude motor control wires from enclosures (other than motor starter enclosures) which contain power circuit overcurrent protection and switching devices; also from pull boxes and junction boxes containing the wires of main and sub main feeders. Utilize auxiliary pull boxes to separate motor control wires from motor power circuit wires before the power circuit wires enter the items from which motor control wires are excluded.
3. Prior to installing any motor control circuitry for a particular motor, notify the Architect of any deviations between the control circuitry requirements of the trade supplying the motor and the indicated electric work.

## 2.12 LIGHTING FIXTURES

### A. All lighting fixtures shall be in accordance with identifications on the Drawings and the following:

1. Finishes shall be as selected by the Architect or as indicated on the plans.
2. Any additional appurtenances required for installation and operation, where same are not covered by the identification used on the Drawings, shall be included.
3. Recessed fixtures shall be coordinated with ceiling construction.
4. Exact location of all fixtures shall be confirmed with Architect prior to rough-in.
5. Recessed fixtures throughout shall have their components, wiring and external connections coordinated for use in ceilings utilized as air handling plenums.



6. Fixtures for use outdoors or in areas designated as damp locations, shall be suitably gasketed and UL listed for such applications.
  7. All fixtures shall be UL approved with labels attesting thereto.
  8. The Contractor shall obtain all information relative to the exact type of hung ceilings and suspension systems to be installed before ordering any recessed fixtures. This Contractor shall furnish the proper type fixtures applicable to the ceiling framing system. If, other than the type of fixtures specified are required for installation, due to the type of ceiling construction, this Contractor shall furnish and install the proper type fixtures and mounting appurtenances required at no extra charge.
  9. The Contractor shall coordinate the exact locations of all lighting fixtures with the ceiling pattern during the construction period and before installation of the fixtures. Interferences between lighting fixtures, and other equipment, shall be brought to the attention of the General Contractor.
  10. Include the aiming and/or adjustments of all lighting fixtures requiring same in accordance with instructions issued by the Architect in the field.
  11. All lamp sockets in lighting fixtures shall be suitable for the indicated lamps and shall be set so that the lamps are positioned in optically correct relation to all lighting fixture components.
  12. Lighting fixtures shall be supported from building structure only, not from hung or suspended ceiling, by means of chains, threaded rods or #14 gauge tie wire.
  13. All fixtures shall include seismic clips and shall be supported to comply with seismic regulations.
  14. Lamps shall be manufactured by Eaton, Phillips. OSRAM, or Sylvania.
- B. Florescent and HID Fixtures:
1. All ballasts or transformers for discharge type lamps shall be for 60 cycles operation.
  2. All ballasts or transformers for discharge or fluorescent type lamps shall be high power factor type.
  3. Ballasts for T5 and T8 fluorescent lamps shall be electronic high frequency electronic type (20 KHZ or greater) type "P", class "A" sound-rated, instant start and parallel wired such that if one lamp burns out the remaining lamps stay lit. Electronic ballasts shall comply with UL 935, ANSI C82.1, CBM certified and meet FCC standards for EMI/RFI (FCC 47 CFR Part 18 non-consumer) with a total harmonic distribution of less than 10%. Ballasts shall carry a manufacturer's warranty of five (5) years and be manufactured by Osram Sylvania, Magnetek, Advance, or approved equal.
  4. Remote ballasts shall be standard core and coil type "P", sound rating "A".
  5. All ballasts or transformers for discharge type lamps intended for use outdoors shall be of the low temperature type having the lowest temperature rating available in standard manufacture.
  6. Ballasts and transformers shall be of the "low energy full light output" type where available. Each shall not exceed industry minimum rated input wattage by more than 8%.
  7. All lamps shall be included. Except where specifically noted otherwise all fluorescent lamps shall be as follows:
    - a. Fluorescent lamps of the proper wattage and voltage rating shall be provided in each fixture as indicated on the fixture schedule. All fluorescent lamps shall be manufactured to appropriate Specifications given in ANSI C78. Unless noted otherwise, fluorescent lamps shall be T8 3500K and have a minimum CRI of 82.

- b. Unless otherwise noted, all compact fluorescent lamps shall be 3500K and have a minimum CRI of 82. The Contractor shall verify that the proper lamp type for the specified ballast type is furnished with the compact fluorescent fixture.
  - 1) Compact fluorescent ballasts shall be UL listed, Class P, Type 1 and CBM Certified.
  - 2) Where 4-pin electronic ballast compatible compact fluorescent lamps are specified, electronic ballasts shall include circuitry capable of sensing when lamp is approaching end of life and shut show the lamp circuit. This end of life sensing must be impervious to low/high line voltage conditions and result in no false tripping or overheating of lamp bases.

