Request for Quotations

The Eastern Iowa Airport
Terminal Building – HVAC Cooling Room
Install Roof Access Hatch

Cedar Rapids Airport Commission
The Eastern Iowa Airport
2515 Arthur Collins Parkway SW
Cedar Rapids, Iowa 52404

March 13, 2023

REQUEST FOR QUOTATIONS

THE EASTERN IOWA AIRPORT
TERMINAL BUILDING – HVAC COOLING ROOM
INSTALL ROOF ACCESS HATCH

A. Description of Work

Remove existing roof section, construct and install roof access hatch and hatch framing at the Airport Terminal Facility located at 2121 Arthur Collins Pkwy SW, Cedar Rapids, IA.

B. Type of Quotation

Quotations shall be on a lump sum basis. A bid bond will not be required.

C. Contract Time Information

Scheduled Item	Scheduled Date
RFQ Release Date (www.flyCID.com)	Monday, March 13, 2023
Pre-Quotation Meeting and Site Visit	Thursday, March 16, 2023 – 2 PM
Deadline for Questions	Friday, March 17, 2023 – 2 PM
Final Addenda, if any, posted Airport's Website	Monday, March 20, 2023 – 4 PM
Quote Due Date and Time	Thursday, March 23, 2023 – 4 PM
Selection	Monday, March 27, 2023

D. Quotation Opening Time, Date and Location

Sealed quotations will be received at the office of the Airport Director at The Eastern Iowa Airport Administration Building, 2515 Arthur Collins Parkway SW, Cedar Rapids, Iowa before 4:00 PM on Thursday, March 23, 2023. Quotations that are not received before this time will not be opened. The time a quotation is submitted shall be determined by the time stamp machine maintained in the Airport Administration Office.

E. Contract Terms

The successful Company will be required to submit a Certification of Non-Segregated Facilities and to notify prospective subcontractors of the requirement for such certification where the subcontract exceeds $10,000.00.

F. Examination and Procurement of Documents

Copies of the Quotation Documents may be obtained at http://flyCID.com/rfq or at The Eastern Iowa Airport, 2515 Arthur Collins Pkwy SW Cedar Rapids, IA 52404, in accordance with the Instructions to Bidders.

G. OWNER's Right to Reject Quotations

The Cedar Rapids Airport Commission reserves the right to reject any and all quotations, to waive informalities and technicalities, and to enter such contracts as it deems in the best interest of the Owner. The Owner reserves the right to defer acceptance of any quote for 30 calendar days after the quotations have been received and opened.

H. INTERPRETATIONS AND ADDENDA

All questions about the meaning or intent of the Documents are to be submitted in writing, either through email, mail or fax by 2 PM on Friday, March 17, 2023 to: Todd Gibbs, The Eastern Iowa Airport, 2515 Arthur Collins Pkwy SW, Cedar Rapids, IA 52404; T.Gibbs@flyCID.com.

Interpretations or clarifications considered necessary in response to such questions will be issued by Addenda. Only questions answered by Addenda will be binding. Oral and other interpretations or clarifications will be without legal effect.

INVITATION FOR QUOTES

THE EASTERN IOWA AIRPORT
TERMINAL BUILDING – HVAC COOLING ROOM
INSTALL ROOF ACCESS HATCH

The undersigned Company has carefully examined the work described herein, has become familiar with the character and extent of the work; has carefully examined the Specifications which are acknowledged to be a part of this Request for Quote, the Quote form, and the form of Contract; and thoroughly understands their stipulations, requirements and provisions.

The undersigned Company has determined the quality and quantity of materials required; determined the sources of supply of the materials required; has investigated labor conditions; and has arranged for the continuous prosecution of the work herein described.

The undersigned Company hereby agrees to be bound by the award of the Contract and, if awarded the Contract on this Quote, to execute within ten (10) days after notice of award, the required Contract, of which Contract, this Quote, and the Specifications shall be a part.

The undersigned Company further agrees to provide all necessary equipment, tools, labor, incidentals, and other means of construction to do all the work, and furnish all the materials of the specified requirements, which are necessary to complete the work in accordance with the Quote and the Specifications.

The undersigned Company declares that this Quotation is made without connection with any other person or persons making Quotations for the same work, and is in all respects fair and without collusion or fraud.

In submitting this quote, the Company has examined copies of all the quote documents and the following Addenda (receipt of which is hereby acknowledged);

DATE OF ADDENDA	ADDENDUM NUMBER
_____	_____
_____	_____

Base Quote:

Roof Access Hatch: Provide and install roof access hatch system within the HVAC Cooling Room as indicated in the project plans and specifications.

Lump Sum Price: _____

_____
Name of Company

By _____
Name and Title of Signing Official

Business Address:

_____

_____

NOTE: THIS FORM MUST BE COMPLETED AND SIGNED AS PART OF QUOTE.

CONTRACT

THE EASTERN IOWA AIRPORT, CEDAR RAPIDS, IOWA

THIS AGREEMENT made and entered into this _____ day of _____, 2023, by and between the CEDAR RAPIDS AIRPORT COMMISSION, CEDAR RAPIDS, IOWA, (Party of the First Part, hereinafter called the Owner) and_____ (Party of the Second part, hereinafter called the Contractor).

WITNESSETH: That the said Contractor has agreed, and by these presents does agree with the said Owner, for the consideration herein mentioned and under the provision of the Specifications to furnish all equipment, tools, materials, skill and labor of every description necessary to carry out and complete in a good, firm and substantial and workmanlike manner, the work specified, in strict conformity with the Specifications, together with the foregoing Quote made by the Contractor, the Advertisement, the Instructions to Companies, and this Agreement, shall all form essential parts to this Agreement. The work covered by this Agreement includes all work described in the Quote and the Specifications and listed in the conditions and specifications, to wit: Remove existing roof section, construct and install roof access hatch and hatch framing in the HVAC Cooling Room in the Terminal Building at The Eastern Iowa Airport.

Work shall be completed no later than May 31, 2023. If said work is not completed within the time stated, the Contractor shall be liable and hereby agrees to pay the Owner as liquidated damages and not as a penalty, the amount of Two Hundred and No/100 Dollars ($200.00) per day as liquidated damages to the Owner.

The Owner shall pay and the Contractor shall receive the price stipulated in the Quote hereto attached as full compensation for everything furnished and done by the Contractor under this Contract, the full sum of _____Dollars _____ based on the unit and/or lump sum quote prices payable as set forth in the specifications constituting a part of this Contract.

IN WITNESS WHEREOF, the parties hereto have executed this Agreement in duplicate this _____ day of _____, 2023.

COMPANY	CEDAR RAPIDS AIRPORT COMMISSION
By:_____	By: _____
Title:_____	Title: _____
ATTEST:	ATTEST:
By:_____	By: _____
Title:_____	Title: _____

DETAILED SPECIFICATIONS

TERMINAL BUILDING – HVAC COOLING ROOM
INSTALL ROOF ACCESS HATCH

I. INTENT

A. These specifications describe the requirements to remove existing roof section, construct and install roof access hatch and hatch framing at the Airport Terminal Building.

B. It is the intent of these specifications to stipulate the minimum acceptable requirements of good performance and to establish the Company's responsibility in furnishing all material, parts, engineering, and labor to supply the system being advertised for in complete conformance with the operational requirements outlined. Any item omitted which is clearly necessary for the satisfactory performance of the proposed system shall be considered a part of the Contract, even though not directly specified.

C. It is the intent of these specifications to establish that the Company will quote only the top of the line, best material(s) available that will offer the most life cycles, cost-effective system obtainable. No prototype or experimental material(s) will be accepted.

D. The Cedar Rapids Airport Commission hereby reserves the right to approve as an equal or to reject as not being an equal, any article the Company proposes to furnish which contains major or minor variations from specification requirements.

E. While it is understood that the various components incorporated into the system assembled are under warranty by the specific component manufacturers, it shall be understood that the successful Company will be responsible for assistance in and resolution to any and all warranty related problems. The successful Company is regarded as the prime Contractor for the completed project.

F. In all cases, it is the Company's responsibility to supply all information requested by these specifications exactly as specified. In cases where information is not provided, is incomplete, or is in a form not as requested, the Cedar Rapids Airport Commission may, at its discretion, rule a Company as not responsive to specifications. The system proposed shall substantially meet or exceed the following minimum specifications.

G. All work herein specified or called for will be executed in accordance with all governing ordinances, laws and regulations that meet all local conditions. Additionally, any changes and/or additions in the work necessary to meet these ordinances, laws, regulations, and/or conditions will be made without additional cost to the Owner.

H. It is the intent of the Cedar Rapids Airport Commission that each prospective Company completely design and submit his own layout plan to satisfy his specific equipment/material(s) requirements in order to obtain and achieve 100% of the following requirements.

I. All parties interested in quoting on this system must first visit and inspect the existing system prior to submission of the quote.

II. COMPANY'S QUALIFICATIONS

To demonstrate Company's qualifications to perform the Work, within five days of OWNER's request, Company shall submit written evidence of the following:

A. A list of five (5) projects completed in the past three (3) years that:
   1. Are of the similar size and dollar volume magnitude of this project.
   2. Demonstrate the Company's capacity to construct projects of this type.
   3. References for each of the above projects are required.

   The Qualifications/References information requirements may be provided in each Company's format, but must contain the listed information.

III. SCOPE OF WORK

A. The scope of work: remove existing roof section, construct and install roof access hatch and hatch framing at the Airport Terminal Building, 2121 Arthur Collins Pkwy SW, Cedar Rapids, IA. Plan drawings are included.

IV. SPECIFICATIONS

A. Site Inspection

Each Company is encouraged to visit the site of the proposed work and fully acquaint themselves with the conditions there relating to construction and labor, and should fully inform themselves as to the facilities involved, the difficulties and restrictions. **A Pre-Quotation Meeting and Site Visit will be held on Thursday, March 16, 2023, 2 P.M. at the Airport Terminal Building, Located at 2121 Arthur Collins Pkwy SW, Cedar Rapids, IA. All Companies are encouraged to attend the Meeting and Site Visit.** For companies that are unable to attend the pre-quotation meeting and/or site visit, please contact Todd Gibbs at T.Gibbs@flyCID.com to answer any questions or arrange access to the site. This will be the only opportunity for a site visit. The Company should thoroughly examine and familiarize themselves with technical specifications, and all other Contract documents. The Contractor by the execution of the Contract shall in no way be relieved of any obligation under it due to their failure to receive or examine any form or legal document or to visit the site and acquaint themselves with the conditions there existing and the Owner will be justified in rejecting any claim thereof.

B. Owner's Authorized Representative

The only authority to approve work performed by the Contractor, make field changes that are deemed necessary and approve estimates submitted by the Contractor for payment, is the Owner or its authorized representative(s). The Owner shall notify the Contractor in writing if an authorized representative(s) is designated. If the Owner is not in direct contact with the Contractor, that person who represents the Owner in awarding the Contract is deemed an authorized representative of the Owner. For the scope of these plans and specifications, the term "Owner" refers to the Owner or his authorized representative(s).

C. Utilities and Protection

It is understood and agreed that the Contractor shall, upon execution of the Contract, notify the Owner of any utility services or other facilities of his plan of operations; and shall request all necessary information regarding the exact location of existing utilities and facilities; and shall mark or cause to have marked the location of such utilities and/or any hidden facility. The Contractor shall be liable for the damages to and the cost of repairing or replacing any conduit, cables, or piping encountered during the installation of the work.

D. Indemnification

1. The Contractor shall protect the Owner against all liabilities, claims, or demands for injuries or damages to any person or property growing out of the performance of the work under this Contract. The Contractor shall assume all liability for any injuries or damages occasioned by his agents or employees acting within the scope of his employment on the premises of the Owner.

2. The Contractor shall protect the Owner against all claims arising from the use of passenger automobiles, motor trucks, and other motor vehicles owned and operated by him and/or his employees in connection with the work herein specified. The Contractor shall submit to the Owner a Certificate of Insurance evidencing public liability coverage of $1,000,000.00 minimum for bodily injury and property damage coverage on all such vehicles.

E. Workmen's Compensation Insurance:

The Contractor shall accept the provisions of the Workmen's Compensation Act of the State of Iowa and shall procure Workmen's Compensation Insurance covering all employees and keep the same in full force and effect until the work covered by these plans and specifications has been fully completed. The Contractor shall file with the Owner Certificates of Insurance complying with the provisions of this paragraph, prior to the commencement of any work.

F. Preparation of Quote

The Company shall submit their quote on the forms furnished by the Owner. The Company shall state the price (written in ink or typed) in numerals for which he proposes to provide for each pay item furnished in the quote.

G. Irregular Quotes

Quotes shall be considered irregular for the following reasons:

A. If the quote is on a form other than that furnished by the Owner, or if the Owner's form is altered.

B. If there are unauthorized additions, conditional or alternate pay items, or irregularities of any kind, which make the quote incomplete, indefinite, or otherwise ambiguous.

The Airport Commission reserves the right to reject any irregular quote and the right to waive technicalities if such waiver is in the best interest of the Airport Commission.

H. Quote Preparation Costs

Issuance of this Request for Quotes does not commit the Airport Commission in any way, to pay any costs incurred in the preparation and submission of a quote. Nor does the issuance of this document obligate the Airport Commission to enter into Contract for any services or equipment. All costs related to the preparation and submission of a quote shall be paid by the Company.

I. Delivery of Quote

Each quote submitted shall be placed in a sealed envelope plainly marked “TERMINAL BUILDING – HVAC COOLING ROOM INSTALL ROOF ACCESS HATCH” and include name and business address of the Company on the outside. When sent by mail, the sealed quote, marked as indicated above, should be enclosed in an additional envelope. No quote will be considered unless received at the place specified in the advertisement before the time specified for opening all quotes. Quotes received after the quote opening time shall be returned to the Company unopened.

J. Withdrawal or Revision of Quotes

A Company may withdraw or revise (by withdrawal of one quote and submission of another) a quote provided that the Company's request for withdrawal is received by the Owner in writing or by telegram before the time specified for opening quotes. Revised quotes must be received at the place specified in the advertisement before the time specified for opening all quotes.

K. Consideration of Quotes

It is the intent of the Owner, if this Contract is awarded, to award this Contract to the lowest responsible Company considering quality, performance, and the time specified for performance. The Owner shall decide which is the best Company and, in determining such Company, the following elements may be considered: Whether the Company involved (a) maintains a permanent place of business; (b) has adequate plant equipment to provide the equipment properly and expeditiously; (c) has a suitable financial status to meet obligations incident to the provision of the equipment; and (d) has appropriate technical experience. The quote for the equipment listed herein shall be evaluated separately by the Airport Commission and not in conjunction with any other item proposed.

In addition, until the award of a Contract is made, the Owner reserves the right to reject any or all quotes, waive technicalities, if such waiver is in the best interest of the Owner; advertise for new quotes; or proceed with the purchase of equipment otherwise. All such actions shall promote the Owner's best interests.

L. Competency of Companies

The Owner may make such investigations as he deems necessary to determine the ability of the Company to provide the equipment, and the Company shall furnish to the Owner all such information and data for this purpose, as the Owner may request. The Owner reserves the right to reject any quote if the evidence submitted by, or investigation of, such Company fails to satisfy the Owner that such Company is properly qualified to carry out the obligations of the Contract and to provide the equipment contemplated therein.

M. Disqualification of Companies

Company shall be considered disqualified for any of the following reasons:

1. Submitting more than one quote from the same partnership, firm, or corporation under the same or different name.

2. Evidence of collusion among Companies. Companies participating in such collusion shall be disqualified as Companies for any future work of the Owner until any such participating Company has been reinstated by the Owner as a qualified Company.

N. Award of Contract

The award of a Contract, if it is to be awarded, shall be set by the Cedar Rapids Airport Commission. Award of the Contract shall be made by the Owner to the lowest, qualified Company whose quote conforms to the cited requirements of the Owner.

O. Cancellation of Award

The Owner reserves the right to cancel the award without liability to the Company, at any time before a Contract has been fully executed by all parties and is approved by the Owner in accordance with the subsection titled APPROVAL OF CONTRACT of this section.

P. Execution of Contract

The successful Company shall sign (execute) the necessary agreements for entering into the Contract and return such signed Contract to the Owner within ten (10) calendar days from the date mailed or otherwise delivered to the successful Company. If the Contract is mailed, special handling is recommended.

Q. Failure to Execute Contract

Failure to execute the Contract as provided herein within ten (10) days from the date of award shall be just cause for cancellation of the award.

R. Approval of Contract

Upon receipt of the Contract that has been executed by the successful Company, the Owner will complete the execution of the Contract, and return the fully executed Contract to the Contractor. Delivery of the fully executed Contract to the Contractor shall constitute the Owner's approval to be bound by the successful Company's quote and the terms of the Contract.

S. Rights Reserved

The Owner reserves the right to reject any or all quotes, to award Contract to other than the low Company, to waive informalities, and to readvertise.

T. Claims

The Owner reserves the right to refuse to issue any vouchers and to direct that no payment shall be made to the Contractor in case the Owner has reason to believe that said Contractor has neglected or failed to pay any subcontractor, materialmen, workmen, or employee for equipment included in these specifications until the Owner is satisfied that such subcontractors, materialmen, workmen, or employees have been fully paid.

U. Wage Laws

While working on the premises of the Owner, the Contractor agrees to comply with all requirements of their Wage and Hour Act and shall be held responsible for compliance.

V. Handling of Contractor's Material and Equipment

The Contractor shall provide and pay for all transportation required to deliver and remove from the site all materials and equipment, as required for all the work shown and specified. The Contractor will be present at the Airport to receive equipment and materials for this project.

W. Equipment, Tools and Labor

The Contractor shall furnish all such equipment, tools, and labor necessary to push work in an acceptable manner, to a speedy completion. This Contract is based on the Contractor furnishing equipment, tools, and labor that are suitable to carry out this Contract in a professional manner, unless otherwise herein specified.

X. Owner's Supervision

The Owner assumes no responsibility in the supervision and inspection of the work involved in the execution of this Contract beyond insuring, to the Owner's satisfaction, that the plans and specifications are being properly interpreted. This supervision and checking will not relieve the Contractor of any responsibility for the performance of his work in accordance with the plans and these specifications.

Y. Changes in the Work

The Owner shall have the right to require alterations of, additions to, and deductions from, the work described in the specifications without rendering void the Contract. All such items will be covered in the form of a change order issued by the Owner. The Contractor will compute the value of the work and submit the same in quote form, but will not proceed with the changes until signed authorization has been given by the Owner. In each case, the price agreed to be paid for the work under the Contract shall be increased or decreased for the work added or omitted. In the event the value of the work or cost adjustment furnished by the Contractor is unacceptable to the Owner, the Contract shall be performed without reference to said change order.

Z. Cleaning the Premises

The Contractor shall at all times keep the premises on which the work is being done, and the adjoining premises, clean of rubbish caused by his work. Upon completion of the job, the Contractor shall clean up all debris caused by his work and leave the job in a neat and clean condition. All debris removed from the job will be taken away from the premises.

AA. Protection of Existing and Site Conditions

The Contractor shall take necessary precautions to protect existing site conditions. Should damage be incurred, the Contractor shall repair the damage to its original condition at his own expense.

BB. Scaffolding, Barricades and Warning Signs

Maintain all warning signs, scaffolding, barricades, flares, and red lanterns as required by the Safety Orders of the Division of Industrial Safety and any local ordinances.

CC. Payments

3. The Owner will make payments on account of the Contract on or before the 10th day of each month that are equal to 95% of the value, based on Contract prices, of labor completed and materials installed up to the 28th day of the month preceding the payment date.

4. The Contractor shall, in connection with his preparation of this request for payment, submit to the Owner the appropriate affidavits specified under the laws of the State of Iowa for protection against the liens of material and labor.