C. LED Lamps and Luminaires:

1. Solid State Lighting/Light Emitting Diode (LED) Lamps and Luminaries:
  - a. Luminaire manufacturer shall have a minimum of five (5) years' experience in the manufacture and design of LED products and systems and no less than one hundred (100) North American installations.
  - b. Unless otherwise specified, all LED luminaires and power/data supplies shall be provided by a single manufacturer to ensure compatibility.
  - c. All components, peripheral devices and control software are to be provided by and shall be the responsibility of a single entity. All components shall perform successfully as a complete system.
  - d. Include all components necessary for a complete installation. Provide all power supplies, synchronizers, data cables, and data terminators for a complete working system.
  - e. All LED sources used in the LED luminaire shall be of proven quality from established and reputable LED manufacturers and shall have been fabricated after 2007.
2. Replacement and Spares:
  - a. Manufacturer will keep record of original bin for each LED module and have replacement modules from the same bin available for three (3) years after date of installation.
  - b. Manufacturer will keep an inventory of replacement parts (source assembly, power and control components).
  - c. Manufacturer's LED system will not become obsolete for ten (10) years.
  - d. Manufacturer will provide exact replacement parts, or provide upgraded parts that are designed to fit into the original luminaire and provide equivalent distribution and lumen output to the original, without any negative consequences.
  - e. Manufacturer has in place a written recycling and re-use program, and will accept returned product and/or components for recycling or re-use.
  - f. Manufacturer will properly dispose of non-recyclable components that are deemed harmful to the environment.
  - g. System shall carry a full warranty for five (5) years. Manufacturer shall be responsible for cost of labor not to exceed \$50 per individual part, and cost of shipping, to replace any component of the system that fails within two (2) years of installation.
3. Products and Components – Performance:
  - a. LED luminaires and components shall be UL listed or UL classified.
  - b. LED luminaires and components shall be CE certified.
  - c. LED luminaires and components shall be PSE marked.
  - d. All LED luminaires shall be subjected to the following JEDEC Reliability Tests for Lead-free Semiconductors: HTOL, RTOL, LTOL, PTMCL, TMSK, Mechanical Shock, Variable Vibration Frequency, SHR, Autoclave.
  - e. To ensure luminaire quality, luminaire shall have been tested under accelerated life test conditions including an operating temperature span of 360 degrees F, and cyclic loading up to 60G.
  - f. All products included in system shall use Mil-Std 810F, Random Vibration 7.698g as a minimum standard. In installations subject to vibration, luminaire shall be installed with vibration isolation hardware to sufficiently dampen vibrations.
  - g. All LED components shall be mercury and lead-free.

- h. All manufacturing processes and materials shall conform to the requirements of the European Union's Restriction on the Use of Hazardous Substances in Electrical and Electronics Equipment (RoHS) Directive, 2002/95/EC.
- i. LEDs shall comply with ANSI/NEMA/ANSLG C78.377-2008 – Specifications for the Chromaticity of Solid State Lighting Products. Color shall remain stable throughout the life of the lamp. Color shall match approved sample.
- j. LEDs shall comply with IESNA LM-80 – Standards for Lumen Maintenance of LED Lighting Products.
- k. White LEDs shall have a rated source life of 50,000 hours under normal operation conditions. RGB LEDs shall have a rated source life of 100,000 hours. LED "rated source life" is defined as the time when a minimum of 70% of initial lumen output remains.
- l. Luminaire assembly shall include a method of dissipating heating so as to not degrade life of source, electronic equipment, or lenses. LED luminaire housing shall be designed to transfer heat from the LED board to the outside environment. Luminaire housing shall have no negative impact on life of components.
- m. Manufacturer shall supply in writing a range of permissible operating temperatures in which system will perform optimally.
- n. High power LED luminaires shall be thermally protected using one or more of the following thermal management techniques: metal core board, gap pad, and/or internal monitoring firmware.
- o. LEDs shall be adequately protected from moisture or dust in interior applications.
- p. For wet and damp use, LED-based luminaires itself shall be sealed, rated, and tested for appropriate environmental conditions, not accomplished by using an additional housing or enclosure. Such protection shall have no negative impact on rated life of source or components, or if so, such reductions shall be explicitly brought to the attention of the Designer.
- q. All hardwired connections to LED luminaires shall be reverse polarity protected and provide high voltage protection in the event connections are reversed or shorted during the installation process.
- r. The LED luminaire shall be operated at constant and carefully regulated current levels. LEDs shall not be overdriven beyond their specified nominal voltage and current.
- s. RGB LED luminaries shall utilize an equal combination of high brightness red, blue and green LEDs, unless otherwise noted, to provide up to 16.78 million additive RGB colors and shall be capable of at least 8-bit control.
- t. Manufacturer shall be able to provide supporting documentation of the product meeting third party regulatory compliance.
- u. Manufacturer shall ensure that products undergo and successfully meet appropriate design and manufacturability testing including Design FMEA, Process FMEA, Environmental Engineering Considerations and Laboratory Tests, IEC standards and UL/CE testing.
- v. All LED luminaires (100% of each lot) shall undergo a minimum twenty-four (24) hour burn-in during manufacturing, prior to shipping.
- w. Manufacturer shall provide Luminaire Efficacy (lm/W), total luminous flux (lumens), luminous intensity (candelas) chromaticity coordinates, CCT and CRI optical performance, polar diagrams, and relevant luminance and illuminance photometric data. Provide data in IES file format in accordance with IES LM-79-2008, based on test results from an independent Nationally Recognized Testing Laboratory.
- x. Power/Data supply shall have the following:
  - 1) Supply outputs shall have current limiting protection.
  - 2) Supply shall provide miswiring protection.
  - 3) Supply shall have power factor correction.
  - 4) Supply shall provide connections that are conduit-ready or clamp-style connections in the case of low-voltage wiring.
  - 5) Supply shall come with a housing that meets a minimum IP20 rating for dry location installation unless located in a damp or wet location.
  - 6) Supply shall be UL listed for Class 1 or Class 2 wiring.

## 2.13 FIRE ALARM EXISTING EQUIPMENT

- A. The existing facility is equipped with a fire alarm system which is to be expanded in the work area. All new equipment shall be of the same manufacturer as of the existing system, including pull stations, smoke detectors, duct smoke detectors, and audible/visual signals, etc. All new horn/strobes shall be synchronized with existing appliances.
- B. It shall be the responsibility of the electrical contractor to review the scope of work and proposed equipment with the superintendent of fire alarms for the city prior to purchase and installation. The E.C. shall also notify the local fire department and the owner at least 48 hours in advance of any modifications, possible disruption to, or associated work on the existing fire alarm system.
- C. The existing fire alarm system shall be reprogrammed as required to indicate the renovated areas, review zoning with the owner's representative and local Fire Marshall. The E.C. shall be responsible for all costs associated with this work.
- D. The Electrical Contractor shall be responsible for all power supplies required due to the new devices/appliances provided under this contract.
- E. The E.C. shall furnish battery calculations which incorporate all existing equipment in addition to all new appliances/devices.
- F. Provide all fire alarm wiring in accordance with manufacturer's recommendations.
- G. All fire alarm wiring shall be installed in conduit. All conduit shall have a red stripe painted every 10'-0". All junction boxes and covers shall be painted red. Fire alarm rated "mc" cable may be used where run concealed if acceptable to the local fire department.

## PART 3 EXECUTION

### 3.1 COMMISSIONING OF EQUIPMENT AND SYSTEMS

- A. Coordinate with the North Kingston School Department Commissioning Agent (CxA) for the commissioning of the work of this specification section. The Contractor(s) providing the work of this specification section shall be available before construction, during construction, and at the end of construction to assist the CxA in the commissioning process. Assistance shall include demonstrating proper operation, calibration, and adjustment of the work of this specification section, as necessary for the CxA to verify that the equipment and systems are working properly and in accordance to the construction documents.
- B. Where the commissioning process reveals, as determined by the CxA, equipment and/or systems that are not operating properly or are not in accordance to the Construction Documents, such equipment and systems shall be repaired and/or adjusted until they are operating properly and are in accordance to the Construction Documents.
- C. Prior to final commissioning, submit documentation indicating that the Contractor(s) providing work of this section have verified the following:
  - 1. That equipment and systems of this specification section have been started up and tested in accordance to the manufacturer's installation manuals. Where either the manufacturer's installation manuals or the equipment submittals include manufacturer's start-up sheets, such documentation shall be completed, signed, and dated by the Contractor(s) performing the start-up.
  - 2. That equipment and systems of this specification section have been tested and balanced by the

testing and balancing agency.

### 3.2 BASIC REQUIREMENTS

#### A. Adhere to best industry practice and the following:

1. All work shall be concealed.
2. Route circuitry runs embedded in concrete to coordinate with structural requirements.
3. Equip each raceway intended for the future installation of wire or cable with a nylon pulling cord 3/16" in diameter and clearly identify both ends of the raceway.
4. Provide all outlet boxes, junction boxes, and pull boxes for proper wire pulling and device installation. Include those omitted from the Drawings due to symbolic methods of notation.
5. Utilize lugs of the limited type to make connections at both ends of cables installed on the line side of main service overcurrent and switching devices. Provide cable limiters for each end of each service entrance cable.
6. Beyond the termination of raceways, fireproof the following:
  - a. All wires and cables within pad-mounted transformer enclosure.
  - b. All service feeder cables ahead of main service overcurrent protection devices, and elsewhere where not in raceways.
  - c. Fireproofing of wires and cables shall be by means of a half-lapped layer of arc proof or by means of sleeving of a type specifically manufactured for the purpose. Ends of tape or sleeving shall be severed with twine. Fireproofing shall be extended up into raceways. After conductors have been finally shaped into their permanent configuration, fireproofing tape or sleeving shall be coated with silicate of soda (water glass). Fireproofing shall be applied in an overall manner to raceway groupings of conductors.
7. Provide all sleeves through fireproof and waterproof slabs, walls, etc., required for electric work.
  - a. Provide waterproof sealing for the sleeves through waterproof slabs, walls, etc.
  - b. Provide fireproof sealing for the sleeves through fireproof walls, slabs, etc.
  - c. Provide fireproof sealing for the openings in fireproof walls, slabs, etc., resulting from removal of existing electrical sleeves, conduits, poke-thru's etc.
8. No splicing of wires will be permitted in Fire Alarm System.
9. Bundle wiring passing through pull boxes and panelboards in a neat and orderly manner.
10. Turn branch circuits and auxiliary system wiring out of wiring gutters at 90 degrees to circuit breakers and terminal lugs.
11. In electric rooms with equipment rated 800 amps or more and over 6 feet wide that contains overcurrent devices, the Electrical Contractor shall provide a powered Exit sign at 18" AFF at each door.
12. All building mounted photovoltaic equipment shall be installed, tested and maintained in accordance with NFPA 1 Section 11.12.
13. All panelboards shall be labeled in accordance with NFPA 70 Article 408.