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Special Provision C - Local Provisions

1. INDEMNIFICATION

A. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner, Engineer, Engineer's Consultants, and the officers, directors, partners, employees, agents, and other consultants and subcontractors of each and any of them from and against all Claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to the performance of the Work, provided that any such Claim, cost, loss, or damage:

1. is attributable to bodily injury, sickness, disease, or death, or to injury to or destruction of tangible property (other than the Work itself), including the loss of use resulting therefrom; and

2. is caused in whole or in part by any negligent act or omission of Contractor, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work or anyone for whose acts any of them may be liable, regardless of whether or not caused in part by any negligence or omission of an individual or entity indemnified hereunder or whether liability is imposed upon such indemnified party by Laws and Regulations regardless of the negligence of any such individual or entity.

B. Regarding indemnification, it shall be understood that public employees are agents of the municipal Owner. In carrying out the provisions of the Contract, there shall be no personal liability of public officials and public employees.

C. In any and all Claims against Owner or Engineer or any of their respective consultants, agents, officers, directors, partners, or employees by any employee (or the survivor or personal representative of such employee) of Contractor, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, the indemnification obligation under paragraph 1.A shall not be limited in any way by any limitation on the amount or type of damages, compensation, or benefits payable by or for Contractor or any such Subcontractor, Supplier, or other individual or entity under workers' compensation acts, disability benefit acts, or other employee benefit acts.

D. The indemnification obligations of Contractor under paragraph 1.A shall not extend to the liability of Engineer and Engineer's Consultants or to the officers, directors, partners, employees, agents, and other consultants and subcontractors of each and any of them arising out of:

1. the preparation or approval of, or the failure to prepare or approve, maps, Drawings, opinions, reports, surveys, Change Orders, designs, or Specifications; or

2. giving directions or instructions, or failing to give them, if that is the primary cause of the injury or damage.

2. INSURANCE REQUIREMENTS

Certificates of Insurance

A. Contractor shall deliver to Owner, with copies to each additional insured identified in the Supplementary Provision, certificates of insurance (and other evidence of insurance requested by Owner or any other additional insured) that Contractor is required to purchase and maintain. The name of the Project and Contract shall be listed on the Certificates of Insurance.

1. All certificates of insurance shall be signed with an original penned signature of the agent and include the typed name of the agent and agency, address, and phone number. Signature stamps shall not be used on the certificates. Also, each certificate shall be accompanied by a power of attorney form or some other document showing the Agent’s authority to sign the certificate as the authorized representative for the insurance company.

B. On projects in which the Contractor must provide traffic control, the insurance certificate shall specifically state said insurance is applicable to the installation and maintenance of construction traffic control.

Contractor's Liability Insurance

A. Contractor shall purchase and maintain such liability and other insurance as is appropriate for the Work being performed and as will provide protection from Claims set forth below that may arise out of or result from Contractor's performance of the Work and Contractor's other obligations under the Contract Documents, whether it is to be performed by Contractor, any Subcontractor or Supplier, or by anyone directly or indirectly employed by any of them to perform any of the Work, or by anyone for whose acts any of them may be liable:

1. Claims under workers' compensation, disability benefits, and other similar employee benefit acts;

2. Claims for damages because of bodily injury, occupational sickness or disease, or death of Contractor's employees;

3. Claims for damages because of bodily injury, sickness or disease, or death of any person other than Contractor's employees;

4. Claims for damages insured by reasonably available personal injury liability coverage that are sustained: (i) by any person as a result of an offense directly or indirectly related to the employment of such person by Contractor, or (ii) by any other person for any other reason;

5. Claims for damages, other than to the Work itself, because of injury to or destruction of tangible property wherever located, including loss of use resulting therefrom; and

6. Claims for damages because of bodily injury or death of any person or property damage arising out of the ownership, maintenance or use of any motor vehicle.

B. The policies of insurance so required by this paragraph to be purchased and maintained shall:

1. with respect to insurance required by paragraphs Contractor's Liability Insurance A.3 through A.6 inclusive, include as additional insured's (subject to any customary exclusion in respect of professional liability) Owner, Engineer, Engineer's and Owner's Consultants, and any other individuals or entities identified in the Supplementary Conditions, all of whom shall be listed as additional insured's, and include coverage for the respective officers, directors, partners, employees, agents, and other consultants and subcontractors of each and any of all such additional insured's, and the insurance afforded to these additional insured's shall provide primary coverage for all Claims covered thereby;

2. include at least the specific coverages and be written for not less than the limits of liability provided in the Supplementary Conditions or required by Laws or Regulations, whichever is greater;

3. include products and completed operations insurance;

4. include independent contractors' coverage;

5. include premises and operations insurance;

6. include contractual liability insurance covering Contractor's indemnity obligations;

7. contain a provision or endorsement that the coverage afforded will not be canceled, materially changed or renewal refused until at least thirty days prior written notice has been given to Owner and Contractor and to each other additional insured identified in the Supplementary Conditions to whom a certificate of insurance has been issued (and the certificates of insurance furnished by the Contractor will so provide);

8. remain in effect at least until final payment and at all times thereafter when Contractor may be correcting, removing, or replacing defective Work; and

9. with respect to completed operations insurance, remain in effect for at least two years after final payment (and Contractor shall furnish Owner and each other additional insured identified in the Supplementary Conditions, to whom a certificate of insurance has been issued, evidence satisfactory to Owner and any such additional insured of continuation of such insurance at final payment and one year thereafter).

C. The limits of liability for the shall provide coverage for not less than the following amounts or greater where required by Laws and Regulations:

1. Workers' Compensation, and related coverages;

a.	State:	$ Statutory
b.	Applicable Federal	$ Statutory
c.	Employer's Liability	
	Bodily Injury by Accident:	
	Each Accident	$ 500,000
	Bodily Injury by Disease:	
	Each Employee	$ 500,000
	Policy Limit	$ 500,000

2. Contractor's General Liability, which shall include completed operations and product liability coverages and eliminate the exclusion with respect to property under the care, custody and control of Contractor:

a.	General Aggregate	$ 2,000,000
b.	Products – Completed Operations Aggregate	$ 2,000,000
c.	Personal and Advertising Injury (Per Person/Organization)	$ 1,000,000
d.	Each Occurrence (Bodily Injury and Property Damage)	$ 1,000,000
e.	Fire Legal Liability Damage Limit (any One Fire)	$ 50,000
f.	Medical Expense Limit (Any One Person)	$ 5,000
g.	Property Damage liability insurance will provide Explosion, Collapse, and Underground coverages.	
h.	Umbrella Liability	$ See paragraph 7.g
i.	Excess Umbrella Liability	$ See paragraph 8.a

3. Policy shall include as a minimum the following coverages:

a. Broad Form Property Damage Coverage.

b. An elimination of the exclusions with respect to property under the care, custody or control of CONTRACTOR. In lieu of elimination of the exclusion, CONTRACTOR may provide Builder's Risk or Installation Floater coverage for property under the care, custody, or control of CONTRACTOR.

c. Contractual Liability Coverage.

d. Independent CONTRACTOR Coverage.

4. Automobile Liability:

a.	Bodily Injury:	
	Each Person	$ 1,000,000
	Each Accident	$ 1,000,000
b.	Property Damage:	
	Each Accident	$ 1,000,000
c.	Combined Single Limit of	$ 1,000,000
d.	Policy shall include contractual liability coverage and coverage on all owned, non-owned and hired vehicles.	

5. The Contractual Liability coverage required shall provide coverage for not less than the following amounts:

a.	Bodily Injury:		
	Each Accident	$	1,000,000
	Annual Aggregate	$	2,000,000
b.	Property Damage:		
	Each Accident	$	1,000,000
	Annual Aggregate	$	2,000,000

6. Additional insurances required:

a. Umbrella – see Section 8.a.
b. Rider covering traffic control operations.
i. Any providers of signs, barricades, lights, or other traffic control devices must show evidence of insurance.
c. Pollution Liability Insurance
i. Not Used

7. Additional insured's coverage:

a. Insurance certificates shall specifically indicate by name the additional insureds which are to include OWNER and ENGINEER as well as other persons or entities so identified:

1) "The Cedar Rapids Airport Commission, and the City of Cedar Rapids, Iowa, it's officers and employees shall be named as additional insureds" on the CONTRACTOR's, subcontractor's and independent contractor's liability insurance policies and certificates of insurance.

2) Policy shall also include ENGINEER's and OWNER's Consultants as additional insureds under the provisions of Contractor's Liability Insurance A.3 through A.6 of the Supplemental Provisions. ENGINEER to provide a list of their Consultants.

3) No Others

b. Additional Insured Endorsement – CONTRACTOR shall purchase and maintain liability insurance, as described above, specifically naming as additional insureds the Cedar Rapids Airport Commission, the City of Cedar Rapids, their officers and employees and ENGINEER and their employees, as well as other persons or entities so identified.

General Aggregate Limits specified above shall apply separately to this Project by attachment of **Additional Insured Endorsement**, **Governmental Immunities Endorsement**, and **Cancellation and Material Changes Endorsement**, text as given below.

ADDITIONAL INSURED ENDORSEMENT

The Cedar Rapids Airport Commission, its officers and employees, and the City of Cedar Rapids, Iowa, including all its elected and appointed officials, all its employees and volunteers, all its boards, commissions and/or authorities and their board members, employees, and volunteers, are included as Additional Insureds with respect to liability arising out the Insured's work and/or services performed for the City of Cedar Rapids, Iowa. This coverage shall be primary to the Additional Insureds, and not contributing with any other insurance or similar protection available to the Additional Insureds, whether available coverage be primary, contributing or excess.

CEDAR RAPIDS AIRPORT COMMISSION and CITY OF CEDAR RAPIDS, IOWA
GOVERNMENTAL IMMUNITIES ENDORSEMENT
(for use when including the City as an Additional Insured)

1. Nonwaiver of Government Immunity. The insurance carrier expressly agrees and states that the purchase of this policy and the including of the Cedar Rapids Airport Commission and City of Cedar Rapids, Iowa as an Additional Insured does not waive any of the defenses of governmental immunity available to the Cedar Rapids Airport Commission and/or the City of Cedar Rapids, Iowa under Code of Iowa Section 670.4 as it now exists and as it may be amended from time to time.

2. Claims Coverage. The insurance carrier further agrees that this policy of insurance shall cover only those claims not subject to the defense of governmental immunity under the Code of Iowa Section 670.4 as it now exists and as may be amended from time to time.

3. Assertion of Government Immunity. The Cedar Rapids Airport Commission and/or the City of Cedar Rapids, Iowa shall be responsible for asserting any defense of governmental immunity, and may do so at any time and shall do so upon the timely written request of the insurance carrier. Nothing contained in this endorsement shall prevent the carrier from asserting the defense of governmental immunity on behalf of the Cedar Rapids Airport Commission and/or the City of Cedar Rapids, Iowa.

4. Non-Denial of Coverage. The insurance carrier shall not deny coverage under this policy and the insurance carrier shall not deny any of the rights and benefits accruing to the Cedar Rapids Airport Commission and/or City of Cedar Rapids, Iowa under this policy for reasons of governmental immunity unless and until a court of competent jurisdiction has ruled in favor of the defense(s) of governmental immunity asserted by the Cedar Rapids Airport Commission and/or City of Cedar Rapids, Iowa.

5. No Other Change in Policy. The insurance carrier and the Cedar Rapids Airport Commission and the City of Cedar Rapids, Iowa agree that the above preservation of governmental immunities shall not otherwise change or alter the coverage available under the policy.

CANCELLATION AND MATERIAL CHANGES ENDORSEMENT

Thirty (30) days Advance Written Notice of Cancellation, Non-Renewal, Reduction in insurance coverage and/or limits and ten (10) days written notice of non-payment of premium shall be sent to Cedar Rapids Airport Commission, attention: Director of Finance and Administration, the Eastern Iowa Airport, 2515 Arthur Collins Parkway SW, Cedar Rapids, IA 52404. This endorsement supersedes the standard cancellation statement on the Certificate of Insurance to which this endorsement is attached.

c. CONTRACTOR shall, prior to the start of any Work on the Project by any Subcontractor, confirm and verify that CONTRACTOR has received a certificate of insurance from each Subcontractor specifically:
i. naming OWNER and ENGINEER as well as other persons and entities so identified as an additional insured, under each subcontractors' policy of insurance and;
ii. that each subcontractors' policy of insurance naming OWNER and ENGINEER as well as other persons and entities so identified as additional insured specifically includes the additional Insured Endorsement language as required by paragraph b.

d. CONTRACTOR shall, prior to the start of any Work on the Project by CONTRACTOR or by any Subcontractor, submit to OWNER:
i. a certificate of insurance for CONTRACTOR in compliance with the above paragraph b.
ii. a certificate of insurance for each Subcontractor in compliance with paragraph c.i and c.ii.

e. That failure of CONTRACTOR or Subcontractor to comply with the above requirements with respect to the Additional Insured Endorsement and/or Certificate of Insurance, shall not be construed as waiver of those provisions by OWNER and ENGINEER as well as other persons and entities so identified.

f. As an alternative to complying with items b through e above, CONTRACTOR may furnish to OWNER a Owners' and Contractors' Protective (OCP) policy, with ENGINEER and its employees as named additional insured. OCP policy shall provide for bodily injury and property damage coverage equal to the sum of: the general aggregate limit for commercial general liability plus the amount specified for the umbrella coverage.

g. The stated limits of paragraphs C.1 through C.7 of the Contractor Liability Insurance of the Supplementary Provisions can be obtained through individual policies or if CONTRACTOR desires to reduce underlying limits to minimums required by its insurance carrier, an umbrella policy must accordingly be provided to maintain overall total level of coverage. Any Umbrella insurance shall be written on an occurrence basis and pay on behalf form and shall include the same endorsements and additional insureds as required of the primary policies.

8. Umbrella:

a. An excess umbrella policy (pay on behalf form) with limits of **$10,000,000** for Employer's liability, CONTRACTOR's General Liability, (bodily injury, personal injury and property damage), Automobile Liability, Contractual Liability and Railroad Protective Insurance on a combined basis shall be provided with the stated underlying limits of paragraphs C.1 through C.7. Any Excess insurance shall be written on an occurrence basis and pay on behalf form and shall include the same endorsements and additional insureds as required of the primary policies.

b. Policy shall include OWNER, ENGINEER and any others required as additional insureds.

9. The types of insurance and the limits of liability indicated are the minimum required. Neither OWNER nor ENGINEER warrant the adequacy of the types of insurance or the limits of liability required. Any policy exclusions shall be indicated on the insurance certificate. All Insurance shall be provided on an occurrence form basis. Insurance certificate(s) must clearly disclose on its face that coverage is on an occurrence basis and that it cannot be cancelled or materially altered without giving the OWNER written notice thirty days prior to cancellation or alteration.

Property Insurance
A. Unless otherwise provided in the Supplementary Provisions, Contractor shall purchase and maintain property insurance upon the Work at the Site in the amount of the full replacement cost thereof. This insurance shall:

1. include the interests of Owner, Contractor, Subcontractors, Engineer, Engineer's and Owner's Consultants, and any other individuals or entities identified in Supplementary Provisions, and the officers, directors, partner, employees, agents, and other consultants and subcontractors of each and any of them, each of whom is deemed to have an insurable interest and shall be listed as an additional insured;

2. be written on a builder's risk policy form to include insurance for physical loss or damage to the work, temporary buildings, false work, and materials, and equipment in transit, and insure against at least the following perils or causes of loss: fire, lighting, explosion, windstorm, hail, smoke, aircraft, vehicles, riot, civil commotion, vandalism, sprinkler leakage, sinkhole collapse, volcanic action, falling objects, weight of snow or ice, building collapse, glass breakage, debris removal, demolition occasioned by enforcement of Laws and Regulations, theft by forcible entry with visible damage to gain entry, and such other perils or causes of loss as may be specifically required by the Supplementary Provisions;

3. include expenses incurred in the repair or replacement of any insured property (including but not limited to fees and charges of engineers and architects);

4. cover materials and equipment stored at the Site or at another location that was agreed to in writing by Owner prior to being incorporated in the Work, from the time Contractor takes possession of them until they are tested and installed by Contractor and the Project is accepted as complete under an endorsement to this policy or in the form of Installation Floater Insurance of the all risk type;

5. allow for Partial Utilization of the Work by Owner;

6. include testing and startup; and

7. be maintained in effect until final payment is made unless otherwise agreed to in writing by Owner, Contractor, and Engineer with 30 days written notice to each other additional insured to whom a certificate of insurance has been issued.

B. The Contractor shall be held responsible for the care of the materials and the Work.

C. All the policies of insurance (and the certificates or other evidence thereof) required to be purchased and maintained in accordance with the Supplementary Provisions will contain a provision or endorsement that the coverage afforded will not be canceled or materially changed or renewal refused until at least 30 days prior written notice has been given to Owner and Contractor and to each other additional insured to whom a certificate of insurance has been issued.

D. Owner shall not be responsible for purchasing and maintaining any property insurance specified in this paragraph Property Insurance to protect the interests of Contractor, Subcontractors, or others in the Work to the extent of any deductible amounts that are identified in the Supplementary Provisions. The risk of loss within such identified deductible amount will be borne by Contractor, Subcontractors, or others suffering any such loss, and if any of them wishes property insurance coverage within the limits of such amounts, each may purchase and maintain it at the purchaser's own expense.

E. The Contractor may self-insure builders risk coverage on infrastructure projects, but must purchase builders risk insurance on buildings being built or modified as part of this project. This insurance must be listed on the Contractor’s certificate of insurance provided to the OWNER.

F. The CONTRACTOR will make no charge for delays due to damage to the Work whether covered by insurance or not. The Contractor may, however, be allowed a reasonable extension of time on account such delay.

3. PAYMENT

The Engineer's measurements of quantities shall be the basis for payment for the work performed under this contract. Should reasonable doubt arise as to the integrity of any part of the completed work, the payment on that portion of the work will be held until the cause for such doubt has been removed. Payment shall be made in the manner set forth in the Official Publications relating thereto, or in the specifications.

The Cedar Rapids Airport Commission requires all prime contractors to pay all subcontractors for satisfactory performance of their contracts no later than seven days from the date the prime contractor received payment or should have received payment when the reason for non-payment is not subcontractor’s fault.

The Cedar Rapids Airport Commission also requires the prompt return of all retainage held on all bonded subcontractors within 30 days after the subcontractor’s work is satisfactorily completed. Non-bonded subcontractors may be required to submit proof of payment for all material bills and wages to the prime contractor before the prime contractor is required to pay the retainage. Prime contractors found to be in noncompliance with the prompt payment clause will be subject to sanctions enforced by the Commission. The sanctions include issuing two party checks for the payment of the Prime Contractor’s Application for payment. The two party check will be made payable to the prime contractor and its subcontractor. The Commission may notify and request corrective action from the prime contractor’s surety company, issuer of the prime contractor’s payment bond. Also, the Commission may withhold funds due the contractor pursuant to provisions of Chapter 573, Code of Iowa.

4. CLAIMS AGAINST CONTRACTOR

All just claims for labor, materials and equipment arising in connection with this work against the Contractor shall be paid by the Contractor. Before any payments or partial payments are made to the Contractor by the Owner, satisfactory evidence shall be filed with the Owner that the cost of all materials, labor, service or claims incurred by the Contractor in connection with work under this contract have been satisfactorily met. The first partial payment may

be made prior to the submission of lien waivers. However, all subsequent partial pay requests shall require a lien waiver from the general contractor. For example, the 2nd partial pay request will not be paid until the lien waiver for work included and paid for under the first request is submitted.
Also, each request for partial payment shall include (3) originals of the approved pay request forms. A copy of the DBE Progress Statement, to track payments to DBE subcontractors, shall also be submitted with all partial pay requests after the initial request.

Final payment will not be released until lien waivers and sales and use tax statements are submitted for all work. This will include waivers and statements from the general contractor, subcontractors, and suppliers with value more than $10,000.

5. PARTIAL PAYMENT & PAYMENT FOR MATERIALS ON HAND
No partial payments as described in will be made prior to a Notice to Proceed. All partial payments following the initial one shall be required to meet the requirements of Paragraph 4 regarding lien waivers.