### 3.3 TESTING REQUIREMENTS & INSTRUCTIONS

- A. The Electrical Subcontractor shall provide supervision, labor, materials, tools, test instruments and all other equipment or services and expenses required to test, adjust, set, calibrate, and operationally check work and components of the electrical systems and circuitry throughout Division 26 work.
- B. The Electrical Subcontractor shall pay for all tests specified in Division 26, including expenses incident to retests occasioned by defects and failures of equipment to meet Specifications, at no additional cost to the Owner. Any defects or deficiencies discovered in any of the Electrical work shall be corrected.
1. The Electrical Subcontractor shall:
    - a. Replace wiring and equipment found defective (defined as failing to meet specified requirements) at no additional cost to the Owner.
    - b. Submit three (3) copies of test results to the Engineer.
  2. Do not void equipment warranties or guarantees by testing and checkout work. Checks and tests shall be supplemental to and compatible with the Manufacturer's installation instructions. Where deviations are apparent, obtain the Manufacturer's approved review of procedures prior to testing. Where any repairs, modifications, adjustments, tests or checks are to be made, the Contractor shall contact the Engineer to determine if the work should be performed by or with the Manufacturer's Representative.
  3. Tests are to:
    - a. Provide initial equipment/system acceptance.
    - b. Provide recorded data for future routine maintenance and trouble-shooting.
    - c. Provide assurance that each system component is installed satisfactorily and can be expected to perform, and continue to perform its specified function with reasonable reliability throughout the life of the facility.
      - 1) At any stage of construction and when observed, any electrical equipment or system determined to be damaged, or faulty, is to be reported to the Engineer. Corrective action by the Contractor requires prior Engineer approval, retesting, and inspection.
      - 2) Prior to testing and start-up, equipment and wiring shall be properly and permanently identified with nameplates, and other identification as specified in Section 3.7. Check and tighten terminals and connection points, remove shipping blocks and thoroughly clean equipment, repair damaged or scratched finishes, inspect for broken and missing parts and review and collect Manufacturer's Drawings and instructions for delivery to the Engineer. Make routine checks and tests as the job progresses to ensure that wiring and equipment is properly installed.
      - 3) Testing and checkout work is to be performed with fully qualified personnel skilled in the particular tests being conducted. Personnel are to have at least five (5) years of experience with tests of same type and size as specified.
      - 4) Inspections and tests shall be in accordance with the following applicable codes and standards as amended to date, unless otherwise specified.
        - a) National Electrical Manufacturer's Association – NEMA.
        - b) American Society for Testing and Materials \_ ASTM.
        - c) Institute of Electrical and Electronic Engineers – IEEE.
        - d) National Electrical Testing Association – NETA.
        - e) American National Standards Institute – ANSI.
        - f) C2: National Electrical Safety Code.
        - g) Z244-1: American National Standard for Personnel Protection.
        - h) Insulated Cable Engineers Association – ICEA.
        - i) Association of Edison Illuminating Companies – AEIC.
        - j) Occupational Safety and Health Administration – OSHA.
        - k) OSHA Part 1910; Subpart S, 1910.308.
        - l) OSHA Part 1926; Subpart V, 1926.950 through 1926.960.
        - m) National Fire Protection Association – NFPA.
        - n) 70B: Electrical Equipment Maintenance.

- o) 70E: Electrical Safety Requirements for Employer Workplaces.
  - p) 70: National Electrical Code.
  - q) 78: Lightning Protection Code.
  - r) 101: Life Safety Code.
  - s) Inspections and tests shall utilize the following references:
  - t) Contract Drawings and Specifications.
  - u) Contractor's Short Circuit and Construction Study, in accordance with Section 16100.
  - v) Manufacturer's printed test procedures for respective equipment.
4. Test Equipment:
- a. Test equipment used by the Contractor is to be inspected and calibrated.
  - b. Perform calibration and setting checks with calibrated test instruments of at least twice that of the accuracy of the equipment, device, relay or meter under test. Dated calibration labels shall be visible on test equipment. Calibrations over six (6) months old are not acceptable on field test instruments. Inspect test instruments for proper operation prior to proceeding with the tests. Record serial and model numbers of the instruments used on the test forms.
5. Test Procedures:
- a. The Electrical Subcontractor is responsible for the preparation of the procedures and schedules for the work specified herein. This work is to be coordinated and compatible with both the work and schedule of the other crafts. Sequence the tests and checks so that the equipment can be energized immediately after the completion of the application tests.
  - b. Submit proposed testing and checkout forms. The procedures shall provide specific instructions for the checking and testing of each electrical component of each system. Schedule tests and inspections as the job progresses. Test procedures submitted shall include job safety rules.
  - c. After each electrical system installation is complete, perform the tests to determine that the entire system is in proper working order and in accordance with applicable codes, Manufacturer's instructions, Drawings, and Specifications. Tests are in addition to shop tests of individual items at the Manufacturer's plant. Perform insulation and ground resistance tests before operating tests.
  - d. Perform insulation tests on electrical equipment, apparatus, cables, motors, generators, transformers, circuit breakers and switches, switchgear, motor control centers, and similar electrical equipment, at the following items and conditions:
  - e. Prior to energization and/or placing into service.
  - f. When damage to the insulation is suspected or known to exist.
  - g. After repairs or modifications to the equipment affecting the insulation.
  - h. Where lightning or other surge conditions are known to have existed on the circuit.
  - i. Make openings in circuits for test instruments and place and connect instruments, equipment, and devices, required for the tests. Upon completion of tests, remove instruments and instrument connections and restore circuits to permanent condition.
  - j. List each circuit and measured resistance as test data. Maintain record of insulation resistance values. Identify conductor, or equipment, date that value was taken and resistance value. Arrange information in tabular form and submit to Engineer.
  - k. Report inspections, tests, and calibrations in writing on Engineer approved reports/forms. The recorded data form shall have the signatures of the persons conducting the tests, authorized witnesses and the Engineer. The forms shall serve as the test and inspection checklist.
  - l. When the electrical tests and inspections specified or required within Division 16 are completed and results reported, reviewed, and approved by the Engineer, the Contractor may consider that portion of the electrical equipment system or installation electrically complete. The Contractor will then affix appropriate, approved, and dated completion or calibration labels to the tested equipment and notify the Engineer of electrical completion. If the Engineer finds completed work unacceptable, he will notify the Contractor in writing of the unfinished or deficient work, with the reason for his rejection, to be corrected by the Contractor. The Contractor will notify the Engineer in writing when exceptions have been corrected. The Contractor will notify the Engineer in writing when exceptions have been corrected. The Contractor will prepare a "Notification of Substantial Electrical Completion" for approval by the

Engineer following Engineer's acceptance of electrical completion. If later in-service operation or further testing identified problems attributable to the Contractor, these will be corrected by the Contractor, at no additional cost to the Authority.

- C. Specific Tests: Perform the following specified tests. De-energize and isolate equipment and cable prior to performing the tests.
- D. Motors:
1. Before energizing any machine, visually inspect for serviceability. Check Manufacturer's instruction manual for correct lubrication and ventilation. Align motor with driven equipment. Check nameplate for electrical power requirements.
  2. Test run motors uncoupled or unloaded, before placing into operation. Check the motor for rotation, speed, current and temperature rise under normal load and record the results. Maintain the proper color codes for phase identifications. This may require swaps at the motor for proper rotation. Use motor phase rotation meter prior to lead connection at motor in order to minimize later swaps.
- E. Grounding Systems:
1. Test main building loops and major equipment grounds to remote earth, directly referenced to an extremely low resistance (approximately 1 ohm) reference ground benchmark. Perform a visual inspection of the systems, raceway and equipment grounds to determine the adequacy and integrity of the grounding. Ground testing results shall be recorded, witnessed, and submitted to the Engineer.
  2. Perform ground tests using a low resistance, null-balance type ground testing ohmmeter, with test lead resistance compensated for. Use the type of test instrument which compensates for potential and current rod resistances.
  3. Test each ground rod and measure ground resistance. If resistance is not 25 ohms or less, drive additional rods to obtain a resistance of 25 ohms or less. Submit tabulation of results to Engineer. Include identification of electrode, date of reading and ground resistance value in the test reports.
  4. Test each building and major equipment grounding system for continuity of connections and for resistance. Ground resistance of conduits, equipment cases, and supporting frames, shall not exceed 5 ohms to ground. Submit all readings to the Engineer.
  5. Where ground test results identify the need for additional grounding conductors or rods that are not indicated or specified, design changes will be initiated to obtain the acceptable values. The Contractor is responsible for the proper installation of the grounding indicated and specified.
  6. Wire and Cable: (All conductors originating from main switchboard and distribution panels).
    - a. Before energizing any cable or wire, megger the insulation resistance of every external circuit wire to each other and to ground. Tests shall be conducted at voltages of 500 volts or lower. Continuity test each wire and cable to verify the field-applied tag per conductor. Continuity test each wire and cable to verify the field-applied tag per conductor. Minimum insulation resistance values shall not be less than two (2) megohms.
    - b. Take insulation resistance measurements for motor feeders. With motors disconnected, measure insulation resistance from load side of contactors or circuit breakers.
    - c. Check cables and wires for the proper identification numbering and/or color coding.
    - d. Inspect cables for physical damage and proper connection in accordance with single line diagram.
- F. Power Distribution System:



1. Panelboards:
  - a. Inspect for physical damage and proper grounding.
  - b. Compare nameplate information with schedules and report any discrepancies.
  - c. Inspect all panelboards for cleanliness, workmanship, etc.
2. Low Voltage Systems: Include, but not limited to the following: Master time clock system, communication/telephone - sound systems, cable/media - TV system, "Area of Rescue" system.
  - a. Visually inspect all components for physical damage, dents, scratches and missing hardware.
  - b. Check all wiring for proper identification numbering and/or color coding.
  - c. Thoroughly clean all components.
  - d. Inspect all wiring for tightness of connections.
  - e. Operate and perform each of the system components and functions to verify system operation per plans and specs.
3. The following systems shall adhere to the general requirements of this section in addition to complying with the specific test requirements outlined in the respective sections listed:
  - a. Fire Alarm System.
4. Operating Instructions: Furnish operating instructions to Owner's designated representative with respect to operations, functions and maintenance procedures for equipment and systems installed. Cost of such instruction up to a full five (5) days of Electrical Subcontractor's time shall be included in contract. Cost of providing a Manufacturer's Representative at site for instructional purposes shall also be included.

### 3.4 BRANCH CIRCUITRY

- A. For all lighting and appliance branch circuitry, raceway sizes shall conform to industry standard maximum permissible occupancy requirements except where these are exceeded by other requirements specified elsewhere.
- B. Circuits shall be balanced on phases at their supply as evenly as possible.
- C. Feeder connections shall be in the phase rotation which establishes proper operation for all equipment supplied.
- D. Reduced size conductors indicated for any feeders shall be taken as their grounding conductors.
- E. Feeders consisting of multiple cables and raceways shall be arranged such that each raceway of the feeder contains one (1) cable for each leg and one (1) neutral cable, if any.
- F. For circuitry indicated as being protected at 20 Amps or less, abide by the following:
  1. All 20 amp, 120/208 volt, 3-phase, 4-wire combined branch circuit homeruns shall be provided with a #8 AWG neutral conductor.
  2. Minimum conductor size shall be No. 12 AWG copper.
  3. Conductors operating at 120 volts extending in excess of 100 ft. or at 277 volts extending in excess of 200 ft., or the last outlet or fixture tap shall be No. 10 AWG copper throughout.
  4. Lighting fixtures and receptacles shall not be connected to the same circuit.
  5. Circuits shall be balanced on phases at their supply point as evenly as possible.
- G. Type MC Cable Installation:

1. Where cable is permitted under the products section, the installation of same shall be done in accordance with code and the following:
  - a. Cable shall be supported in accordance with code. Tie wire is not an acceptable means of support. Cable supports such as Caddy WMX-6, MX-3, and clamps such as Caddy 449 shall be used. Where cables are supported by the structure and only need securing in place, then ty-raps will be acceptable. Ty-raps are not acceptable as a means of support. All fittings, hangers, and clamps for support and termination of cables shall be of type specifically designed for use with cable, i.e., romex connectors not acceptable.
  - b. Armor of cable shall be removed with rotary cutter device equal to roto-split by Seatek Co.; not with a hacksaw.
  - c. Use split "Insuliner" sleeves at terminations.