The following requirements exist for payment for materials on hand:

a. Materials paid for under this section must be incorporated into the project within 60 calendar days, unless prior written permission from the Engineer has been granted.

b. Materials must be “finished product” in nature.

c. No payment will be made prior to a “Notice to Proceed” issued by the Engineer.

d. No payment will be made for paving materials until they are incorporated into the project, except reinforcing steel, curing compound, and joint material.

e. Proof of insurance for stored materials and associated value.

6. DISPOSAL OF WASTE MATERIAL
Any waste material generated shall be the responsibility of the Contractor for proper disposal. No waste disposal sites are located on the airport.

7. CITY WATER (CITY OF CR)
The Contractor will be allowed to use City water at regular meter rates, but before any water is used he shall make application at the Office of the City Water Works for same. A suitable water meter will be provided by the City Water Works upon the deposit to guarantee the return of the meter in good condition. This deposit will be returned to the Contractor after the meter has been returned and all water rentals paid. No water shall be used without a meter.

8. OSHA REQUIREMENTS
All work covered under a public improvements contract with the Cedar Rapids Airport Commission, shall be done in accordance with the Occupational Safety and Health Act of 1970 (Williams-Steiger Act) as amended and enforced by the State Labor Department of Iowa. Enforcement and responsibility for fulfilling this provision of the specifications shall rest solely with the Contractor or his foremen and shall in no way rest with the City.

9. AFFIRMATIVE ACTION PROGRAM COMPLIANCE

The successful bidder shall complete and submit the following items prior to contract award:

1. Non-Discrimination Clause
2. Non-Collusion Affidavit

If the CONTRACTOR does not have a current approved Equal Employment Opportunity Certificate on file with the City of Cedar Rapids (Certificate valid for one year), the CONTRACTOR to whom the Contract is awarded shall submit a written Affirmative Action Program to the City of Cedar Rapids. This Affirmative Action plan shall be submitted a minimum of one month in advance of the CONTRACTOR’s first Application for Payment submittal. The CONTRACTOR shall not submit the first Application for Payment until receiving approval from the Equal Employment Opportunity Officer. Delays in submitting an acceptable Affirmative Action Program will not be considered as reasons

for extension of the Contract completion date. The model for an Affirmative Action Program is available at the Equal Employment Opportunity Officer's office.

10. SECURITY

A. This project will take place in the Airport Terminal Building. A minimum of four workers shall obtain an Airport Photo-Identification badge with SIDA Clearance. The contractors may drive their marked vehicles in the non-movement area.

B. Description of Requirements

This Section describes provisions of the Airport's security measures that are applicable to Contractor's operations.

1. Providing adequate security of the project site, equipment, and materials is the Contractor's sole responsibility. Except as otherwise indicated, the use of alternative security methods of facilities, equivalent to those specified, is the Contractor's option, subject to the Owner's acceptance.

2. Comply with governing regulations for the operations of security, including the rules and recommendations of fire departments, police, rescue squads, watchman services and similar local organizations and companies, and the Owner.

3. Provide security at the times first needed at the site; and maintain, expand and modify the facilities as needed throughout the construction period.

4. Use security services in a safe, lawful, and publicly acceptable manner, which will not interfere unduly with performance of the work, the operation of the Airport nor result in other deleterious effects.

5. Changes can be mandated at any time by the Transportation Security Administration, the Eastern Iowa Airport, or other governing bodies. The Contractor will be required to comply with all such changes. The Contractor will be given notice of the effective date of a change.

C. Security at the Eastern Iowa Airport (The EIA)

1. General Philosophy: The EIA conducts its security operations in a serious manner and incorporates its mandated security directives to the letter. The management of the Airport fully expects all Tenants and Contractors to help enforce security regulations. The EIA strictly enforces the requirements on issuance and use of Airport identification/access media. Companies and individuals found to be in non-compliance with rules and regulations outlined in this manual may face revocation of access privileges and/or prosecution.

2. Role of the U.S. Government in Airport Security: The Transportation Security Administration (TSA) through several Transportation Security Regulations (TSR) has the regulatory power to assess fines for breaches of airport security. Accordingly, if the Contractor is found culpable for security breaches, fines assessed to the Airport will be collected from the Contractor.

D. Secured Areas at the Eastern Iowa Airport

1. Security Identification Display Area (SIDA) / Secured Area: At the EIA, the SIDA is the same as the Secured Area. It is the restricted area where the airlines enplane and deplane passengers and sort and load baggage. The SIDA also includes cargo areas where the cargo companies sort and load cargo. SIDA also includes adjacent areas to airline and cargo operations. The east SIDA area includes the apron around the Terminal, the Air Cargo Building apron including Gate 5 and the west cargo apron adjacent to Signature Aviation Fixed Base Operator. The west SIDA area is located at the west cargo apron and includes the ramp area to the movement/non-movement on A2. In these areas, authorized personnel must continuously display an airport identification medium unless under airport escort on his/her outermost garment.

2. Air Operations Area (AOA): Area designed and constructed for the landing, take-off, and surface maneuvering of aircraft. The AOA has been divided into areas and numbered. A tall chain-link fence surrounds the AOA. In these areas, authorized personnel must continuously display an airport identification medium on his/her outermost garment, unless under escort

3. Sterile Area: Not Applicable to this project.

E. Contractor Responsibilities

1. A person or a company acting as a general contractor is directly responsible to the Airport for authorizing his/her employees and the employees of the sub-contractors into the SIDA or AOA. The general contractor shall also account for photo-ID badges and controlled keys that are issued to his/her employees and the subs' employees. The Contractor shall collect all Airport photo-ID badges from his/her employees at the conclusion of the project and return them to the Airport Public Safety Department. The General Contractor shall ensure that all photo-ID badges issued to his sub-contractors are returned to the Airport Public Safety Department. This policy also applies to Airport-owned keys. If the badge and/or key is not returned, the contractor will be invoiced for its cost at 200 dollars for a badge and 70 dollars for a key. If the invoice is not paid within 10 days after receipt by contractor, said amount may be withheld by the owner from the contractor's final payment.

2. Each contractor employee is responsible for challenging unidentified or suspicious persons or vehicles that are not displaying the appropriate permit or identification medium in his area, and promptly reporting such incidents to the Public Safety Department, telephone 319-731-5722. At the time of report, please give as much information concerning the individual or incident as possible.

3. Each contractor employee must immediately notify the Airport Public Safety Department when security-related facilities and equipment within the contractor's area are malfunctioning or not longer adequate to perform the control function.

4. No contractor employee may tamper or interfere with, compromise, modify, attempt to circumvent, or cause a person tamper or interfere with, compromise, modify, or attempt to circumvent any security system, measure, or procedure implemented at the EIA.

5. No contractor employee may enter, or be present within, a secured area, SIDA, AOA, or Sterile Area without complying with the systems, measures, or procedures being applied to control access to, or presence, or movement in, such areas.

6. No contractor employee may use, or allow to be used airport-issued access medium or identification medium that authorizes the access, presence, or movement of persons or vehicles in SIDA's, or AOA's in any other manner than that for which it was issued by the authority based in several Transportation Security Regulations (TSR) or the Airport Security Program (ASP).

7. Enforcement of Airport security will be through the Federal, State, City, and Airport codes. Prosecution can be a fine and/or imprisonment, lease violation, or impoundment of a vehicle.

8. The contractor and all sub-contractors entering or working in secure areas must have an Airport Photo-Identification Badge. Escorting of workers will be limited to 14 days onsite by the non-badged worker.

F. Obtaining an Airport Photo-Identification Badge

1. The prime contractor shall submit a list of authorized people who are designated to receive an Airport Badge to the Director of Operations prior to starting the badge process. The list must include the following: sub-contractor company name, last name, first name, escort privileges (if needed). No one will start the badging process until the list has been submitted. All badges will be issued under the prime contractor.

2. Projects in the SIDA or Sterile Area: Each contractor employee designated to receive an Airport Photo-Identification Badge to allow unescorted access must accomplish a criminal history check by submitting to fingerprinting by the Airport Public Safety Department, accomplish an application form supplied by the Airport Public Safety Department, complete a one-hour to one-and-a-half hour online training session, and stand for the photo. The online training will be delivered through an individual email per individual with a certificate that will be presented to Airport Public Safety upon completion and at the time of standing for the photo. The criminal history check determines if the individual has a criminal record, and it consists of a form that can be obtained from the Airport Public Safety Department. Persons convicted of felonies or other disqualifying crimes are not eligible for a badge. If the person does not have a criminal record, then he/she must submit to fingerprinting. At this time, the identity of the person must be verified by presenting two forms of identification, one of which must be a government form showing the person's photo. Persons must also submit to a Security Threat

Assessment. Persons should report to the Airport Public Safety Building for fingerprinting at least two weeks before the badge is needed in order to receive the verification in a timely manner. If the person has been denied unescorted access based on the fingerprinted criminal history check, he/she will be notified and he/she cannot work onsite, even under escort. If the person has been granted access, he/she will contact the Airport Public Safety Department for a training session appointment. The training and the badge making equipment are located at the Airport Public Safety Facility. For additional information or to request forms, please contact the Airport Public Safety Department, 319-731-5722.

3. Projects in the Non-Security Identification Display Area (Non-SIDA): This Area generally includes the remainder of the A.O.A. not in the SIDA. Each contractor employee designated to receive an Airport Photo-Identification Badge must accomplish an application form supplied by the Airport Public Safety Department, submit to a Security Threat Assessment, complete a one-hour to one-and-a-half hour online training session, and stand for the photo. The online training will be delivered through an individual email per individual with a certificate that will be presented to Airport Public Safety upon completion and at the time of standing for the photo. The badge making equipment is located at the Airport Public Safety Facility. For additional information or to request forms, please contact the Airport Public Safety Department, 319-731-5722.

4. Contractors may receive "Escort" privileges through prior written request of the Airport Security Coordinator. If escorting privileges are given, a superintendent or foreman with a badge may escort an employee or group of employees for the duration of the project in non-secured areas, however escorting of employees will be limited to 14 days onsite by the non-badged employee. An employee with escort privileges with a badge shall be present at all times during working hours.

5. Costs

a. The Contractor shall pay a non-refundable fee of $85.00 to the EIA for fingerprinting, criminal history check, training, and badge printing for each employee who does <u>not</u> have a photo-ID badge at the EIA and will have unescorted access to the SIDA and the Airport Operations Area (AOA).

b. The contractor shall pay a non-refundable fee of $10.00 to the EIA for fingerprinting, criminal history check, training, and badge printing for each employee who has previously had a photo-ID badge at the EIA and will have unescorted access to the SIDA. The Airport Public Safety Department maintains a file of individuals possessing identification badges.

c. The Contractor shall pay a fee of $200.00 to the EIA for every photo-ID badge <u>NOT returned</u> to the Airport Public Safety Department after the completion of a project.

d. The Contractor shall pay a fee of $70.00 each door or gate key NOT returned and a fee of $25.00 for every core that needs to be changed.

e. In addition to the above fees, the general contractor and each subcontractor will be required to provide a $85.00 deposit to the EIA for each issued photo-ID badge and key to a maximum of $1,000 per organization. This deposit is fully refundable upon the return of <u>all</u> issued photo-ID badges and keys at the end of the project.

G. Security Requirements for SIDA and AOA

1. Personnel Access: The control of access and easy identification of authorized personnel in these areas is the primary tool of civil aviation security in preventing acts of unlawful interference against the airport/air carrier community. To this end, the Eastern Iowa Airport has defined two (2) types of lawful access for entry into restricted areas of the Airport:

a. Escorted Access

i. Any individual requiring access to a restricted non-public area of the Airport, who does not have in his possession at the time of access a recognized form of Airport Identification, must be under the general observation and control of an employee who has in his possession a valid Eastern Iowa Airport photo identification badge with escort privileges. A current badged personnel who does not have their badge at the time of access **<u>CAN NOT</u>** be escorted.

ii. The individual requiring escort must be escorted on, off and remain under the control of the properly badged employee with appropriate escort endorsement the entire time they are in the restricted area.

iii. Escort shall mean to accompany or monitor the activities of an individual who does not have unescorted access authority into or within a secured area or SIDA. The individual under escort must be visually and audibly monitored without any physical barriers.

b. Unescorted Access

i. Persons possessing a valid form of the Eastern Iowa Airport identification has unlimited and unescorted access to the work area in the restricted area(s) designated by the type of badge.

ii. This type of access is granted for permanent Airport employees and contract service employees who need to be in restricted areas for long or re-occurring periods.

2. Personnel Identification/Access Media: Rules and Regulations

a. **All Airport-issued identification/access media is the property of the Eastern Iowa Airport**.

b. No person may be issued any identification media that provides unescorted access to any SIDA unless the person has successfully completed training in accordance with a TSA approved curriculum, completed a criminal history background check, and an assessment from the TSA. This training for all holders of owner issued/approved identification badges is mandatory and will take approximately one hour and a half to complete.

c. Badges will be issued to personnel whose duties require their presence in a restricted area of the Airport. Airport-issued identification badges will be displayed on outermost garment above the waist. Persons observed in the SIDA or AOA without proper credentials will immediately be arrested and charged with criminal trespass as specified under Iowa statute.

d. The Contractor shall report immediately to the Airport Public Safety Department information relating to any employee whose Airport issued identification badge is lost, stolen or misplaced or who is terminated. This policy ensures the lost or stolen ID is not used by unauthorized persons to gain access to a secured area.

e. The Contractor shall make every attempt to collect the Airport photo-ID badge from employees no longer employed by that company. If the badge cannot be collected, the Contractor shall report this information to the Airport Public Safety Department immediately, and shall be subject to fines. The contractor will be responsible for the entire badge population.

f. All badges will be collected by the end of the project and be held at the Public Safety building for purposes of warranty work.

H. Contractor Vehicles Operating in the SIDA or AOA

1. Contractors requiring access to non-movement areas of the AOA, shall complete a drivers training course for non-movement drivers.

2. Contractors requiring access to the movement area of the AOA, shall at a minimum complete the following:

a. Movement area driver's training course

b. Pass written exam

c. Pass practical exam

3. Contractor vehicles with access to the movement area shall have the following items provided by the contractor:

a. Company vehicle with logos of sufficient size to be recognizable from Control Tower.

b. A radio capable of providing two way contact with the Control Tower.

c. A yellow/amber rotating beacon operational at all times on the airfield.

4. Contractor Vehicles shall be escorted if the vehicle does not have the following:

a. A driver trained and authorized to drive the vehicle in the SIDA or AOA.

b. A driver with proper Airport Identification media.

c. Vehicles with company logo. Each contractor general-purpose vehicle must display a company logo on both sides of sufficient size to be recognizable to personnel in the Control Tower. Signs must be a minimum of 200 square inches and be approved by the Airport. Specialized construction equipment do not require signs.

5. The escort vehicle and driver must comply with the above requirements and regulations pertaining to escorted and unescorted access onto the AOA according to the Airport Security Program, the Airport Certification Manual and TSR Part 1542.207. The Airport Public Safety Department conducts driver training.

6. The Contractor is responsible for escorting subs and suppliers to the project site.

7. The Control Tower has overall control of ground vehicular traffic on lettered taxiways and runways. Vehicles must have two-way VHF radio communications, an operational requirement to drive on lettered taxiways and runways, and the vehicle driver must have movement area training. The vehicle driver wanting to enter a lettered taxiway or runway shall announce his/her intentions on the ground frequency, 121.6 MHz. Once entering a lettered taxiway or runway, the vehicle driver shall switch to frequency 118.7. Between 11:30 PM and 5:00 AM, the frequency shall be 118.7. Vehicles with two-way communication shall escort vehicles without two-way communication. Pedestrian traffic is likewise restricted. The Contractor will provide the VHF radios.

I. Contractor's Security

1. If applicable, the project plans will show the entry point(s), barricades, Contractor's staging area, employee's private vehicle parking area, and work area. The Contractor shall provide security for these areas. The Contractor is to provide to the Airport, for review and approval, all security measures, barricades, and other means to be taken to secure scheduled openings between the secure and non-secure areas, prior to creating the opening.

2. The Contractor shall provide a guard with unescorted access to control the access into the SIDA or AOA, if applicable. The guard shall have a contractor-provided cell phone to enable quick communication with the Airport Public Safety Department.

3. If the Contractor fails to provide adequate security or barriers at the breech or other openings between the secure and non-secure areas, the Airport will mandate a guard to be provided with the cost charged against the Contractor or project may be shut down at the discretion of the Airport Commission. The guard will remain until adequate security or barriers are provided or installed. The contractor is to notify the Owner immediately if a breech in security accidentally occurs.

4. The Airport provides security oversight and patrols of the Airport, but the Contractor should not rely on the patrols to provide full-time security. Security is the responsibility of the Contractor until such a time adequate security procedures are provided.

11. CEDAR RAPIDS ELECTRICAL CODE

All electrical work performed under this project shall be in conformance with Chapter 34 of the Municipal Code of the City of Cedar Rapids. Items include qualifications, licensure, employee ratios, and construction requirements.

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SECTION 014533 - STRUCTURAL TESTS AND SPECIAL INSPECTIONS

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 INTENT AND CONDITIONS

A. Intent:

1. For compliance with the Iowa State Building Code, the Owner shall employ and pay for a special inspector (or inspectors) as required by Chapter 17 of the International Building Code.
2. Duties and responsibilities of the special inspector(s) shall be as outlined in Chapter 17 of the International Building Code and as herein specified.
3. Define and coordinate structural tests and special inspection services.
4. Define and coordinate conventional testing and inspection services.
5. Testing and Inspection services are intended to assist in determining probable compliance of the work with requirements specified. These services do not relieve the Contractor of responsibility for compliance with the requirements of the Contract Documents.

B. Conditions:

1. If inspection of fabricator's work is required, the Owner's representative may require testing and inspection of the work at the plant, before shipment. Owner, Architect and Structural Engineer of Record (SER) reserve the right to reject material not complying with Contract Documents.
2. Perform testing and inspection in accordance with industry standard used as reference for specific material or procedure unless other criteria are specified. In the absence of a referenced standard, accomplish tests in accordance with generally accepted industry standards.
3. Failure to detect defective work or materials shall in no way prevent later rejection if defective work or materials are discovered.

1.3 RELATED REQUIREMENTS

A. Refer to individual technical specification sections for additional qualifications, inspections, tests, frequency and standards required.

1.4 DEFINITIONS

A. Testing: Evaluation of systems, primarily requiring physical manipulation and analysis of materials, in accordance with approved standards.

B. Inspection: Evaluation of systems, primarily requiring observation and judgment.

C. Structural Tests and Special Inspections: Structural Tests and Special Inspection Services herein include items required by Chapter 17 of the International Building Code as adopted by the Iowa State Building Code, and other items which in the professional judgement of the Structural Engineer of Record, are critical to the integrity of the building structure.

D. Conventional Testing and Inspections: Conventional Testing and Inspection Services herein describe those items not specially required by Code but may be considered essential to the proper performance of the building systems.

E. Architect of Record: The prime consultant in charge of overall design and coordination of the Project.

F. Structural Engineer of Record (SER): The Licensed Engineer in responsible charge of the structural design for the Project.

G. Licensed Structural Engineer: A professional engineer with education and experience in the design of structures similar to this Project and licensed in the State of Iowa.

H. Testing Agency (TA):

1. Testing Agency: Approved independent testing agency acceptable to the Owner, Architect, SER and as noted below:
2. Authorized to operate in the State of Iowa and experienced with the requirements and testing methods specified in the Contract Documents.
3. Meeting applicable requirements of references stated in paragraph 1.4.
4. Calibrate testing equipment at reasonable intervals by devices of accuracy traceable to either the National Bureau of Standards, or to accepted values of natural physical constants.

I. Special Inspector (SI): A properly qualified individual or firm performing special inspections.

J. The categories of special inspector are:

1. Special Inspector - Technical I, II and III: Usually an employee of a testing agency:

   a. Technical I (Sections 31 20 00, 31 62 23, 31 63 29) - Technician shall be under the direct supervision of a licensed civil/geotechnical engineer regularly engaged in this type of work. Work shall be performed in a qualified geotechnical/testing laboratory.
   b. Technical I (Sections 03 10 00, 03 20 00, 03 30 00)

      1) ACI Certified Concrete Field Testing Technician – Grade I.
      2) ACI Certified Concrete Strength Testing Technician.
      3) ACI Certified Concrete Laboratory Testing Technician – Grade 1.
      4) ACI Certified Concrete Construction Inspector-In-Training.
      5) Inspector shall be employed by a testing laboratory, experienced in the type of work being performed, and under the direct supervision of a licensed civil/structural engineer.

c. Technical I (Section 04 20 00) - Technician shall be under the direct supervision of a licensed civil/structural engineer regularly engaged in testing and inspection of this type of work. The licensed engineer shall review and approve all inspection reports.
d. Technical I (Section 05 12 00) - Non-destructive Testing Technician SNT-TC-1A Level I, and/or AWS Certified Associate Weld Inspector (CAWI).
e. Technical I (Section 07 81 00) - Shall be familiar with the interpretation and use of ASTM E 605, and have prior field experience in testing and inspection of spray-applied fireproofing. Shall be supervised by an engineer licensed to practice in the State of Iowa.
f. Technical II (Sections 31 20 00, 31 62 13, 31 62 23, 31 63 29,) - Technician with a minimum of 2 years' experience, or a graduate engineer, and is an employee of a qualified and approved geotechnical/technical laboratory, under the direct supervision of a licensed civil/geotechnical engineer regularly engaged in this type of work.
g. Technical II (Sections 03 10 00, 03 20 00, 03 30 00)

    1) ACI Certified Concrete Laboratory Testing Technician - Grade II.
    2) ACI Certified Laboratory Aggregate Testing Technician.
    3) ACI Certified Concrete Construction Inspector.
    4) Inspector shall be employed by a testing laboratory, experienced in the type of work being performed, and under the direct supervision of a licensed civil/structural engineer.

h. Technical II (Section 04 20 00) - Graduate civil/structural engineer, with experience in this type of work. Supervised by a licensed civil/structural engineer. The licensed engineer shall review and approve all inspection reports.
i. Technical II (Section 05 12 00) - Non-destructive Testing Technician ASNT TC-1A Level II, (NDE Technician II), AWS/CAWI, with minimum 3 years' experience, or an AWS/CWI.
j. Technical III (Sections 31 20 00, 31 62 23, 31 63 29) - A civil/geotechnical engineer regularly engaged in this type of work with a minimum of 4 years' experience, licensed in the State of Iowa, and is an employee of a qualified and approved geotechnical/testing laboratory. This licensed engineer shall review and approve all final field reports.
k. Technical III (Section 03 30 00) - A civil/structural engineer regularly engaged in this type of work, with a minimum of 4 years' experience and licensed in the State of Iowa and is an employee of a qualified and approved testing laboratory. The licensed engineer shall review and approve all reports.
l. Technical III (Section 05 12 00) - ASNT Level III with a minimum of 10 years' experience or an AWS/CWI with a minimum of 10 years' experience.

2. Special Inspector - Structural I and II: Usually an employee of the Structural Engineer of Record.

a. Structural I (Sections 03 10 00, 03 20 00, 03 30 00, 03 38 16, 04 20 00, 05 12 00, 31 62 23, 31 63 29) - Graduate civil/structural engineer, or other personnel acceptable to the SER, with experience in the design of structural systems of this type. Inspections shall be performed under the direct supervision of a licensed civil/structural engineer.
b. Structural II (Sections 03 10 00, 03 20 00, 03 30 00, 04 20 00, 05 12 00, 31 62 23, 31 63 29) - Civil/structural engineer regularly engaged in the design of structural systems of this type, licensed in the State of Iowa. The licensed engineer shall review and approve all inspection reports.

K. Building Official: The Officer or duly authorized representative charged with the administration and enforcement of the State Building Code.

1.5 REFERENCES

A. See technical specification sections for specific references.

1. ANSI/ASTM E329 – Standard Specification for Agencies Engaged in the Testing and/or Inspection of Materials Used in Construction.
2. ASTM E543 – Standard Practice for Agencies Performing Non-destructive Testing.
3. ASTM E548 – Standard Guide for General Criteria Used for Evaluating Laboratory Competence.
4. ASTM C1077 – Standard Practice for Laboratories Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Laboratory Evaluation.
5. ASTM C1093 – Standard Practice for the Accreditation of Testing Agencies for Unit Masonry.
6. ANSI/ASTM D3740 - Standard Practice for Minimum Requirements for Agencies Engaged in the Testing and/or Inspection of Soil as Used in Engineering Design and Construction.

B. Iowa State Building Code.

C. International Building Code.

1.6 RESPONSIBILITIES/AUTHORITY

A. Structural Tests and Special Inspections:

1. Special Inspector:

a. Attend all pre-installation meetings to review scope of structural tests and special inspections.
b. Test and/or inspect the work assigned for conformance with the building department approved plans, specifications, and applicable material and workmanship provisions of the code. Perform testing and inspection in a timely manner to avoid delay of work.
c. Bring nonconforming items to the immediate attention of the Contractor for correction, then, if uncorrected after a reasonable period of time, to the

attention of the Structural Engineer of Record, the Building Official, and to the Architect.

d. Submit test and/or inspection reports to the Building Official, Contractor, the Structural Engineer of Record, and other designated persons in accordance with the Structural Testing and Special Inspection Schedule.
e. Submit a final signed report stating whether the work requiring special inspection was, to the best of the inspector's knowledge, in conformance with the approved plans, specifications and the applicable workmanship provisions of the code.
f. Sign the Structural Testing and Special Inspection Schedule in conjunction with other responsible parties prior to commencing construction.

2. Architect:

a. Coordinate the flow of reports and related information to expedite resolution of construction issues.
b. Attend pertinent pre-installation meetings to review scope of structural testing and special inspection.
c. Complete and sign the Structural Testing and Special Inspection Schedule in conjunction with other responsible parties prior to commencing construction. Provide a completed copy of the schedule to all signed parties including Building Official.

3. Structural Engineer of Record:

a. Identify items requiring structural testing and special inspection including special cases.
b. Define "type" of special inspector required for "description" of work indicated on the Structural Testing and Special Inspection Schedule.
c. Attend pertinent pre-installation meetings to review scope of structural testing and special inspection.
d. Complete and sign the Structural Testing and Special Inspection Schedule in conjunction with other responsible parties prior to commencing construction.
e. Review reports issued by all special inspectors.
f. If engaged as a special inspector, provide structural testing and special inspection services as noted in Article 1.6.A.1.

4. Testing Agency:

a. When engaged as a special inspector, provide structural testing and special inspection services as noted in Item 1.6.A.1.
b. Sign the Structural Testing and Special Inspection Schedule in conjunction with other responsible parties prior to commencing construction.
c. Attend pertinent pre-installation meetings to review scope of structural testing and special inspection.

5. Contractor:

    a. Arrange and attend all pre-installation meetings to review scope of structural testing and special inspection. Include the Building Official, Owner, Architect, SER, Testing Agency and other parties concerned.
    b. Post or make available the Structural Testing and Special Inspection Schedule within project site office. Provide timely notification to those parties designated on the schedule so they may properly prepare for and schedule their work.
    c. Provide special inspector access to the approved plans and specifications at the project site.
    d. Review all reports issued by special inspectors.
    e. Retain at the project site all reports submitted by the special inspectors for review by the building official upon request.
    f. Correct in a timely manner, deficiencies identified in inspection and/or testing reports.
    g. Provide safe access to the work requiring inspection and/or testing.
    h. Provide labor and facilities to provide access to the work and to obtain, handle and deliver samples, to facilitate testing and inspection and for storage and curing of test samples.
    i. Sign the Structural Testing and Special Inspection Schedule in conjunction with other responsible parties prior to commencing construction.
    j. Verification of conformance of work within specified tolerances is solely the responsibility of the Contractor.

6. Fabricator:

    a. Submit a Certificate of Compliance to the Building Official, Special Inspector, and Structural Engineer of Record stating the work was performed in accordance with the Contract Documents.
    b. Sign the Structural Testing and Special Inspection Schedule in conjunction with other responsible parties prior to commencing construction.

7. Building Official:

    a. Review all special inspector qualifications.
    b. Review all fabricators who perform work in their shop, which requires special inspection.
    c. Accept and sign completed Structural Testing and Special Inspection Schedule.
    d. Review reports and recommendations submitted by special inspector.
    e. Review the "final signed reports" submitted by special inspector. These documents must be accepted and approved by the building department prior to issuance of a Certificate of Occupancy.
    f. Determine work, which, in the Building Officials opinion, involves unusual hazards or conditions.

8. Owner:

   a. Provide and pay cost of structural testing and special inspection services.
   b. Provide special inspector with Contract Documents and accepted shop drawings.
   c. Provide special inspectors and testing agencies with full access to the site at all times.
   d. Sign the Structural Testing and Special Inspection Schedule in conjunction with other responsible parties prior to commencing construction.

B. Inspections by Building Official: provide timely notice for inspections performed by the building official, as required by IBC Chapter 17, the State Building Code, and local ordinance.

1.7 INSPECTION NOTICES

A. Contractor: Provide minimum of 24 hours notice for all items requiring testing or inspection. Do not place items requiring testing and inspection services prior to or during placement until testing and inspection services are available. Do not enclose or obscure items requiring testing and inspection services after placement until testing and inspection services are performed.

1.8 REPORTS

A. Testing agency and/or special inspectors shall submit a report in accordance with the Structural Testing and Special Inspection Schedule and shall conduct and interpret tests and inspections and state in each report whether; (1) test specimens and observations comply with Contract Documents, and specifically state any deviations, (2) record types and locations of defects found in work, (3) record work required and performed, to correct deficiencies.

B. Submit reports for structural testing and special inspection, in timely manner to the Contractor, Building Official, SER, and Architect.

   1. Submit reports for ongoing work, to provide the information noted below:

      a. Date issued.
      b. Project title and number.
      c. Firm name and address.
      d. Name and signature of tester or inspector.
      e. Date and time of sampling.
      f. Date of test or inspection.
      g. Identification of product and specification section.
      h. Location in project, including elevations, grid location and detail.
      i. Type of test or inspections.
      j. Results of tests or inspections and interpretation of same.
      k. Observations regarding compliance with Contract Documents or deviations there from.

2. Submit final signed report stating that, to the best of the special inspector's knowledge, the work requiring testing and/or inspection conformed to the Contract Documents.

1.9 FREQUENCY OF TESTING AND INSPECTION

A. For detailed requirements see individual technical specification sections, and Part 3 of this section.

1.10 PROTECTION AND REPAIR

A. Upon completion of testing, sample-taking, or inspection, repair damaged work and restore substrates and finishes to eliminate deficiencies, including deficiencies in the visual qualities of exposed surfaces, as judged solely by the Architect/Engineer of Record. Protect work exposed by or for testing and/or inspection and protect repaired work. Repair and protection is the Contractor's responsibility, regardless of the assignment of responsibility for testing and/or inspection.

1.11 TESTS TO DEMONSTRATE QUALIFICATION

A. If the Contractor proposes a product material, method, or other system that has not been pre-qualified, the Architect or SER may require applicable tests, to establish a basis for acceptance or rejection. These tests will be paid for by the Contractor.

B. The Architect or SER reserves the right to require certification or other proof that the system proposed, is in compliance with any tests, criteria or standards called for. The certificate shall be signed by a representative of an independent testing agency.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 SCOPE OF STRUCTURAL TESTS AND SPECIAL INSPECTIONS

A. Refer to individual specification section articles for Quality Control testing and inspection items.

3.2 STRUCTURAL TESTS AND SPECIAL INSPECTIONS PROGRAM SUMMARY

A. The parties involved shall complete and sign the Structural Testing and Special Inspection Schedule. The completed schedule is an element of the Contract Documents and after permit issuance, becomes part of the building department approved plans and specifications. The completed schedule shall include the following:

1. Specific listing of items requiring inspection and testing.
2. Associated specification section which defines applicable standards by which to judge conformance with approved plans and specifications in accordance with IBC Chapter 17 as adopted by the State Building Code. The specification section should also include the degree or basis of inspection and testing; i.e., intermittent/will-call or full-time/continuous.

3. Frequency of reporting, i.e., intermittent, weekly, monthly, per floor, etc.
4. Parties responsible for performing inspection and testing work.
5. Required acknowledgments by each designated party.

B. See attached "Structural Testing and Special Inspection Schedule".

END OF SECTION 014533

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SECTION 016000 - PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes administrative and procedural requirements for selection of products for use in Project; product delivery, storage, and handling; manufacturers' standard warranties on products; special warranties; and comparable products.

B. Related Requirements:

1. Section 011000 "Summary" for Contractor requirements related to Owner-furnished products.
2. Section 012100 "Allowances" for products selected under an allowance.
3. Section 012500 "Substitution Procedures" for requests for substitutions.
4. Section 014200 "References" for applicable industry standards for products specified.
5. Section 01770 "Closeout Procedures" for submitting warranties.

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 that is current as of date of the Contract Documents.
2. New Products: Items that have not previously been incorporated into another project or facility. Salvaged items or items reused from other projects are not considered new products. Items that are manufactured or fabricated to include recycled content materials are considered new products, unless indicated otherwise.
3. Comparable Product: Product by named manufacturer that is demonstrated and approved through the comparable product submittal process described in Part 2 "Comparable Products" Article, 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 single manufacturer's product is named and accompanied by the words "basis-of-design product," including make or model number or other designation. Published attributes and characteristics of basis-of-design product establish salient characteristics of products.

1. Evaluation of Comparable Products: In addition to the basis-of-design product description, product attributes and characteristics may be listed to establish the significant qualities related to type, function, in-service performance and physical properties, weight, dimension, durability, visual characteristics, and other special features and requirements for purposes of evaluating comparable products of additional manufacturers named in the specification. Manufacturer's published attributes and characteristics of basis-of-design product also establish salient characteristics of products for purposes of evaluating comparable products.

C. Subject to Compliance with Requirements: Where the phrase "Subject to compliance with requirements" introduces a product selection procedure in an individual Specification Section, provide products qualified under the specified product procedure. In the event that a named product or product by a named manufacturer does not meet the other requirements of the specifications, select another named product or product from another named manufacturer that does meet the requirements of the specifications; submit a comparable product request or substitution request, if applicable.

D. Comparable Product Request Submittal: An action submittal requesting consideration of a comparable product, including the following information:

1. Identification of basis-of-design product or fabrication or installation method to be replaced, including Specification Section number and title and Drawing numbers and titles.
2. Data indicating compliance with the requirements specified in Part 2 "Comparable Products" Article.

E. Basis-of-Design Product Specification Submittal: An action submittal complying with requirements in Section 013300 "Submittal Procedures."

F. Substitution: Refer to Section 012500 "Substitution Procedures" for definition and limitations on substitutions.

1.4 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. Resolution of Compatibility Disputes between Multiple Contractors:

a. Contractors are responsible for providing products and construction methods compatible with products and construction methods of other contractors.
b. If a dispute arises between the multiple contractors over concurrently selectable but incompatible products, Architect will determine which products shall be used.

B. Identification of Products: Except for required labels and operating data, do not attach or imprint manufacturer or product names or trademarks on exposed surfaces of products or equipment that will be exposed to view in occupied spaces or on the exterior.

1. Labels: Locate required product labels and stamps on a concealed surface, or, where required for observation following installation, on a visually accessible surface that is not conspicuous.
2. Equipment Nameplates: Provide a permanent nameplate on each item of service- or power-operated equipment. Locate on a visually accessible but inconspicuous surface. Include information essential for operation, including the following:

    a. Name of product and manufacturer.
    b. Model and serial number.
    c. Capacity.
    d. Speed.
    e. Ratings.

3. See individual identification Sections in Divisions 21, 22, 23, and 26 for additional equipment identification requirements.

1.5 COORDINATION

A. Modify or adjust affected work as necessary to integrate work of approved comparable products and approved substitutions.

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 that products are undamaged and properly protected.

C. Storage:

1. Provide a secure location and enclosure at Project site for storage of materials and equipment.
2. Store products to allow for inspection and measurement of quantity or counting of units.
3. Store materials in a manner that will not endanger Project structure.
4. Store products that are subject to damage by the elements under cover in a weathertight enclosure above ground, with ventilation adequate to prevent condensation and with adequate protection from wind.

5. Protect foam plastic from exposure to sunlight, except to extent necessary for period of installation and concealment.
6. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.
7. Protect stored products from damage and liquids from freezing.
8. 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 standard warranty form furnished by individual manufacturer for a particular product and issued in the name of the Owner or endorsed by manufacturer to Owner.
2. Special Warranty: Written warranty required by the Contract Documents to provide specific rights for Owner and issued in the name of the Owner or endorsed by manufacturer to 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 in the Project Manual, prepare a written document, using indicated form properly executed.
3. See other Sections for specific content requirements and particular requirements for submitting special warranties.

C. Submittal Time: Comply with requirements in Section 017700 "Closeout Procedures."

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 meeting 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 approved equal," or "or approved," comply with requirements in "Comparable Products" Article to obtain approval for use of an unnamed product.

    a. Submit additional documentation required by Architect in order to establish equivalency of proposed products. Unless otherwise indicated, evaluation of "or equal" product status is by the Architect, whose determination is final.

B. Product Selection Procedures:
1. Limited List of Products: 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.

    a. Limited list of products may be indicated by the phrase "Subject to compliance with requirements, provide one of the following."

2. Non-Limited List of Products: Where Specifications include a list of names of both available manufacturers and products, provide one of the products listed or an unnamed product that complies with requirements.

    a. Non-limited list of products is indicated by the phrase "Subject to compliance with requirements, available products that may be incorporated in the Work include, but are not limited to, the following."
    b. Provision of an unnamed product is not considered a substitution, if the product complies with requirements.

3. Limited List of Manufacturers: 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.

    a. Limited list of manufacturers is indicated by the phrase "Subject to compliance with requirements, provide products by one of the following."

4. Non-Limited List of Manufacturers: Where Specifications include a list of available manufacturers, provide a product by one of the manufacturers listed or a product by an unnamed manufacturer that complies with requirements.

    a. Non-limited list of manufacturers is indicated by the phrase "Subject to compliance with requirements, available manufacturers whose products may be incorporated in the Work include, but are not limited to, the following."
    b. Provision of products of an unnamed manufacturer is not considered a substitution, if the product complies with requirements.

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 may additionally 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.

    a. For approval of products by unnamed manufacturers, comply with requirements in Section 012500 "Substitution Procedures" for substitutions for convenience.

C. Visual Matching Specification: Where Specifications require the phrase "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 Section 012500 "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 a 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.

E. Sustainable Product Selection: Where Specifications require product to meet sustainable product characteristics, select products complying with indicated requirements. Comply with requirements in Division 01 sustainability requirements Section and individual Specification Sections.

1. Select products for which sustainable design documentation submittals are available from manufacturer.

2.2 COMPARABLE PRODUCTS

A. Conditions for Consideration of Comparable Products: 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 the following requirements:

1. Evidence that proposed product does not require revisions to the Contract Documents, is consistent with the Contract Documents, will produce the indicated results, and is compatible with other portions of the Work.
2. Detailed comparison of significant qualities of proposed product with those of the named basis-of-design product. Significant product qualities include attributes, such as type, function, in-service performance and physical properties, weight, dimension, durability, visual characteristics, and other specific features and requirements.
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.

B. Architect's Action on Comparable Products Submittal: If necessary, Architect will request additional information or documentation for evaluation, as specified in Section 013300 "Submittal Procedures."

1. Form of Approval of Submittal: As specified in Section 013300 "Submittal Procedures."
2. Use product specified if Architect does not issue a decision on use of a comparable product request within time allocated.