### 3.5 REQUIREMENTS GOVERNING ELECTRICAL WORK IN DAMP OR WET LOCATIONS

- A. Outlets and outlet size boxes shall be of galvanized cast ferrous metal only.
- B. The finish of threaded steel conduit shall be galvanized only.
- C. Wires for pulling into raceways for lighting and appliance branch circuitry shall be limited to "THWN".
- D. Wires for pulling into raceways for feeders shall be limited to "THWN".
- E. Plates for toggle switches and receptacles shall have gasketed snap shut covers suitable for wet locations while in use.
- F. Final connections of flexible conduit shall be neoprene sheathed.
- G. Apply one (1) layer of half looped plastic electric insulating tape over wire nuts used for joining the conductors of wires.
- H. Enclosures, junction boxes, pull boxes, cabinets, cabinet trims, wiring troughs and the like, shall be fabricated of galvanized sheet metal, shall conform to the following:
  1. They shall be constructed with continuously welded joints and seams.
  2. Their edges and weld spots shall be factory treated with cold galvanizing compound.
  3. Their connection to circuitry shall be by means of watertight hub connectors with sealing rings.
- I. Enclosures for individually mounted switching and overcurrent devices shall be NEMA Class IV weatherproof construction.
- J. The covers, doors and plates and trims used in conjunction with all enclosures, pull boxes, outlet boxes, junction boxes, cabinets and the like shall be equipped with gaskets.
- K. Panels shall be equipped with doors without exception.
- L. The following shall be interpreted as damp or wet locations within building confines:
  1. Spaces where any designations indicating weatherproof (WP) or vapor proof appear on the Drawings.
  2. Below waterproofing in slabs applied directly on grade.
  3. Spaces defined as wet or damp locations by Article 100 of the National Electric Code.

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### 3.6 IDENTIFICATION AND TAGGING

- A. Identify individually:
1. Each transformer.
  2. Each panelboard.
  3. Each switch and circuit breaker.
  4. Each feeder, wire or cable or all systems.
  5. Each end of nylon pullwire in empty conduit.
- B. Each wire or cable in a feeder shall be identified at its terminal points of connection and in each pullbox, junction box and panel gutter through which it passes.
- C. The nomenclature used to identify panelboards or load center shall designate the numbers assigned to them.
- D. The nomenclature used to identify switches or circuit breakers shall:
1. Where they disconnect mains or services designate this fact.
  2. Where they control feeders, designate the feeder number and the name of the load supplied.
  3. Where they control lighting and appliance branch circuitry, designate the name of the space and the load supplied.
- E. The nomenclature used to identify feeder wires and cables shall designate the feeder number.
- F. Identification for panelboards or load centers shall be by means of engraved Lamacoid nameplates showing 1/4" high white lettering on a black background fastened to the outside face of the front.
- G. Identification for switches or circuit breakers shall be by means of the following:
1. Where individually enclosed – engraved Lamacoid nameplates showing 1/8" high white lettering on a black background fastened on the outside front face of the enclosure.
  2. Where in panelboards or load centers without doors – same as for individually enclosed.
  3. Where in panelboards or load centers with doors – typewritten directories mounted behind transparent plastic covers, in metal frames fastened on the inside face of the doors.
- H. Identification for wires and cables shall be by means of wrap around "brady" type labels.
- I. Device plates for local toggle switches, toggle switch type motor starters, pilot lights and the like, whose function is not readily apparent shall be engraved with 1/8" high letters suitably describing the equipment controlled or indicated.
- J. Phase identification letters shall be stamped into the metal of the bus bars of each phase of the main busses of each switchboard and each panelboard. The letters shall be visible from at least one (1) "normal posture" location without having to demount any current carrying or supporting elements.
- K. Identify each outlet box, junction box, and cabinet used in conjunction with empty raceway for wires of a future system by means of indelible markings on the inside denoting the system.
- L. Prior to installing identifying tags and nameplates, submit their nomenclature for approval. Conform to all revisions issued by the Architect.

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### 3.7 SUPPORTS AND FASTENINGS

- A. Support work in accordance with best industry standards, Local Electric Code and the following:
1. Include supporting frames or racks for equipment, intended for vertical surface mounting, which is required in a freestanding position.
  2. Supporting frames or racks shall be of standard angle, standard channel or specialty support system steel members. They shall be rigidly bolted or welded together and adequately braces to form a substantial structure. Racks shall be of ample size to assure a workmanlike arrangement of all equipment mounted on them.
  3. No work intended for exposed installation shall be mounted directly on any building surface. In such locations, flat bar members or spacers shall be used to create a minimum of 1/4" air space between the building surfaces and the work. Provide 3/4" thick exterior grade plywood painted with two (2) coats of fire-retardant gray paint for mounting of panelboards.
  4. Nothing (including outlet, pull and junction boxes and fittings) shall depend on electric conduits, raceways or cables for support.
  5. Nothing shall rest on, or depend for support on, suspended ceiling media.
  6. Support less than 2" trade size, vertically run, conduits at intervals no greater than 8'. Support such conduits, 2-1/2" trade size or larger, at intervals no greater than they story height, or 15', whichever is smaller.
  7. Where they are not embedded in concrete, support less than 1" trade size, horizontally run, conduits at intervals no greater than 7'. Support such conduits, 1" trade size or larger, at intervals no greater than 10'.
  8. Support all lighting fixtures directly from structural slab, intermediate decking or framing member as directed by the Architect. No light fixtures shall be supported directly from the roof deck.
  9. Where fixtures and ceilings are such as to require fixture support from ceiling openings frames, include in the electric work the members necessary to tie back the ceiling opening frames to ceiling suspension members or slabs so as to provide actual support for the fixtures noted above.
  10. Support all runs of conduit and/or circuitry directly from structural slabs, intermediate decking or framing members.
  11. Fasten electric work to building structure in accordance with the best industry practice.
  12. Floor mounted equipment shall not be held in place solely by its own dead weight. Include floor anchor fastenings in all cases.
  13. For items which are shown as being ceiling mounted at locations where fastenings to the building construction element above is not possible, provide suitably auxiliary channel or angle iron bridging tying to building structural elements.
  14. As a minimum procedure, where weight applied to the attachment points is 100 lbs. or less, fasten to concrete and solid masonry with bolts and expansion shields.
  15. As a minimum procedure, where weight applied to building attachment points exceed 100 lbs., but is 300 lbs. or less, conform to the following:
    - a. At field poured concrete slabs, utilize inserts with 20' minimum length slip-through steel rods, set transverse to reinforcing steel.