C. Submittal Requirements, Two-Step Process: Approval by the Architect of Contractor's request for use of comparable product is not intended to satisfy other submittal requirements. Comply with specified submittal requirements.

D. Submittal Requirements, Single-Step Process: When acceptable to Architect, incorporate specified submittal requirements of individual Specification Section in combined submittal for comparable products. Approval by the Architect of Contractor's request for use of comparable product and of individual submittal requirements will also satisfy other submittal requirements.

PART 3 - EXECUTION (Not Used)

END OF SECTION 016000

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SECTION 017300 - EXECUTION

1.1 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's portion of the Work.
6. Coordination of Owner-installed products.
7. Progress cleaning.
8. Starting and adjusting.
9. Protection of installed construction.
10. Correction of the Work.

B. Related Requirements:

1. Section 011000 "Summary" for coordination of Owner-furnished products, Owner-performed work, Owner's separate contracts, and 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, replacing defective work, and final cleaning.
4. Section 024119 "Selective Demolition" for demolition and removal of selected portions of the building.
5. Section 078413 "Penetration Firestopping" for patching penetrations in fire-rated construction.

1.2 DEFINITIONS

A. Cutting: Removal of in-place construction necessary to permit installation or performance of subsequent work.

B. Patching: Fitting and repair work required to restore construction to original conditions after installation of subsequent work.

1.3 PREINSTALLATION MEETINGS

A. Cutting and Patching Conference: Conduct conference at Project site.

1. Prior to commencing work requiring cutting and patching, review extent of cutting and patching anticipated and examine procedures for ensuring satisfactory result from cutting and patching work. Inform Architect of scheduled meeting. Require representatives of each entity directly concerned with cutting and patching to attend, including the following:

a. Contractor's superintendent.

b. Trade supervisor responsible for cutting operations.
c. Trade supervisor(s) responsible for patching of each type of substrate.
d. Mechanical, electrical, and utilities subcontractors' supervisors, to the extent each trade is affected by cutting and patching operations.

2. Review areas of potential interference and conflict. Coordinate procedures and resolve potential conflicts before proceeding.

B. Layout Conference: Conduct conference at Project site.

1. Prior to establishing layout of new perimeter and structural column grid(s), review building location requirements. Review benchmark, control point, and layout and dimension requirements. Inform Architect of scheduled meeting. Require representatives of each entity directly concerned with Project layout to attend, including the following:

a. Contractor's superintendent.
b. Professional engineer or Contractor's personnel responsible for performing Project surveying and layout.
c. Professional engineer responsible for performing site survey serving as basis for Project design.

2. Review meanings and intent of dimensions, notes, terms, graphic symbols, and other layout information indicated on the Drawings.
3. Review requirements for including layouts on Shop Drawings and other submittals.
4. Review areas of potential interference and conflict. Coordinate procedures and resolve potential conflicts before proceeding.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For land surveyor or professional engineer.

B. Certified Surveys: Submit two (2) copies signed by land surveyor or professional engineer.

C. Certificates: Submit certificate signed by land surveyor or professional engineer, certifying that location and elevation of improvements comply with requirements.

D. Cutting and Patching Plan: Submit plan describing procedures at least ten (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.

E. Landfill Receipts: Submit copy of receipts issued by a landfill facility, licensed to accept hazardous materials, for hazardous waste disposal.

1.5 CLOSEOUT SUBMITTALS

A. Final Property Survey: Submit ten (10) copies showing the Work performed and record survey data.

1.6 QUALITY ASSURANCE

A. Land Surveyor Qualifications: A professional land surveyor who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing land-surveying services of the kind indicated.

B. Professional Engineer Qualifications: Refer to Section 014000 "Quality Requirements."

C. 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, or when encountering the need for cutting and patching of elements whose structural function is not known, notify Architect of locations and details of cutting and await directions from Architect before proceeding. Shore, brace, and support structural elements during cutting and patching. Do not cut and patch structural elements in a manner that could change their load-carrying capacity or increase deflection.
2. Operational Elements: Do not cut and patch operating elements and related components in a manner that results in reducing their capacity to perform as intended or that results in increased maintenance or decreased operational life or safety. Operational elements include the following:

    a. Primary operational systems and equipment.
    b. Fire separation assemblies.
    c. Air or smoke barriers.
    d. Fire-suppression systems.
    e. Plumbing piping systems.
    f. Mechanical systems piping and ducts.
    g. Control systems.
    h. Communication systems.
    i. Fire-detection and -alarm systems.
    j. Conveying systems.
    k. Electrical wiring systems.
    l. 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 that results in increased maintenance or decreased operational life or safety. Other construction elements include but are not limited to the following:

   a. Water, moisture, or vapor barriers.
   b. Membranes and flashings.
   c. Exterior curtain-wall construction.
   d. Sprayed fire-resistive material.
   e. Equipment supports.
   f. Piping, ductwork, vessels, and equipment.
   g. 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.

D. Manufacturer's Installation Instructions: Obtain and maintain on-site manufacturer's written recommendations and instructions for installation of specified products and equipment.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Comply with requirements specified in other Sections.

1. For projects requiring compliance with sustainable design and construction practices and procedures, use products for patching that comply with sustainable design requirements.

B. In-Place Materials: Use materials for patching identical to in-place materials. For exposed surfaces, use materials that visually match in-place adjacent surfaces to the fullest extent possible.

1. If identical materials are unavailable or cannot be used, use materials that, when installed, will provide a match acceptable to Architect for the visual and functional performance of in-place materials. Use materials that are not considered hazardous.

C. 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.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Existing Conditions: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning sitework, investigate and verify the existence and location of underground utilities, mechanical and electrical systems, and other construction affecting the Work.

1. Before construction, verify the location and invert elevation at points of connection of sanitary sewer, storm sewer, gas service piping, and water-service piping; underground electrical services; and other utilities.
2. Furnish location data for work related to Project that must be performed by public utilities serving Project site.

B. Examination and Acceptance of Conditions: Before proceeding with each component of the Work, examine substrates, areas, and conditions, with Installer or Applicator present where indicated, for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.

1. Examine roughing-in for 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.

C. 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, including Specification Section number and paragraph, and Drawing sheet number and detail, where applicable.
2. List of detrimental conditions, including substrates.
3. List of unacceptable installation tolerances.
4. Recommended corrections.

D. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. Existing Utility Information: Furnish information to local utility that is necessary to adjust, move, or relocate existing utility structures, utility poles, lines, services, or other utility appurtenances located in or affected by construction. Coordinate with authorities having jurisdiction.

B. 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.

C. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.

D. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents, submit a request for information to Architect in accordance with requirements in Section 013100 "Project Management and Coordination."

3.3 CONSTRUCTION LAYOUT

A. Verification: Before proceeding to lay out the Work, verify layout information shown on Drawings, in relation to the property survey and existing benchmarks and existing conditions. If discrepancies are discovered, notify Architect promptly.

B. Engage a land surveyor or professional engineer experienced in laying out the Work, using the following accepted surveying practices:

1. Establish benchmarks and control points to set lines and levels at each story of construction and elsewhere as needed to locate each element of Project.
2. Establish limits on use of Project site.
3. Establish dimensions within tolerances indicated. Do not scale Drawings to obtain required dimensions.
4. Inform installers of lines and levels to which they must comply.
5. Check the location, level and plumb, of every major element as the Work progresses.
6. Notify Architect when deviations from required lines and levels exceed allowable tolerances.
7. Close site surveys with an error of closure equal to or less than the standard established by authorities having jurisdiction.

C. Site Improvements: Locate and lay out site improvements, including pavements, grading, fill and topsoil placement, utility slopes, and rim and invert elevations.

D. Building Lines and Levels: Locate and lay out control lines and levels for structures, building foundations, column grids, and floor levels, including those required for mechanical and electrical work. Transfer survey markings and elevations for use with control lines and levels. Level foundations and piers from two or more locations.

E. Record Log: Maintain a log of layout control work. Record deviations from required lines and levels. Include beginning and ending dates and times of surveys, weather conditions, name and duty of each survey party member, and types of instruments and tapes used. Make the log available for reference by Architect.

3.4 FIELD ENGINEERING

A. Identification: Owner will identify existing benchmarks, control points, and property corners.

B. Reference Points: Locate existing permanent benchmarks, control points, and similar reference points before beginning the Work. Preserve and protect permanent benchmarks and control points during construction operations.

1. Do not change or relocate existing benchmarks or control points without prior written approval of Architect. Report lost or destroyed permanent benchmarks or control points promptly. Report the need to relocate permanent benchmarks or control points to Architect before proceeding.
2. Replace lost or destroyed permanent benchmarks and control points promptly. Base replacements on the original survey control points.

C. Benchmarks: Establish and maintain a minimum of two (2) permanent benchmarks on Project site, referenced to data established by survey control points. Comply with authorities having jurisdiction for type and size of benchmark.

1. Record benchmark locations, with horizontal and vertical data, on Project Record Documents.
2. Where the actual location or elevation of layout points cannot be marked, provide temporary reference points sufficient to locate the Work.
3. Remove temporary reference points when no longer needed. Restore marked construction to its original condition.

D. Certified Survey: On completion of foundation walls, major site improvements, and other work requiring field-engineering services, prepare a certified survey showing dimensions, locations, angles, and elevations of construction and sitework.

E. Final Property Survey: Engage a land surveyor or professional engineer to prepare a final property survey showing significant features (real property) for Project. Include on the survey a certification, signed by land surveyor or professional engineer, that principal metes, bounds, lines, and levels of Project are accurately positioned as shown on the survey.

1. Show boundary lines, monuments, streets, site improvements and utilities, existing improvements and significant vegetation, adjoining properties, acreage, grade contours, and the distance and bearing from a site corner to a legal point.
2. Recording: At Substantial Completion, have the final property survey recorded by or with authorities having jurisdiction as the official "property survey."

3.5 INSTALLATION

A. 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.
4. Maintain minimum headroom clearance of 96 inches in occupied spaces and 90 inches in unoccupied spaces, unless otherwise indicated on Drawings.

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 satisfactory results as judged by Architect. 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 of type expected for Project.

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: Select tools or equipment that minimize production of excessive 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 portions of the 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 with manufacturer.

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, as judged by Architect. Fit exposed connections together to form hairline joints.

3.6 CUTTING AND PATCHING

A. General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.

1. Cut in-place construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.

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

C. Temporary Support: Provide temporary support of Work to be cut.

D. Protection: Protect in-place construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.

E. Adjacent Occupied Areas: Where interference with use of adjoining areas or interruption of free passage to adjoining areas is unavoidable, coordinate cutting and patching in accordance with requirements in Section 011000 "Summary."

F. 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.

G. 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. Excavating and Backfilling: Comply with requirements in applicable Sections where required by cutting and patching operations.
5. Mechanical and Electrical Services: Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting.
6. Proceed with patching after construction operations requiring cutting are complete.

H. 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, as judged by Architect. 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 eliminate 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. Floors and Walls: Where walls or partitions that are removed extend one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform finish, color, texture, and appearance.

Remove in-place floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.

a. Where patching occurs in a painted surface, prepare substrate and apply primer and intermediate paint coats appropriate for substrate over the patch, and apply final paint coat over entire unbroken surface containing the patch, corner to corner of wall and edge to edge of ceiling. Provide additional coats until patch blends with adjacent surfaces.

4. Ceilings: Patch, repair, or rehang in-place ceilings as necessary to provide an even-plane surface of uniform appearance.
5. Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weathertight condition and ensures thermal and moisture integrity of building enclosure.

I. Cleaning: Clean areas and spaces where cutting and patching are performed. Remove paint, mortar, oils, putty, and similar materials from adjacent finished surfaces.

3.7 COORDINATION OF OWNER'S PORTION OF THE WORK

A. Site Access: Provide access to Project site for Owner's construction personnel and Owner's separate contractors.

1. Provide temporary facilities required for Owner-furnished, Contractor-installed and Owner-furnished, Owner-installed products.
2. Refer to Section 011000 "Summary" for other requirements for Owner-furnished, Contractor-installed and Owner-furnished, Owner-installed products.

B. Coordination: Coordinate construction and operations of the Work with work performed by Owner's construction personnel and Owner's separate contractors.

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 and Owner's separate contractors 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.

3.8 PROGRESS CLEANING

A. 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: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.

G. Waste Disposal: Do not bury or burn waste materials on-site. Do not wash waste materials down sewers or into waterways. Comply with waste disposal requirements in Section 015000 "Temporary Facilities and Controls." and Section 017419 "Construction Waste Management and Disposal."

H. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.

I. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.

J. Limiting Exposures: Supervise construction operations to ensure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

3.9 STARTING AND ADJUSTING

A. Coordinate startup and adjusting of equipment and operating components with requirements in Section 019100 "Commissioning."

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 Section 014000 "Quality Requirements."

3.10 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. Protection of Existing Items: Provide protection and ensure that existing items to remain undisturbed by construction are maintained in condition that existed at commencement of the Work.

C. Comply with manufacturer's written instructions for temperature and relative humidity.

3.11 CORRECTION OF THE WORK

A. Repair or remove and replace damaged, defective, or nonconforming Work. Restore damaged substrates and finishes.

1. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment.

B. Repair Work previously completed and subsequently damaged during construction period. Repair to like-new condition.

C. Restore permanent facilities used during construction to their specified condition.

D. Remove and replace damaged surfaces that are exposed to view if surfaces cannot be repaired without visible evidence of repair.

E. Repair components that do not operate properly. Remove and replace operating components that cannot be repaired.

F. Remove and replace chipped, scratched, and broken glass or reflective surfaces.

END OF SECTION 017300

SECTION 017329 – CUTTING AND PATCHING

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. Procedural requirements for cutting and patching.

1.3 RELATED WORK

A. Review all Division 01 Sections.

B. Divisions 02 through 31 Sections for specific requirements.

1.4 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 surfaces to original conditions after installation of other Work.

1.5 QUALITY ASSURANCE

A. Structural Elements: Do not cut and patch structural elements in a manner that could change their load-carrying capacity or load-deflection ratio.

B. Operational Elements: Do not cut and patch operating elements and related components in a manner that results in reducing their capacity to perform as intended or that result in increased maintenance or decreased operational life or safety.

C. Miscellaneous Elements: Do not cut and patch miscellaneous elements or related components in a manner that could change their load-carrying capacity that result in reducing their capacity to perform as intended, or that result in increased maintenance or decreased operational life or safety.

D. Visual Requirements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch construction exposed on the exterior or in occupied spaces in a manner that would, in the Architect’s opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.

PART 2 - PRODUCTS

2.1 MATERIALS

A. General: Comply with requirements specified in other Sections.

B. In-Place Materials: Use materials 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 match the visual and functional performance of in-place materials.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine surfaces to be cut and patched and conditions under which cutting and patching are to be performed.

1. Compatibility: Before patching, verify compatibility with and suitability of substrates, including compatibility with in-place finishes or primers.
2. Proceed with installation only after unsafe or unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Temporary Support: Provide temporary support of Work to be cut.

B. Protection: Protect 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.

C. Adjoining Areas: Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas.

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.

3.3 PERFORMANCE

A. General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.

1. Cut 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. 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 as small as possible, neatly to 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/Masonry/Asphalt: 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.

C. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other Work. Patch with durable seams that are as invisible as possible. Provide materials and comply with installation requirements specified in other Sections.

1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate integrity of installation.
2. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will eliminate evidence of patching and refinishing.

    a. Clean piping, conduit, and similar features before applying paint or other finishing materials.
    b. Restore damaged pipe covering to its original condition.

3. Exterior Pavements: Where concrete and asphalt pavements are removed protect remaining pavement rom damage. Make openings by sawing completely through existing pavement.

    a. Pavement may be broken out after initial saw cuts in the event pavement thickness prevents cutting through.

    b. Where sawing is not possible, make openings by drilling holes around perimeter of opening and the chipping out the pavement.

        1) Holes shall be sufficient in number to prevent damage to remaining pavement.

    c. Oversize required openings in existing pavement by 1-inch on all sides and build back to required opening sized by means of the following:

        1) Concrete: Nonshrink grout epoxy bonded to the existing concrete.
        2) Asphalt: Cold-patch asphalt to existing.

4. Floors and Walls: Where walls or partitions that are removed extend one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform finish, color, texture, and

appearance. Remove in-place floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.

a. Where patching occurs in a painted surface, apply primer and intermediate paint coats over the patch and apply final paint coat over entire unbroken surface containing the patch. Provide additional coats until patch blends with adjacent surfaces.

5. Ceilings: Patch, repair, or rehang in-place ceilings as necessary to provide an even-plane surface of uniform appearance.
6. Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weathertight condition.

D. Cleaning: Clean areas and spaces where cutting and patching are performed. Completely remove paint, mortar, oils, putty, and similar materials.

END OF SECTION 017329

SECTION 017419 - CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes administrative and procedural requirements for the following:

1. Salvaging nonhazardous demolition and construction waste.
2. Recycling nonhazardous demolition and construction waste.
3. Disposing of nonhazardous demolition and construction waste.

B. Related Requirements:

1. Section 011200 "Multiple Contract Summary" for coordination of responsibilities for waste management.
2. Section 044313.13 "Anchored Stone Masonry Veneer" for disposal requirements for excess stone and stone waste.
3. Section 311000 "Civil Sitework Requirements" for disposition of waste resulting from site clearing and removal of above- and below-grade improvements.

1.3 DEFINITIONS

A. Construction Waste: Building, structure, and site improvement materials and other solid waste resulting from construction, remodeling, renovation, or repair operations. Construction waste includes packaging.

B. Demolition Waste: Building, structure, and site improvement materials resulting from demolition operations.

C. Disposal: Removal of demolition or construction waste and subsequent salvage, sale, recycling, or deposit in landfill, incinerator acceptable to authorities having jurisdiction, or designated spoil areas on Owner’s property.

D. Recycle: Recovery of demolition or construction waste for subsequent processing in preparation for reuse.

E. Salvage: Recovery of demolition or construction waste and subsequent sale or reuse in another facility.

F. Salvage and Reuse: Recovery of demolition or construction waste and subsequent incorporation into the Work.

1.4 MATERIALS OWNERSHIP

A. Unless otherwise indicated, demolition and construction 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 ACTION SUBMITTALS

A. Waste Management Plan: Submit plan within thirty (30) days of date established for the Notice to Proceed.

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 point 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.

G. Qualification Data: For waste management coordinator and refrigerant recovery technician.

H. Statement of Refrigerant Recovery: Signed by refrigerant recovery technician responsible for recovering refrigerant, stating that all refrigerant that was present was recovered and that recovery was performed according to EPA regulations. Include name and address of technician and date refrigerant was recovered.

I. Refrigerant Recovery: Comply with requirements in Section 024119 "Selective Demolition" for refrigerant recovery submittals.

1.7 QUALITY ASSURANCE

A. Waste Management Coordinator Qualifications: Experienced firm, or individual employed and assigned by General Contractor, with a record of successful waste management coordination of projects with similar requirements. Superintendent may serve as Waste Management Coordinator.

B. Refrigerant Recovery Technician Qualifications: Comply with requirements in Section 024119 "Selective Demolition."

C. Regulatory Requirements: Comply with transportation and disposal regulations of authorities having jurisdiction.

D. Waste Management Conference(s): Conduct conference(s) at Project site to comply with requirements in Section 013100 "Project Management and Coordination." Review methods and procedures related to waste management including, but not limited to, the following:

1. Review and discuss waste management plan including responsibilities of each contractor and waste management coordinator.
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 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 demolition and construction waste generated by the Work. Use Form CWM-1 for construction waste and Form CWM-2 for demolition 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 demolition 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 Reuse: For materials that will be salvaged and reused in this Project, describe methods for preparing salvaged materials before incorporation into the Work in compliance with Section 024119 "Selective Demolition."
2. Salvaged Materials for Sale: For materials that will be sold to individuals and organizations, include list of their names, addresses, and telephone numbers.
3. Salvaged Materials for Donation: For materials that will be donated to individuals and organizations, include list of their names, addresses, and telephone numbers.
4. Recycled Materials: Include list of local receivers and processors and type of recycled materials each will accept. Include names, addresses, and telephone numbers.
5. Disposed Materials: Indicate how and where materials will be disposed of. Include name, address, and telephone number of each landfill and incinerator facility.
6. 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 were 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 demolition waste. Include the following:

1. Total quantity of waste.
2. Estimated cost of disposal (cost per unit). Include transportation and tipping fees and cost of collection containers and handling 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 transportation and tipping fees by donating materials.
7. Savings in transportation 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.