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### 3.8 SPLICING AND TERMINATING WIRES AND CABLES

- A. Maintain all splices and joints in removable cover boxes or cabinets where they may be easily inspected.
- B. Locate each completed conductor splice or joint in the outlet box, junction box, or pull box containing it, so that it is accessible from the removal cover side of the box.
- C. Join solid conductors No. 8 AWG and smaller by securely twisting them together and soldering, or by using insulated coiled steel spring "wire nut" type connectors. Exclude "wire nuts" employing non-expandable springs. Terminate conductors No. 8 AWG and smaller by means of a neat and fast holding application of the conductors directly to the binding screws or terminals of the equipment or devices to be connected.
- D. Join, tap and terminate standard conductors No. 6 AWG and larger by means of solder sleeves, taps, and lugs with applied solder or by means of bolted saddle type or pressure indent type connectors, taps and lugs. Exclude connectors and lugs of the types which apply set screws directly to conductors. Where equipment or devices are equipped with set screw type terminals which are impossible to change, replace the factory supplied set screws with a type having a ball bearing tip. Apply pressure indent type connectors, taps and lugs utilizing tools manufactured specifically for the purpose and having features preventing their release until the full pressure has been exerted on the lug or connector.
- E. Except where wire nuts are used, build up insulation over conductor joints to a value, equal both in thickness and dielectric strength, to that of the factory applied conductor insulation. Insulation of conductor taps and joints shall be by means of half-lapped layers of rubber tape, with an outer layer of friction tape; by means of half-lapped layers of approved plastic electric insulating tape; or by a means of split insulating casings manufactured specifically to insulate the particular connector and conductor, and fastened with stainless steel or non-metallic snaps or clips.
- F. Exclude splicing procedures for neutral conductors in lighting and appliance branch circuitry which utilize device terminals as the splicing points.
- G. Exclude joints or terminations utilizing solder in any conductors used for grounding or bonding purposes.
- H. Exclude all but solder or pressure indent type joints in conductors used for signaling or communication purposes.
- I. Lugs for conductors used to make phase leg connections on the line side of the main service overcurrent and switching device shall be of the limiter type.

### 3.9 REQUIREMENTS FOR THE INSTALLATION OF JUNCTION BOXES, OUTLET BOXES AND PULL BOXES

- A. Flush wall-mounted outlet boxes shall not be set back to back but shall be offset at least 12" horizontally regardless of any indication on the Drawings.
- B. Locate all boxes so that their removable covers are accessible without necessitating the removal of parts of permanent building structure, including piping, ductwork, and other permanent mechanical elements.
- C. In conjunction with concealed circuitry, abide by one of the following instructions (as may be applicable to the conditions) in order to assure the aforementioned accessibility. (Not required for circuitry concealed by removable suspended ceiling tiles.)

1. For a small (outlet size) box on circuitry concealed in a partition or wall, locate box or fitting so that its removable cover side, (or the face of any applied raised cover) penetrates through to within 1/8" of the exposed surface of the building materials concealing the circuitry and apply a blank or device plate to suit the functional requirements.
  2. For a large box on circuitry concealed in a partition, suspended ceiling, or wall, locate box totally hidden but with its removable cover directly behind an architectural access door or panel (included for the purpose, separate from the electric work) in the building construction which conceals the circuitry.
  3. For a small (outlet size) box on circuitry concealed above and intended as an outlet for a surface mounted lighting fixture or other such electrical item, locate box so that its removable cover side penetrates through to the exposed surface of the building materials concealing the circuitry. Arrange the mounting of the lighting fixture or other item so that it completely covers the opening in the building construction caused by the box.
  4. For a small (outlet size) box on circuitry concealed in a suspended ceiling, and intended as an outlet for a non-demountable type of recessed lighting fixtures or other such electrical items, locate box totally hidden but with its removable cover not more than 1' away from the building construction opening occupied by the demountable items.
- D. Apply junction and pull boxes in accordance with the following:
1. Include all pull boxes in long straight runs of raceway to assure that cables are not damaged when they are pulled in.
  2. Include junction and pull boxes to assure a neat and workmanlike installation of raceways.
  3. Include junction and pull boxes to fulfill requirements pertaining to the limitations to the number of bends permitted in raceway between cable access points, the accessibility of cable joints and splices, and the application of cable supports.
  4. Include all required junction and pull boxes regardless of indications on the Drawings (which, due to symbolic methods of notation, may omit to show some of them).
- E. Apply outlet boxes in accordance with the following:
1. Unless noted below or otherwise specifically indicated, include a separate outlet box for each individual wiring device, lighting fixture and signal or communication system outlet component. Outlet boxes supplied attached to lighting fixtures shall not be used as replacements for the boxes specified herein.
  2. A continuous row of fixtures of the end-to-end channel type, designed for "through wiring", and wired in accordance with the specification hereinafter pertaining to circuitry through a series of lighting fixtures, may be supplied through a single outlet box.
  3. A series of separate fixtures, designed for "through wiring", spaced not more than 4' apart, and inter-connected with conduit or raceway and circuitry which is in accordance with the Specifications hereinafter pertaining to circuitry through a series of lighting fixtures, may be supplied through a single outlet box.
  4. Connection to recessed ceiling fixtures supplied with pigtailed may be arranged so that more than one (1), but not more than four (4) such fixtures are connected into a single outlet box. When adopting this procedure:
    - a. Utilize an outlet box no smaller than 5" square by 2-1/2" deep.
    - b. Allow no fixture to be supplied from an outlet box in another room.