PART 2 - PRODUCTS

2.1 RECYCLING RECEIVERS AND PROCESSORS

A. Subject to compliance with requirements, coordinate with locally available recycling receivers and processors.

2.2 PERFORMANCE REQUIREMENTS

A. General: Achieve end-of-Project rates for salvage/recycling of fifty (50) percent by weight of total nonhazardous 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. Demolition Waste:

a. Asphalt paving.
b. Concrete.
c. Concrete reinforcing steel.
d. Brick.
e. Concrete masonry units.
f. Wood studs.
g. Wood joists.
h. Plywood and oriented strand board.
i. Wood paneling.
j. Wood trim.
k. Structural and miscellaneous steel.
l. Rough hardware.
m. Roofing.
n. Insulation.
o. Doors and frames.
p. Door hardware.
q. Windows.
r. Glazing.
s. Metal studs.
t. Gypsum board.
u. Acoustical tile and panels.
v. Carpet.
w. Carpet pad.
x. Demountable partitions.
y. Equipment.
z. Cabinets.
aa. Plumbing fixtures.
bb. Piping.
cc. Supports and hangers.
dd. Valves.
ee. Sprinklers.
ff. Mechanical equipment.
gg. Refrigerants.
hh. Electrical conduit.
ii. Copper wiring.
jj. Lighting fixtures.
kk. Lamps.
ll. Ballasts.
mm. Electrical devices.
nn. Switchgear and panelboards.
oo. Transformers.

2. Construction Waste:

   a. Masonry and CMU.
   b. Lumber.
   c. Wood sheet materials.
   d. Wood trim.
   e. Metals.
   f. Roofing.
   g. Insulation.
   h. Carpet and pad.
   i. Gypsum board.
   j. Piping.
   k. Electrical conduit.
   l. 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) Wood pallets.
      8) Plastic pails.

   m. Construction Office Waste: Regardless of salvage/recycle goal indicated in "General" Paragraph above, salvage or recycle 100 percent of the following construction office waste materials:

      1) Paper.
      2) Aluminum cans.
      3) Glass containers.

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 Section 015000 "Temporary Facilities and Controls."

B. Waste Management Coordinator: Engage a waste management coordinator to 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 (3) 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 and recycled.
2. Comply with Section 015000 "Temporary Facilities and Controls" for controlling dust and dirt, environmental protection, and noise control.

E. Waste Management in Historic Zones or Areas: Transportation equipment and other materials shall be of sizes that clear surfaces within historic spaces, areas, rooms, and openings, by 12 inches or more.

3.2 SALVAGING DEMOLITION WASTE

A. Comply with requirements in [Section 024116 "Structure Demolition"] [Section 024119 "Selective Demolition"] [Section 024296 "Historic Removal and Dismantling] for salvaging demolition waste.

B. Salvaged Items for Reuse in the Work: Salvage items for reuse and handle as follows:

1. Clean salvaged items.
2. Pack or crate items after cleaning. Identify contents of containers with label indicating elements, date of removal, quantity, and location where removed.
3. Store items in a secure area until installation.
4. Protect items from damage during transport and storage.
5. Install salvaged items to comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make items functional for use indicated.

C. Salvaged Items for Sale and Donation: Not permitted on Project site.

D. Salvaged Items for Owner's Use: Salvage items for Owner's use and handle as follows:

1. Clean salvaged items.
2. Pack or crate items after cleaning. Identify contents of containers with label indicating elements, date of removal, quantity, and location where removed.
3. Store items in a secure area until delivery to Owner.
4. Transport items to Owner's storage area designated by Owner.
5. Protect items from damage during transport and storage.

E. Doors and Hardware: Brace open end of door frames. Except for removing door closers, leave door hardware attached to doors.

F. Equipment: Drain tanks, piping, and fixtures. Seal openings with caps or plugs. Protect equipment from exposure to weather.

G. Plumbing Fixtures: Separate by type and size.

H. Lighting Fixtures: Separate lamps by type and protect from breakage.

I. Electrical Devices: Separate switches, receptacles, switchgear, transformers, meters, panelboards, circuit breakers, and other devices by type.

3.3 RECYCLING, DEMOLITION AND CONSTRUCTION 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. 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.

2. Stockpile processed materials on-site without intermixing with other materials. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.
3. Stockpile materials away from construction area. Do not store within drip line of remaining trees.
4. Store components off the ground and protect from the weather.
5. Remove recyclable waste from Owner's property and transport to recycling receiver or processor as often as required to prevent overfilling bins.

3.4 RECYCLING DEMOLITION WASTE

A. Asphalt Paving: Grind asphalt to maximum 1-1/2-inch (38) size.

1. Crush asphaltic concrete paving and screen to comply with requirements in Section 312000 "Earth Moving" for use as general fill.

B. Asphalt Paving: Break up and transport paving to asphalt-recycling facility.

C. Concrete: Remove reinforcement and other metals from concrete and sort with other metals.

1. Pulverize concrete to maximum 1-1/2-inch (38 mm) size.
2. Crush concrete and screen to comply with requirements in Section 312000 "Earth Moving" for use as satisfactory soil for fill or subbase.

D. Masonry: Remove metal reinforcement, anchors, and ties from masonry and sort with other metals.

1. Clean and stack undamaged, whole masonry units on wood pallets.

E. Wood Materials: Sort and stack members according to size, type, and length. Separate lumber, engineered wood products, panel products, and treated wood materials.

F. Metals: Separate metals by type.

1. Structural Steel: Stack members according to size, type of member, and length.
2. Remove and dispose of bolts, nuts, washers, and other rough hardware.

G. Asphalt Shingle Roofing: Separate organic and glass-fiber asphalt shingles and felts. Remove and dispose of nails, staples, and accessories.

H. Gypsum Board: Stack large clean pieces on wood pallets or in container and store in a dry location. Remove edge trim and sort with other metals. Remove and dispose of fasteners.

I. Acoustical Ceiling Panels and Tile: Stack large clean pieces on wood pallets and store in a dry location.

J. Metal Suspension System: Separate metal members, including trim and other metals from acoustical panels and tile, and sort with other metals.

K. Carpet and Pad: Roll large pieces tightly after removing debris, trash, adhesive, and tack strips.

1. Store clean, dry carpet and pad in a closed container or trailer provided by carpet reclamation agency or carpet recycler.

L. Carpet Tile: Remove debris, trash, and adhesive.

1. Stack tile on pallet and store clean, dry carpet in a closed container or trailer provided by carpet reclamation agency or carpet recycler.

M. Piping: Reduce piping to straight lengths and store by material and size. Separate supports, hangers, valves, sprinklers, and other components by material and size.

N. Conduit: Reduce conduit to straight lengths and store by material and size.

O. Lamps: Separate lamps by type and store according to requirements in 40 CFR 273.

3.5 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.

C. Gypsum Board: Stack large clean pieces on wood pallets or in container and store in a dry location.

1. Clean Gypsum Board: Grind scraps of clean gypsum board using small mobile chipper or hammer mill. Screen out paper after grinding.

D. Paint: Seal containers and store by type.

3.6 DISPOSAL OF WASTE

A. General: Except for items or materials to be salvaged or recycled, 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. General: Except for items or materials to be salvaged or recycled, remove waste materials and legally dispose of at designated spoil areas on Owner’s property.

C. Burning: Do not burn waste materials.

D. Burning: Burning of waste materials is permitted only at designated areas on Owner's property, provided required permits are obtained. Provide full-time monitoring for burning materials until fires are extinguished.

END OF SECTION 017419

SECTION 02 41 19 - SELECTIVE DEMOLITION

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Demolition and removal of selected portions of building or structure.
2. Demolition and removal of selected site elements.
3. Salvage of existing items to be reused or recycled.

1.3 RELATED WORK

A. Review all Division 01 Sections.

B. Divisions 02 through 49 Sections for specific requirements. Equally Note:

1. Section 017329 “Cutting and Patching”
2. Section 011000 "Summary" for restrictions on use of the premises, Owner-occupancy requirements, and phasing requirements.
3. Section 017300 "Execution" for cutting and patching procedures.

1.4 DEFINITIONS

A. Remove: Detach items from existing construction and legally dispose of them off-site, unless indicated to be removed and salvaged/store or removed and reinstalled.

B. Remove and Salvage: Detach items from existing construction, in a manner to prevent damage, and deliver to Owner’s requested location ready for reuse.

C. Remove and Store: Detach items from existing construction in a manner to prevent damage, and store at an on-site or off-site location. All off-site location storage is at the expense of the contractor. Store in the location until the Owner requests reinstall or is ready for a coordinated relocation. The item(s) is/are stored until the owner requests or the final completion certificate is issued.

D. Remove and Reinstall: Detach items from existing construction, in a manner to prevent damage, prepare for reuse, and reinstall where indicated. Item may need to be stored for a period as to when it can be reinstalled. Coordinate the work with Construction sequencing.

E. Existing to Remain: Leave existing items that are not to be removed and that are not otherwise indicated to be salvaged, stored, or reinstalled.

F. Dismantle: To remove by disassembling or detaching an item from a surface, using gentle methods and equipment to prevent damage to the item and surfaces; disposing of items unless indicated to be salvaged, stored or reinstalled. Dismantle can be interchangeable with remove

1.5 MATERIALS OWNERSHIP

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

B. Historic items, relics, antiques, and similar objects including, but not limited to, cornerstones, sconces, pendants, 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. Coordinate findings with owner, items in question should be saved and considered through the Request for proposal process.

1. Carefully salvage in a manner to prevent damage and promptly return to Owner.

C. Salvaged items shall remain the property of the Owner unless specifically noted otherwise. In addition to items specifically indicated to be salvaged, Owner reserves the right to request other items to be salvaged prior to actual demolition.

1.6 PREINSTALLATION MEETINGS

A. Pre-demolition Conference: Conduct conference at Job Site Trailer.

1. Inspect and discuss condition of construction to be selectively demolished.
2. Review the Pre-Construction Demolition documents and Submittal
3. Review structural load limitations of existing structure.
4. Review and finalize selective demolition schedule and verify availability of materials, demolition personnel, equipment, and facilities needed to make progress and avoid delays.
5. Review requirements of work performed by other trades that rely on substrates exposed by selective demolition operations.
6. Review areas where existing construction is to remain and requires protection.
7. Review the extent of demolition in various areas with the Owner and identify all items which are to be salvaged to the Owner.

1.7 INFORMATIONAL SUBMITTALS

A. Qualification Data:

1. General Contractor Qualifications: An experienced firm will have completed a coordinated demolition of a project in the last five (5) years.
2. Demolition Firm Qualifications: An experienced firm that has specialized in demolition work similar in material and extent to that indicated for this Project. Must have managed and Substantially Completed at least two (2) projects at a similar facility with similar security restrictions, (i.e. Prisons, Correctional and Detention facilities, Government facilities, or large hospital buildings) each requiring demolition of at least 5,000 square feet of interior and consisted of exterior elements in the year 2010 or later. Demolition Firm Requirements:

a. All demolition subcontractors working in each area and scope of work in line with the demolition drawings will have the appropriate certification for removal of the specific items. For example, the safe removal of refrigerants will only be by refrigerant recovery technician. Comply with all

regulatory requirements. Submit a list of the subcontractors and their credentials related to each area.

b. Regulatory Requirements submittals: Submit and comply with all Federal, State, and Local governing regulations including but not limited to EPA notification regulations before beginning selective demolition. Submit a copy to the Owner and Architect of all documents submitted to any jurisdiction.

c. Comply with hauling and disposal regulations of authorities having jurisdiction and the Airport Operations and Site regulations.

1.8 ACTION SUBMITTALS

A. Pre-Construction Submittal should include:

1. The information submittal as outlined above in Section 1.6/A
2. Proposed Protection Measures:

    a. Submit report, including Drawings, that indicates the measures proposed for protecting individuals and property. This should include both the secure areas and public areas, and items described should include but not limited to: environmental protection needed or requested, dust and Foreign Object Debris (FOD) control, noise control, coverings, identified areas that are vulnerable including those called out on drawings. Indicate proposed locations and construction measures including any barriers.

3. Schedule of Selective Demolition Activities:

    a. Indicate the following:
        1) Detailed sequence of selective demolition and removal work, with starting and ending dates for each activity. Ensure on-site operations of the Owner's staff, Airlines, tenants, and any other Owner approved entity are uninterrupted.
        2) Interruption of utility services. Indicate how long utility services will be interrupted.
        3) Coordination for shutoff, capping, and continuation of utility services.
        4) Use of elevator and stairs as approved by Owner.
        5) Coordination of Owner's continuing occupancy of portions of existing building and of Owner's partial occupancy of completed Work.

4. Indicate the frequency the Contractor's will report progress during the schedule.
5. Pre-demolition Survey and Photographs:

    a. Engage a professional engineer to perform an engineering survey of condition of building to determine whether removing any element might result in structural deficiency or unplanned collapse of any portion of structure or adjacent structures during selective building demolition operations.
        1) Provide written report

b. Inventory the areas where demolition will occur and indicate in writing the items in the photographs that will be demolished, salvaged, stored, reinstalled, and existing to remain.
   1) This is required for each major phase.

c. Show existing conditions of adjoining construction, including finish surfaces, that might be misconstrued as damage caused by demolition operations. Comply with Section 013233 "Photographic Documentation." Submit before Work begins.

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

1.9 CLOSEOUT SUBMITTALS

A. Walkthrough: Schedule a walkthrough of the areas completed as demolished.

1. Gain Written approval of areas completed by Owner or Architect.

B. Inventory: Submit a Photographic and written list, similar to the Preconstruction photo inventory of items that have been removed, salvaged, and/or stored.

C. Documentation of Existing Warranty of existing Roofing.

1. Refer to Warranty Section

1.10 QUALITY ASSURANCE

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

1.11 PROJECT CONDITIONS

A. Hazardous Materials: Owner will contract separately for hazardous materials inspections/surveys/testing in advance of demolition work.

1. This report on the presence of hazardous materials will be made available and will be on file for review and use. Examine report to become aware of locations where hazardous materials are present.
2. If materials suspected of containing hazardous materials are encountered, do not disturb; immediately notify Architect and Owner. Owner will remove hazardous materials under a separate contract.

1.12 FIELD CONDITIONS

A. Owner will occupy portions of building immediately adjacent to selective demolition area. Conduct selective demolition so Owner's operations will not be disrupted.

B. Revise first paragraph below if necessary. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.

1. Before selective demolition, Coordinate with Owner the items that the Owner will remove.

C. Notify Architect of discrepancies between existing conditions and Drawings before proceeding with selective demolition.

D. Hazardous Materials: It is not expected that hazardous materials will be encountered in the Work.

1. Hazardous materials will be removed by Owner before start or restart of the Work.
2. If suspected hazardous materials are encountered, do not disturb; immediately notify Architect and Owner. Hazardous materials will be removed by Owner under a separate contract.

E. Storage or sale of removed items or materials on-site is not permitted.

F. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.

1. Maintain fire-protection facilities in service during selective demolition operations.

1.13 WARRANTY

A. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during selective demolition, by methods and with materials and using approved contractors so as not to void existing warranties. Notify warrantor before proceeding. Existing warranties include the following:

1. Roofing Assembly

B. Notify warrantor on completion of selective demolition and obtain documentation verifying that existing system has been inspected and warranty remains in effect. Submit documentation at Project closeout.

1.14 COORDINATION

A. Arrange selective demolition schedule so as not to interfere with Owner's operations, Airlines, Public Safety and Other Owner Approved Entities.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.

B. Standards: Comply with ASSE A10.6 and NFPA 241.

C. Refer to and comply with all requirements in Section 01 74 19 Construction Waste Management and Disposal.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Retain first paragraph below if disconnection of utilities is the Work of other Sections or if Owner performs work.Verify that utilities have been disconnected and capped before starting selective demolition operations.

B. Review Project Record Documents of existing construction or other existing condition and hazardous material information provided by Owner. Owner does not guarantee that existing conditions are same as those indicated in Project Record Documents.

C. Engage a professional engineer to perform an engineering survey of condition of building to determine whether removing any element might result in structural deficiency or unplanned collapse of any portion of structure or adjacent structures during selective building demolition operations. Written report in preconstruction submittal.

1. Perform surveys as the Work progresses to detect hazards resulting from selective demolition activities.

    a. Provide report at frequency indicated in preconstruction submittal.

D. Verify that hazardous materials have been remediated before proceeding with building demolition operations.

E. Survey of Existing Conditions: Record existing conditions by use of measured drawings and preconstruction photographs

1. Comply with requirements specified in Section 013233 "Photographic Documentation."
2. Inventory and record the condition of items to be removed and salvaged. See the preconstruction submittals. Provide inventory photographs and photographic conditions that might be misconstrued as damage caused by salvage operations.
3. Before selective demolition or removal of existing building elements that will be reproduced or duplicated in final Work, make permanent record of measurements, materials, and construction details required to make exact reproduction.

3.2 PREPARATION

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

3.3 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

A. Existing Services/Systems to Remain: Maintain services/systems indicated to remain and protect them against damage. Coordinate all activity with the Civil Documents.

B. Existing Services/Systems to Be Removed, Relocated, or Abandoned: Locate, identify, disconnect, and seal or cap off utility services and mechanical/electrical systems serving areas to be selectively demolished.

1. Owner will arrange to shut off indicated services/systems when requested by Contractor.
2. Arrange to shut off utilities with utility companies.
3. If services/systems are required to be removed, relocated, or abandoned, provide temporary services/systems that bypass area of selective demolition and that maintain continuity of services/systems to other parts of building.
4. Disconnect, demolish, and remove fire-suppression systems, plumbing, and HVAC systems, equipment, and components indicated on Drawings to be removed.

    a. Piping to Be Removed: Remove portion of piping indicated to be removed and cap or plug remaining piping with same or compatible piping material.
    b. Piping to Be Abandoned in Place: Drain piping and cap or plug piping with same or compatible piping material and leave in place.
    c. Equipment to Be Removed: Disconnect and cap services and remove equipment.
    d. Equipment to Be Removed and Reinstalled: Disconnect and cap services and remove, clean, and store equipment; when appropriate, reinstall, reconnect, and make equipment operational.
    e. Equipment to Be Removed and Salvaged: Disconnect and cap services and remove equipment and deliver to Owner.
    f. Ducts to Be Removed: Remove portion of ducts indicated to be removed and plug remaining ducts with same or compatible ductwork material.
    g. Ducts to Be Abandoned in Place: Cap or plug ducts with same or compatible ductwork material and leave in place.

3.4 PROTECTION

A. Temporary Protection: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.

1. Provide protection to ensure safe passage of people around selective demolition area and to and from occupied portions of building.
2. Provide temporary weather protection, during interval between selective demolition of existing construction on exterior surfaces and new construction, to prevent water leakage and damage to structure and interior areas.
3. Protect walls, ceilings, floors, and other existing finish work that are to remain or that are exposed during selective demolition operations.
4. Cover and protect furniture, furnishings, and equipment that have not been removed.
5. Comply with requirements for temporary enclosures, dust control, heating, and cooling specified in Section 01 50 00 "Temporary Facilities and Controls."

B. Temporary Shoring: Design, provide, and maintain shoring, bracing, and structural supports as required to preserve stability and prevent movement, settlement, or collapse of construction and finishes to remain, and to prevent unexpected or uncontrolled movement or collapse of construction being demolished.

1. Strengthen or add new supports when required during progress of selective demolition.
2. Coordinate the temporary shoring for each phase and document with survey report.