5. Multiple local switches indicated at a single location shall be gang-mounted in a single outlet box.
  6. Include all required outlet boxes regardless of indications on the Drawings (which due to symbolic methods of notation, may omit to show some of them).
- F. Install junction boxes, pull boxes and outlet boxes in conjunction with concealed circuitry.
1. Exclude surface-mounted outlet boxes in conjunction with concealed circuitry.
  2. Exclude unused circuitry openings in junction and pull boxes. In larger boxes each such opening shall be closed with a galvanized sheet steel plate fastened with a continuous weld all around. In small outlet type boxes, utilize plugs as specified for such boxes.
  3. Close up all unused circuitry openings in outlet boxes. Unused openings in cast boxes shall be closed with approved cast metal threaded plugs. Unused openings in sheet metal boxes shall be closed with sheet metal knock-out plugs.
  4. Outlet boxes for switches shall be located at the strike side of doors. Indicate door swings are subject to field change. Outlet boxes shall be located on the basis of final door swing arrangements.
  5. Boxes and plaster covers for duplex receptacles shall be arranged for vertical mounting of the receptacle.
  6. Equip outlet boxes used for devices which are connected to wires of systems supplied by more than one set of voltage characteristics with barriers to separate the different systems.
- G. Barriers in junction and pull boxes of outlet size shall be of the same metal as the box.
1. Barriers in junction and pull boxes which are larger than outlet size shall be of the polyester resin fiberglass of adequate thickness for mechanical strength, but in no case less than 1/4" thick. Each barrier shall be mounted, without fastenings, between angle iron guides so that they may be readily removed.

### 3.10 LOCATING AND ROUTING OF CIRCUITRY

- A. In general, all circuitry shall be run concealed except that it shall be run exposed where the following conditions occur:
1. Horizontally at the ceiling of permanently unfinished spaces which are not assigned to mechanical or electrical equipment.
  2. Horizontally and vertically in mechanical equipment spaces.
  3. Horizontally and vertically in electric equipment rooms.
- B. Concealed circuitry shall be so located that building construction materials can be applied over its thickest elements without being subject to spalling or cracking.
- C. All circuitry and raceways shall not be run within slabs. If field conditions requires raceways to be embedded in field-poured structural building construction concrete fill or slab shall conform to the following:
1. All proposed embedded raceways shall be indicated on plan and elevation and submitted to the Architect and Structural Engineer for review and written approval prior to installation. Any costs associated with the review and approval shall be borne by the Electrical Subcontractor.

2. They shall be run "single layer" with their outside surface no closer than 1" to any surface of the structural concrete.
3. They shall not be located in any configuration which places the outside surface of one closer than 3" to outside surface of another, except at tees, crosses or other single level wide angle junction points.
4. Where crossovers or close grouping are unavoidable, circuitry shall be carefully field coordinated so as not to cause structural weakness.
5. Where turned up or down into a wall or partition they shall, before entering same, be routed parallel for a long enough distance to assure that no relocation of the wall or partition will be necessary to conceal the required bend.
6. They shall be routed in such a manner as to coordinate with the structural requirements of the building.
7. They shall be routed in accordance with field instructions issued by the Architect where such instructions differ from Specifications set forth herein.

D. Circuitry run exposed shall be routed parallel to building walls and column lines.

E. Exposed circuitry located overhead shall be run in a completely accessible manner on the underside of all piping and ductwork.

F. Circuitry run in suspended ceilings shall be routed parallel to building walls, column lines, etc.

G. Circuitry shall be routed so as to prevent electric conductors from being subject to high ambient temperature. Minimum clearances from heated lines or surfaces shall be maintained as follows:

1. Crossing where uninsulated: 3".
2. Crossing where insulated: 1"
3. Running parallel where uninsulated: 36".
4. Running parallel where insulated: 6".

H. Circuitry shall not be run in elevator shafts, hoistways, and the like. Where outlets for trail cables, pit lights, run be level lights, and the like, are involved, only the "final connection" outlet boxes themselves shall be located within or open into, the confines of the shaft.

I. Circuitry for miscellaneous systems indicated without notation as to location and routing shall be run as per the requirements and notations governing the adjacent light and power circuitry.

### 3.11 INSTALLING CIRCUITRY

- A. The outside surface of circuitry, which is to be embedded in cinder concrete, shall be coated with asphaltum paint.
- B. In runs of conduit or raceway including flexible limit the number of bends between cable access points to a total which does not exceed the maximum specified for the particular system. Where no such maximum is specified, limit the number to four (4) right angle bends or the equivalent thereof.
- C. In each conduit or raceway assigned for the future pulling in of wires, include a nylon drag cord. In raceways 2" trade size and larger, the cord shall be pulled in utilizing a suitable brush, followed by an 85% diameter ball mandrel ahead of the cord in the pulling assembly. In the event that obstructions are encountered, which will not permit the drag cord to be installed, the blocked section of raceway shall be replaced and any cutting and patching of the structure involved in such replacement shall be included as part of the electric work.



- D. Circuitry shall be arranged such that conductors of one feeder or circuitry carrying “going” current are not separated from conductors of the same feeder or circuitry carrying “return” current by any ferrous or other metal. Where not within raceways, all “going” and “return” current conductors of one feeder or circuit shall be laced together so as to minimize induction heating of adjacent metal components.
- E. Sleeves used where circuitry is to penetrate waterproof slabs, decks and walls, shall be of a type selected to suit the water condition encountered in the field.

END OF SECTION 26 00 00