C. Provide temporary means of egress, pathways, circulation, and others means for Owner and occupants to maintain operations as required by the phasing and sequencing of the demolition or scope of work.

D. Comply with all regulatory requirements including but not limited to exiting, egress, and occupancy limits.

E. Remove temporary barricades and protections where hazards no longer exist.

3.5 SELECTIVE DEMOLITION, GENERAL

A. General: General extents of demolition are indicated. Include all additional demolition needed to complete the work. Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:

1. Proceed with selective demolition systematically, from higher to lower level. Complete selective demolition operations above each floor or tier before disturbing supporting members on the next lower level.
2. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping. Temporarily cover openings to remain.
3. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
4. Use of flammable tools or methods:

    a. Gain flammable permits where required, and approvals that are needed by the airport and or regulatory bodies.
    b. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain portable fire-suppression devices during flame-cutting operations. Verify are flammable permits, and approvals that are needed by the airport and or regulatory bodies.
    c. Maintain fire watch during and for at least twenty-four (24) hours after flame-cutting operations.
    d. Maintain adequate ventilation when using cutting torches.

5. Remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials and promptly dispose of off-site.

6. Remove structural framing members and lower to ground by method suitable to avoid free fall and to prevent ground impact or dust generation.
7. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
8. Dispose of demolished items and materials promptly. Comply with requirements in Section 017419 "Construction Waste Management and Disposal."

B. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities. Gain approval by owner or all haul routes, circulation, and timing of all activities.

C. Removed and Stored and Salvaged Items:

1. Clean stored and 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 salvaged items to Owner's storage area where approved and designated by Owner.
5. Protect items from damage during transport and storage.

D. Removed and Reinstalled Items:

1. Clean and repair items to functional condition adequate for intended reuse.
2. Temporary storage of Reinstalled items: 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.

E. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by Architect, items may be removed to a suitable, protected storage location during selective demolition and cleaned and reinstalled in their original locations after selective demolition operations are complete.

3.6 SELECTIVE DEMOLITION PROCEDURES FOR SPECIFIC MATERIALS

A. Concrete: Demolish in small sections. Using power-driven saw, cut concrete to a depth of at least 3/4 inch (19 mm) at junctures with construction to remain. Dislodge concrete from reinforcement at perimeter of areas being demolished, cut reinforcement, and then remove remainder of concrete. Neatly trim openings to dimensions indicated.

B. Masonry: Demolish in small sections. Cut masonry at junctures with construction to remain, using power-driven saw, and then remove masonry between saw cuts.

C. Concrete Slabs-on-Grade: Saw-cut perimeter of area to be demolished, and then break up and remove.

D. Resilient Floor Coverings: Remove floor coverings and adhesive according to recommendations in RFCI's "Recommended Work Practices for the Removal of Resilient Floor Coverings.

E. Roofing: Remove no more existing roofing than what can be covered in one day by new roofing and so that building interior remains watertight and weathertight. See New Roofing Sections for new roofing requirements.

1. Remove existing roof membrane, flashings, copings, and roof accessories.
2. Remove existing roofing system down to substrate.
3. Coordinate the tie-in with new construction, leave excess where needed.
4. Coordinate the Roof Tie-in with approved sequence plans.
5. Coordinate the inspection and approval of existing warranty.

F. Piping, electrical and ductwork: Remove as indicated and otherwise needed. Unless otherwise indicated remove abandoned piping, electrical lines and ductwork back to source and permanently cap.

3.7 DISPOSAL OF DEMOLISHED MATERIALS

A. Remove demolition waste materials from Project site and dispose of them in an EPA-approved construction and demolition waste landfill acceptable to authorities having jurisdiction. Recycle or dispose of them according to Section 01 74 19 "Construction Waste Management and Disposal.

1. Do not allow demolished materials to accumulate on-site.
2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
3. Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.
4. Comply with requirements specified in Section 01 74 19 "Construction Waste Management and Disposal."

B. Burning: Do not burn demolished materials.

3.8 CLEANING

A. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before selective demolition operations began.

END OF SECTION 02 41 19

SECTION 051200 - STRUCTURAL STEEL

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
1. Structural steel framing members and all related accessories such as structural embeds, connections, bolts, welds, fasteners, threaded rods, headed studs, including fabrication, erection and all related work and accessories.
2. Framing around openings in roof and floor deck systems.
3. Connections and other performance specified items, including related design by contractor's specialty structural engineer.
4. Temporary bracing and shoring, including related design by contractor's specialty structural engineer.
5. Shop applied finishes and coatings, including preparation, primers, special paint systems or galvanizing on steel exposed to exterior or aggressive environments, and bitumastic coating on steel below grade in soil
6. Shear stud connectors.
7. Shrinkage-resistant grout.
8. Structural cast steel components including: Timber End Connectors.

B. Related Requirements:
1. Section 01 45 33 Structural Tests and Special Inspections
2. Division 03 Section "Concrete" for items attached to formwork, anchors and embeds to be cast in concrete.
3. Division 04 Section "Unit Masonry" for items attached to masonry, anchors and embeds to be set in masonry.
4. Section 05 05 19 "Post-Installed Anchors" for anchoring steel to concrete or masonry.
5. Section 05 31 00 "Steel Decking" for field installation of shear stud connectors through deck.
6. Section 05 50 00 "Metal Fabrications" for miscellaneous steel fabrications and other steel items not defined as structural steel.
7. Section 09 91 13 "Exterior Painting" and Section 09 91 23 "Interior Painting" and Section 09 96 00 "High-Performance Coatings" for painting requirements.

1.2 DEFINITIONS

A. Structural Steel: Elements of the structural frame indicated on Drawings and as described in ANSI/AISC 303, that support design loads, and as indicated on the structural contract documents.

B. Heavy Sections: Rolled and built-up sections as follows:
1. Shapes included in ASTM A6/A6M with flanges thicker than 1-1/2 inches.

1.3 COORDINATION

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

B. Coordinate installation of anchorage items to be embedded in or attached to other construction without delaying the Work. Provide setting diagrams, sheet metal templates, instructions, and directions for installation.

C. Verify actual locations of existing structure, new work previously placed and other construction to which the new work must fit by accurate field measurements before submittal of related shop drawings or fabrication. Show recorded measurements on shop drawings submitted for review. Coordinate fabrication schedule with construction progress to avoid delay of Work. Where work will be connected to existing masonry or concrete, contractor shall engage a testing agency to pre-locate hidden embeds and reinforcing steel prior to submittal of shop drawings. Provide templates and dimensions to fabricator for accurate alignment with existing conditions. Show field conditions impacting the work on the shop drawings, prior to submittal.

1.4 ACTION SUBMITTALS

A. Product Data:
1. Structural-steel materials.
2. High-strength, bolt-nut-washer assemblies.
3. Shear stud connectors.
4. Anchor rods.
5. Threaded rods.
6. Forged-steel hardware.
7. Shop primer.
8. Galvanized-steel primer.
9. Galvanized repair paint.
10. Shrinkage-resistant grout.
11. Casting material test reports and non-destructive test reports.

B. Shop Drawings: Show fabrication of structural-steel components.
1. Submit shop drawings under provisions of Division 1 Section “Submittal Procedures”. Phase submittals to match sequence of actual construction to avoid delay of work. Field verify all existing conditions impacting this work and add relevant field information to shop drawings, prior to submittal of shop drawings.
2. Indicate profiles, sizes, spacing, and locations of structural members, connections, attachments, fasteners, loads, welds, and headed studs. Cut erection details where details are cut on structural plans and add erection details as needed. Provide erection plans, erection details and member detail sheets. If partial area submittals are made, submit all related sheets and cloud related plan areas. Reference specific structural plans and details from which information is drawn or submittals will be rejected.
3. Include details of cuts, connections, splices, camber, holes, and other pertinent data.
4. Include details of Structural Cast Steel components: Design, detail and engineer castings including establishing interior and exterior dimensions and the preparation of casting specifications
5. Include embedment Drawings.
6. Provide setting drawings, templates and directions for the installation of the anchor rods and other anchoring devices, including embedments.
7. Indicate welds by standard AWS symbols, distinguishing between shop and field welds, and show size, length, and type of each weld. Show backing bars that are to be removed and supplemental fillet welds where backing bars are to remain.
8. Indicate type, size, and length of bolts, distinguishing between shop and field bolts. Identify pretensioned and slip-critical, high-strength bolted connections.

9. Identify members not to be shop primed.

C. Delegated-Design Submittal: For structural-steel connections indicated on Drawings to comply with design loads, include analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
   1. Calculations: Contractor shall engage a specialty structural engineer to perform final design calculations and submit same, for all connections not fully designed and detailed on the drawings by the Structural Engineer of Record (SER). Design for the criteria indicated here-in and as shown on the drawings. Submit signed calculations same day as steel framing shop drawings to which they relate, to ensure compatibility between specialty engineers calculations and shop drawings.
   2. Specialty engineer responsible for connection design shall review shop drawings to ensure compatibility between specialty engineers calculations and shop drawings and submit a letter along with calculations stating the shop drawings have been reviewed and conforms to the calculations.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Fabricator
   1. Reference section 1.8.A, “Quality Assurance”, Fabricator Qualifications submit one of the following as fabricator qualification.
   2. AISC Quality Certification Program: Submit documentation with initial shop drawing submittal as follows:
      a. Proof of AISC Certification.

B. Welding certificates.

1.6 QUALITY ASSURANCE

A. Fabricator Qualifications: A qualified fabricator that participates in the AISC Quality Certification Program and is designated an AISC-Certified Plant, Category BU~~.~~

B. Installer Qualifications: A qualified installer who has a minimum of 5 years experience in the erection of structural steel framing.
   1. Provide resume indicating compliance with work experience above. Work shall not begin until installer has received written approval from Architect that they are registered and approved by building code official in accordance with IBC Chapter 17.

C. Contractor shall assign a qualified staff member to perform quality control on their own work in the field on a daily basis, for each day work is performed. The Contractor’s quality control staff shall review their own work for compliance with contract documents before the Contractor notifies the design team or others, of readiness for required inspections, tests and observations to be provided by the Owner’s Representatives.

D. Specialty Structural Engineer Qualifications: Employ professional Engineer, registered in State where Project is located, to perform design of connections to meet structural performance requirements.

E. Welding Qualifications: Qualify procedures and personnel in accordance with AWS D1.1/D1.1M.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Store materials to permit easy access for inspection and identification. Keep steel members off ground and spaced by using pallets, dunnage, or other supports and spacers. Protect steel members and packaged materials from corrosion and deterioration.
   1. Do not store materials on structure in a manner that might cause distortion, damage, or overload to members or supporting structures. Repair or replace damaged materials or structures as directed.

B. Store fasteners in a protected place in sealed containers with manufacturer's labels intact.
   1. Fasteners may be repackaged provided Owner's testing and inspecting agency observes repackaging and seals containers.
   2. Clean and relubricate bolts and nuts that become dry or rusty before use.
   3. Comply with manufacturers' written recommendations for cleaning and lubricating ASTM F3125/F3125M, Grade F1852 bolt assemblies and for retesting bolt assemblies after lubrication.

C. Deliver anchor rods and other anchorage devices to be embedded in concrete or masonry construction to site in time for installation without impact on schedule. Provide setting diagrams, sheet metal templates, instructions, and directions for installation.

1.8 COORDINATION OF TOLERANCES BETWEEN CASTINGS AND STRUCTURAL FRAMING

A. The Steel Fabricator shall assume responsibility for the final coordination between cast steel product tolerances and the overall structural geometry, including allowances for fabrication and erection tolerances.

B. The Steel Fabricator shall notify the manufacturer of any discrepancies between the custom casting design and the overall structural geometry in a timely manner so that these discrepancies can be resolved prior to the creation of casting tooling.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Comply with applicable provisions of the following specifications and documents:
   1. ANSI/AISC 303.
   2. ANSI/AISC 360.
   3. RCSC's "Specification for Structural Joints Using High-Strength Bolts."

B. Connection Design Information:
   1. For simple shear connections, fabricator's experienced steel detailer shall select or complete connections in accordance with ANSI/AISC 303.
      a. Select and complete connections using schematic details indicated and ANSI/AISC 360.
      b. Use Load and Resistance Factor Design; data are given at factored-load level
   2. Design coped shear, axially loaded beam, braced frame, and moment connections and final configuration of member reinforcement at connections in accordance with ANSI/AISC 303 by fabricator's qualified professional engineer.
      a. Use Load and Resistance Factor Design; data are given at factored-load level

C. Moment Connections: Type FR, fully restrained.

D. Construction: Combined system of braced frame, cantilever column, and shear walls.

2.2 STRUCTURAL-STEEL MATERIALS

A. Provide material indicated below except where higher grade material is explicitly shown on drawings or delegated design submittal.

B. W-Shapes: ASTM A992/A992M

C. Channels, Angles: ASTM A36/A36M

D. Plate and Bar: ASTM A36/A36M, ASTM A572/A572M, Grade 50, ASTM A529/A529M, Grade 50.

E. Cold-Formed Hollow Structural Sections: ASTM A500/A500M, Grade C, structural tubing.

F. Steel Pipe: ASTM A53/A53M, Type E or Type S, Grade B.
1. Weight Class: As indicated on drawings
2. Finish: Black except where indicated to be galvanized.

G. Steel Castings: ASTM A216/A216M, Grade WCB, with supplementary requirement S11.

H. Steel Forgings: ASTM A668/A668M.

I. Welding Electrodes: Comply with AWS requirements.

2.3 BOLTS AND CONNECTORS

A. High-Strength A325 Bolts, Nuts, and Washers: ASTM F3125/F3125M, Grade A325, Type 1, heavy-hex steel structural bolts; ASTM A563, Grade DH, heavy-hex carbon-steel nuts; and ASTM F436/F436M, Type 1, hardened carbon-steel washers; all with plain finish.
1. Direct-Tension Indicators: ASTM F959/F959M, Type 325-1, compressible-washer type with plain finish.

B. High-Strength A490 Bolts, Nuts, and Washers: ASTM F3125/F3125M, Grade A490, Type 1, heavy-hex steel structural bolts; ASTM A563, Grade DH, heavy-hex carbon-steel nuts; and ASTM F436/F436M, Type 1, hardened carbon-steel washers; all with plain finish.
1. Direct-Tension Indicators: ASTM F959/F959M, Type 490-1, compressible-washer type with plain finish.
2. Use where indicated on drawings or within delegated design submittal.

C. Zinc-Coated High-Strength A325 Bolts, Nuts, and Washers: ASTM F3125/F3125M, Grade A325, Type 1, heavy-hex steel structural bolts; ASTM A563, Grade DH, heavy-hex carbon-steel nuts; and ASTM F436/F436M, Type 1, hardened carbon-steel washers.
1. Finish: Hot-dip zinc coating.
2. Direct-Tension Indicators: ASTM F959/F959M, Type 325-1, compressible-washer type with mechanically deposited zinc coating finish.

D. Tension-Control, High-Strength Bolt-Nut-Washer Assemblies: ASTM F3125/F3125M, Grade F1852, Type 1, heavy-hex head assemblies, consisting of steel structural bolts with splined ends; ASTM A563, Grade DH, heavy-hex carbon-steel nuts; and ASTM F436/F436M, Type 1, hardened carbon-steel washers.
1. Finish: Plain.

E. Shear Stud Connectors or Headed Stud Concrete Anchors (HSA): ASTM A108, AISI C-1015 through C-1020, headed-stud type, cold-finished carbon steel; AWS D1.1/D1.1M, Type B.
   1. The ferules shall be specifically designed for the weld-through technique.

F. Structural Thermal Breaks: Provide one of the following structural thermal breaks products including bushings and washers:
   1. Armatherm FRR
   2. Fabreeka-TIM

2.4 RODS

A. Unheaded Anchor Rods: ASTM F1554, Grade 36]
   1. Configuration: Straight (or hooked if indicatged on drawings)
   2. Nuts: ASTM A563 heavy-hex carbon steel.
   3. Plate Washers: ASTM A36/A36M carbon steel.
   4. Washers: ASTM F436, Type 1, hardened carbon steel.
   5. Finish: Plain or Hot-dip zinc coating, ASTM A153/A153M, Class C, as indicated on drawings

B. Headed Anchor Rods: [ASTM F1554, Grade 36] [ASTM F1554, Grade 55, weldable] [ASTM A354] [ASTM A449], straight.
   1. Nuts: ASTM A563 heavy-hex carbon steel.
   2. Plate Washers: ASTM A36/A36M carbon steel.
   3. Washers: ASTM F436, Type 1, hardened carbon steel.
   4. Finish: Plain or Hot-dip zinc coating, ASTM A153/A153M, Class C as indicated on the drawings.

C. Threaded Rods: ASTM A36/A36M
   1. Nuts: ASTM A 63 heavy-hex carbon steel.
   2. Washers: ASTM F436, Type 1, hardened carbon steel.
   3. Finish: Plain or Hot-dip zinc coating, ASTM A153/A153M, Class C as indicated on drawings.

D. Deformed Bar Anchors (DBA):
   1. Manufactures:
      a. Nelson Stud Welding, Inc.
   2. ASTM A496, uniform diameter with minimum tensile strength of 80ksi.

E. Expansion Bolts:
   1. Manufactures:
      a. Liebig International, Ultraplus
      b. Hilti, Kwik-Bolts II
      c. ITW Ramset/Redhead, Trubolt
      d. Wej-it Expansion Products, Inc. Wej-it Bolts
   2. If embedment length is not indicated on the drawings, provide embedment length recommended by the manufacturer to develop full strength of bolt.

F. Adhesive Anchors into Hollow Masonry:
   1. Manufacturers:
      a. Hilti, HY 200
   2. Rods: Standard rods per ASTM A36.

3. If embedment length is not indicated on the Drawings, provide embedment length recommended by manufacturer to develop full strength of bolt.

G. Adhesive Anchors into Solid Masonry or Concrete:
1. Manufacturers:
a. Hilti, HIT RE 500
2. Rods:
a. Standard rods per ASTM A36.
b. Super rods per ASTM A193 Grade B7.
c. Stainless steel rods per ASTM F593 Condition CW.
d. Reinforcement bar per Section 03 20 0.
3. If embedment length is not indicated on the Drawings, provide embedment length recommended by manufacturer to develop full strength of bolt.

H. Provide rods threaded full length with 45 degree bevel cut at base.

2.5 FORGED-STEEL STRUCTURAL HARDWARE

A. Clevises and Turnbuckles: Made from cold-finished carbon-steel bars, ASTM A108, AISI C-1035.

B. Eye Bolts and Nuts: Made from cold-finished carbon-steel bars, ASTM A108, AISI C-1030.

C. Sleeve Nuts: Made from cold-finished carbon-steel bars, ASTM A108, AISI C-1018.

2.6 STRUCTURAL CAST STEEL COMPONENTS

A. Manufacturers:

1. CAST CONNEX, Timber End Connector

B. Substitutions: Requests for substitutions will be considered in accordance with provisions of Section 01 60 00 - Product Requirements.

C. Structural Cast Steel Components

1. Timber End Connectors (TEC): Provide as shown on the drawings, as manufactured by Cast Connex Corporation including:

a. Materials shall comply with manufacturer's current published data for dimensions.
b. Connection between the Timber End Connector and the timber/glulam element shall be coordinated between Cast Connex Corporation and the Timber Supplier.

2.7 PRIMER

A. Steel Primer:
1. For painted steel Comply with Section 09 91 13 "Exterior Painting" and Section 09 91 23 "Interior Painting."
2. Fabricator's standard lead- and chromate-free, nonasphaltic, rust-inhibiting primer complying with MPI#79 and compatible with topcoat.

B. Galvanized-Steel Primer:
   1. Etching Cleaner: MPI#25, for galvanized steel.
   2. Galvanizing Repair Paint: ASTM A780/A780M.

C. Bituminous Protection Coating: Carboline, Bitumastic 50

2.8 SHRINKAGE-RESISTANT GROUT

A. Nonmetallic, Shrinkage-Resistant Grout: ASTM C1107/C1107M, factory-packaged, nonmetallic aggregate grout, noncorrosive and nonstaining, mixed with water to consistency suitable for application and a 30-minute working time.

2.9 FABRICATION

A. Structural Steel: Fabricate and assemble in shop to greatest extent possible. Fabricate in accordance with ANSI/AISC 303 and to ANSI/AISC 360.
   1. Camber structural-steel members where indicated.
   2. Fabricate beams with rolling camber up.
   3. Identify high-strength structural steel in accordance with ASTM A6/A6M and maintain markings until structural-steel framing has been erected.
   4. Mark and match-mark materials for field assembly.
   5. Complete structural-steel assemblies, including welding of units, before starting shop-priming operations.

B. Thermal Cutting: Perform thermal cutting by machine to greatest extent possible.
   1. Plane thermally cut edges to be welded to comply with requirements in AWS D1.1/D1.1M.

C. Bolt Holes: Cut, drill, mechanically thermal cut, or punch standard bolt holes perpendicular to metal surfaces.

D. Finishing: Accurately finish ends of columns and other members transmitting bearing loads.

E. Cleaning: Clean and prepare steel surfaces that are to remain unpainted in accordance with SSPC-SP 2.

F. Shear Stud Connectors: Prepare steel surfaces as recommended by manufacturer of shear connectors. Weld using automatic end welding of headed-stud shear connectors in accordance with AWS D1.1/D1.1M and manufacturer's written instructions.

G. Holes: Provide holes required for securing other work to structural steel and for other work to pass through steel members.
   1. Cut, drill, or punch holes perpendicular to steel surfaces. Do not thermally cut bolt holes or enlarge holes by burning.
   2. Baseplate Holes: Cut, drill, mechanically thermal cut, or punch holes perpendicular to steel surfaces.
   3. Weld threaded nuts to framing and other specialty items indicated to receive other work.

H. Architecturally Exposed Structural Steel: Comply with fabrication requirements, including tolerance limits, of AISC's "Code of Standard Practice for Steel Buildings and Bridges" for structural steel identified as architecturally exposed structural steel.

1. Fabricate with exposed surfaces smooth, square, and free of surface blemishes including pitting, rust, scale, seam marks, roller marks, rolled trade names, and roughness.
2. Remove blemishes by filling or grinding or by welding and grinding, before cleaning, treating, and shop priming.

I. Orient weld seams of all exposed HSS columns to reduce visibility.

2.10 SHOP CONNECTIONS

A. High-Strength Bolts: Shop install high-strength bolts in accordance with RCSC's "Specification for Structural Joints Using High-Strength Bolts" for type of bolt and type of joint specified.
   1. Joint Type: As indicated on drawings or delegated design submittal

B. Weld Connections: Comply with AWS D1.1/D1.1M for tolerances, appearances, welding procedure specifications, weld quality, and methods used in correcting welding work.
   1. Assemble and weld built-up sections by methods that maintain true alignment of axes without exceeding tolerances in ANSI/AISC 303 for mill material.

2.11 RELATED STEEL FABRICATION FOR CAST STEEL PRODUCTS

A. Cast steel products are to be delivered to the shop of the Steel Fabricator and incorporated into the structural steelwork by the Steel Fabricator.

B. Base material joint preparation and cleaning:

   1. Prior to welding, steel casting surfaces for welding shall be prepared by the Steel Fabricator and shall be clean and free from paint, oil, rust, scale, slag, grease, and other foreign materials that are detrimental to welding.

C. Welds between the connectors and the attaching structural member shall be ground flush and smooth to the exterior of the connector or, if loading allows and the steel assembly incorporating the connectors will be within the building envelope, the welded joints may be prepared with a concave finish and an automotive body filler material that is compatible with the steel coating system may be used to mask the welded joint.

D. Unless otherwise noted on the drawings, cast steel products are to be coated along with and using the same coating system as applied to the attaching structural steel elements.

   1. Do not apply coatings to any stainless-steel pin accessories supplied by Cast Connex Corporation.

2.12 GALVANIZING

A. Hot-Dip Galvanized Finish: Apply zinc coating by the hot-dip process to structural steel in accordance with ASTM A123/A123M.
   1. Fill vent and drain holes that are exposed in the finished Work unless they function as weep holes, by plugging with zinc solder and filing off smooth.
   2. Galvanize lintels, shelf angles, and welded door frames attached to structural-steel frame and located in exterior walls.

2.13 SHOP PRIMING

A. Shop prime steel surfaces exposed to view and all other steel surfaces, except the following:
   1. Surfaces embedded in concrete or mortar. Extend priming of partially embedded members to a depth of 2 inches.
   2. Surfaces to be field welded.
   3. Surfaces of high-strength bolted, slip-critical connections.
   4. Surfaces to receive sprayed fire-resistive materials (applied fireproofing).
   5. Galvanized surfaces unless indicated to be painted.
   6. Surfaces enclosed in interior construction.

B. Surface Preparation of Steel: Clean surfaces to be painted. Remove loose rust and mill scale and spatter, slag, or flux deposits. Prepare surfaces in accordance with the following specifications and standards:
   1. SSPC-SP 2.
   2. SSPC-SP 3.

C. Surface Preparation of Galvanized Steel: Prepare galvanized-steel surfaces for shop priming by thoroughly cleaning steel of grease, dirt, oil, flux, and other foreign matter, and treating with etching cleaner or in accordance with SSPC-SP 16.

D. Priming: Immediately after surface preparation, apply primer in accordance with manufacturer's written instructions and at rate recommended by SSPC to provide a minimum dry film thickness of 1.5 mils. Use priming methods that result in full coverage of joints, corners, edges, and exposed surfaces.
   1. Stripe paint corners, crevices, bolts, welds, and sharp edges.
   2. Apply two coats of shop paint to surfaces that are inaccessible after assembly or erection. Change color of second coat to distinguish it from first.

2.14 SOURCE QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified testing agency to perform shop tests and inspections. These shop tests and Inspections are not required for fabricators meeting AISC Certification qualifications.
   1. Allow testing agency access to places where structural-steel work is being fabricated or produced to perform tests and inspections.
   2. Bolted Connections: Inspect and test shop-bolted connections in accordance with RCSC's "Specification for Structural Joints Using High-Strength Bolts."
   3. Welded Connections: Visually inspect shop-welded connections in accordance with AWS D1.1/D1.1M and the following inspection procedures, at testing agency's option:
      a. Liquid Penetrant Inspection: ASTM E165/E165M.
      b. Magnetic Particle Inspection: ASTM E709; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration are not accepted.
      c. Ultrasonic Inspection: ASTM E164.
      d. Radiographic Inspection: ASTM E94/E94M.
   4. In addition to visual inspection, test and inspect shop-welded shear stud connectors in accordance with requirements in AWS D1.1/D1.1M for stud welding and as follows:
      a. Perform bend tests if visual inspections reveal either a less-than-continuous 360-degree flash or welding repairs to any shear stud connector.

b. Conduct tests in accordance with requirements in AWS D1.1/D1.1M on additional shear stud connectors if weld fracture occurs on shear stud connectors already tested.

5. Prepare test and inspection reports.
6. Correct deficiencies in Work that test reports and inspections indicate does not comply with the Contract Documents.

PART 3 - **EXECUTION**

3.1 EXAMINATION

A. Verify, with certified steel erector present, elevations of concrete- and masonry-bearing surfaces and locations of anchor rods, bearing plates, and other embedments for compliance with requirements.
1. Verify dimensions that affect the new work including gridlines, column and beam centerlines, face of wall, etc.
2. Prepare a certified survey of existing conditions. Include bearing surfaces, anchor rods, bearing plates, and other embedments showing dimensions, locations, angles, and elevations.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Provide temporary shores, guys, braces, and other supports during erection to keep structural steel secure, plumb, and in alignment against temporary construction loads and loads equal in intensity to design loads. Remove temporary supports when permanent structural steel, connections, and bracing are in place unless otherwise indicated on Drawings.
1. Do not remove temporary shoring supporting composite deck construction and structural-steel framing until cast-in-place concrete has attained its design compressive strength.

3.3 ERECTION

A. Set structural steel accurately in locations and to elevations indicated and in accordance with ANSI/AISC 303 and ANSI/AISC 360.

B. Baseplates: Clean concrete- and masonry-bearing surfaces of bond-reducing materials, and roughen surfaces prior to setting plates. Clean bottom surface of plates.
1. Set plates for structural members on wedges, shims, or setting nuts as required.
2. Weld plate washers to top of baseplate.
3. Snug-tighten anchor rods after supported members have been positioned and plumbed. Do not remove wedges or shims but, if protruding, cut off flush with edge of plate before packing with grout.
4. Promptly pack shrinkage-resistant grout solidly between bearing surfaces and plates, so no voids remain. Neatly finish exposed surfaces; protect grout and allow to cure. Comply with manufacturer's written installation instructions for grouting.

C. Maintain erection tolerances of structural steel within ANSI/AISC 303.

D. Align and adjust various members that form part of complete frame or structure before permanently fastening. Before assembly, clean bearing surfaces and other surfaces that

are in permanent contact with members. Perform necessary adjustments to compensate for discrepancies in elevations and alignment.

1. Level and plumb individual members of structure. Slope roof framing members to slopes indicated on Drawings.
2. Make allowances for difference between temperature at time of erection and mean temperature when structure is completed and in service.

E. Splice members only where indicated.

F. Do not use thermal cutting during erection[unless approved by Architect. Finish thermally cut sections within smoothness limits in AWS D1.1/D1.1M].

G. Do not enlarge unfair holes in members by burning or using drift pins. Ream holes that must be enlarged to admit bolts.

H. No trades may field cut or alter structural members without specific approval of the Structural Engineer. Submit dimensioned plan and detail sketch of proposed modification under cover of an RFI or cloud proposed changes on shop drawings.

I. Provide deck support framing typically around openings in roof and floor deck cutting more than one deck rib. Also provide support thus where openings cutting only 1 rib occur within 24” of each other in the same deck span. Typical support detail is shown on the drawings. Not all openings are shown on the structural drawings. Fabricator shall coordinate with Mechanical, Electrical, Roofing contractors and other associated trades to include all such work in base bid and determine final locations as required.

J. Coat all steel below grade with bituminous protection coating per manufactures instruction.

3.4 FIELD CONNECTIONS

A. High-Strength Bolts: Install high-strength bolts in accordance with RCSC's "Specification for Structural Joints Using High-Strength Bolts" for bolt and joint type specified.
   1. Joint Type: As indicated in delegated design submittal

B. Weld Connections: Comply with AWS D1.1/D1.1M for tolerances, appearances, welding procedure specifications, weld quality, and methods used in correcting welding work.
   1. Comply with ANSI/AISC 303 and ANSI/AISC 360 for bearing, alignment, adequacy of temporary connections, and removal of paint on surfaces adjacent to field welds.
      a. Contractor shall remove all weld slag using pick and brush to expose bright steel for self-verification of workmanship by the contractor and for Quality Assurance access by testing agency. This shall be done on a daily basis as welding proceeds.
   2. Remove backing bars or runoff tabs, back gouge, and grind steel smooth.
   3. Assemble and weld built-up sections by methods that maintain true alignment of axes without exceeding tolerances in ANSI/AISC 303 for mill material.

C. Tension Control Devices:
   1. Install using electric power wrench as recommended by bolt manufacturer.
   2. Tighten until splined end of bolt is sheared off.

D. Expansion Bolts or Adhesive Anchors: Install according to manufactures published instructions.

E. Shear Connectors: Prepare steel surfaces as recommended by manufacturer of shear connectors. Use automatic end welding of headed-stud shear connectors according to AWS D1.1/D1.1M and manufacturer's written instructions.
   1. The top flanges of the beams receiving stud shear connectors shall be free of any substances that might interfere with the welding operations.
   2. During welding the steel decking panels shall be free of detrimental substances and rest tightly upon the top flange of the beam.
   3. Do not weld when the temperature is below 0 degrees F.
   4. Remove standing water in deck ribs so that water is not trapped between beams and deck during welding.
   5. Install studs after steel framing and metal decking are in place.
   6. Prior to starting each day's operations, weld at least two shear studs to determine proper generator control unit and stud welder settings.
   7. Test that studs are capable of being bent 45 degrees from vertical without weld failure.
   8. Weld additional trial shear studs at request of ITL.
   9. Minimum projection of stud above top of deck: 1-1/2 inches.

3.5 FIELD QUALITY CONTROL

A. Special Inspections: Owner will engage a qualified special inspector to provide special inspections and testing services and prepare reports in accordance with Division 1, Section "Structural Tests and Special Inspections", and with IBC Chapter 17 and other items which in the professional judgement of the Structural Engineer of Record, are critical to the integrity of the building structure.

B. Special Inspections: Owner will engage a special inspector to perform the following special inspections:
   1. Verify structural-steel materials and inspect steel frame joint details.
   2. Verify weld materials and inspect welds.
   3. Verify connection materials and inspect high-strength bolted connections.

C. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections as indicated under "Special Inspection and Testing Criteria."
   1. Bolted Connections: Inspect and test bolted connections in accordance with RCSC's "Specification for Structural Joints Using High-Strength Bolts."
   2. Welded Connections: Visually inspect field welds in accordance with AWS D1.1/D1.1M.
      a. In addition to visual inspection, test and inspect field welds in accordance with AWS D1.1/D1.1M and the following inspection procedures, at testing agency's option:
         1) Liquid Penetrant Inspection: ASTM E165/E165M.
         2) Magnetic Particle Inspection: ASTM E709; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration are not accepted.
         3) Ultrasonic Inspection: ASTM E164.
         4) Radiographic Inspection: ASTM E94/E94M.

D. In addition to visual inspection, test and inspect field-welded shear connectors according to requirements in AWS D1.1/D1.1M for stud welding and as follows:
   1. Perform bend tests if visual inspections reveal either a less-than-continuous 360-degree flash or welding repairs to any shear connector.

2. Conduct tests according to requirements in AWS D1.1/D1.1M on additional shear connectors if weld fracture occurs on shear connectors already tested.

3.6 SPECIAL INSPECTION AND TESTING CRITERIA

A. General
1. If special inspection of fabricators work is required in the shop, testing agent may test and inspect structural steel at plant before shipment. Owner and SER reserve right to reject material not complying with Contract Documents at any time before final acceptance.

B. Definitions
1. Refer to Division 1, Section “Structural Tests and Special Inspections”for standard requirements.
2. A.S.N.T.: The American Society for Non-destructive Testing
3. N.D.E.: Non-destructive Evaluation
4. A.W.S./C.A.W.I.: American Welding Society / Certified Associate Weld Inspector
5. A.W.S./C.W.I.: American Welding Society / Certified Weld Inspector
6. Special Inspector – Technical: Shall be employed by a testing agency and shall be supervised by an A.W.S./C.W.I. with a minimum of 10 years experience, or an A.S.N.T. Level III with a minimum of 10 years experience. These individuals shall satisfy the following requirements:
   a. Technical I: Non-destructive Testing Technician A.S.N.T.-TC-1A Level I, and/or A.W.S. Certified Associate Weld Inspector (C.A.W.I.)
   b. Technical II: Nondestructive Testing Technician A.S.N.T.-TC-1A Level II (NDE Technician II), A.W.S./C.A.W.I. with minimum 3 years experience, or an A.W.S./C.W.I
   c. Technical III: A.S.N.T. Level III with a minimum of 10 years experience or an A.W.S./C.W.I with a minimum of 10 years experience.
7. Special Inspector – Structural
   a. Structural I: Graduate civil/structural engineer, or other personnel acceptable to the SER, with experience in the design of structural systems of this type. Inspections shall be performed under the direct supervision of a licensed civil/structural engineer.
   b. Structural II: Civil/structural engineer regularly engaged in the design of structural systems of this type, licensed in the state in which the project is located. The licensed engineer shall review and approve all inspection reports.
   c. Special Inspector – Structural may be an employee of the SER.

C. Special Testing and Inspection Requirements
1. High Strength Bolting (Field Installed).
   a. General (Technical II)
      1) Visually inspect mating surfaces and bolt type for all slip-critical bolted connections for general conformance with the contract documents prior to bolting.
      2) Determine the requirements for bolts, nuts, washers, paint and installation/tightening standards are met.
      3) Observe calibration procedures when such procedures are required in the contract documents and verify that selected procedure is used to tighten bolts.
   b. Slip Critical Bolts and Tension Bolts (Technical II)

1) Test bolt tightening in 10% of all bolts. Test a minimum of two bolts in each connection. Verify that all plies of connected elements have been brought into contact, at 100% of connection. Verify all tips are removed from “twist-off” bolts.

c. Bearing Bolts (Technical II)
1) Visually inspect to conform all plies of connected elements have been brought into contact, at 100% of connections. (Applies only to bolts designed for values not requiring exclusion of threads from failure plane, all other bolts require testing as for tension bolts.)

d. Standard
1) Test High Strength bolted connections per R.C.S.C. Specifications for Structural Joints Using ASTM A325 or A490 Bolts.

2. High Strength Bolting (Shop Installed) (Technical II)
a. For shop fabricated work, perform tests required for field installation, except that bolt testing may be reduced of deleted, if fabrication shop satisfies AISC Quality Certification Program – Category I, or more stringent criteria, or is approved by SER.

3. Welding (General): The Special Inspector shall perform the following (Technical II):
a. Prior to start of fabrication, determine if fabrication shop meets the criteria for exempting shop welds from inspection and confirm in writing to SER.
b. Verify qualifications of all welders as AWS certified.
c. Verify proposed welding procedures and materials.
d. Verify adequate preparation of faying surfaces.
e. Verify preheat and interpass temperature of steel, proper technique and sequence of welding, and cleaning and number of passes are provided as required.

4. Welding (Field)
a. Fillet Welds (Technical II)
1) Visually inspect 100% of all fillet welds for size, length and quality per AWS D1.1.

b. Partial Penetration Welds (Technical II)
1) Test 100% of all partial penetration welds exceeding 5/16 inch, using Ultrasonic Tester per AWS D1.1. Test 25% of all partial penetration welds less than 5/16 inch, using Magnetic Particle Testing per ASTM E109, performed on root pass on finished weld.

c. Full Penetration Welds (Technical II)
1) Test 100% of all full penetration welds exceeding 5/16 inch, using Ultrasonic Tester per AWS D1.1. Test 25% of all full penetration welds less than 5/16 inch, using Magnetic Particle Testing per ASTM E109, performed on root pass on finished weld.

d. Stud Shear Connector Welds (Technical I)
1) Visually inspect 100% of installed studs for full 360 degree flash. Test all questionable studs, not showing full 360 degree flash by bending studs 15 degrees from vertical, away from weld discontinuity, per AWS D1.1. All ceramic welding ferrules shall be removed by contractor. Randomly test all other studs by bending to 15 degrees from vertical as noted:
a) Studs welded through deck: 15%
b) Studs welded to bare steel: 5%
c) Alternatively, sound 100% of installed studs, for full penetration weld, using an 8 lb. Maul. Test questionable studs as noted above. Welding ferrules need not be removed.

e. Deck Welds and Fasteners (Technical I)

1) Visually inspect size, location, length and burn through for 100% of puddle welds on metal deck designed as a structural element, per AWS D1.3.
2) Visually inspect sidelap fasteners to meet spacing and size specified.

f. Welding of Reinforcing Bars (Technical II)
1) Be continuously present during welding and visually inspect 100% of all reinforcing bar welds as the welding is performed, per AWS D1.4. Verify proper joint preparation is provided and proper electrodes are used and properly store and dried.

5. Welding (Shop)
a. Perform inspections as for field welding except weld testing may be reduced or deleted, if fabrication shop satisfies AISC Quality Certification Program – Category I, or more stringent criteria, or is approved by SER.

6. Mechanical Fasteners (Misc.)
a. Fasteners (Technical I)
1) Visually inspect specified size, spacing, embedment, and location of expansion bolts and adhesive bonded bolts in connections shown on the structural drawings.

7. Structural Configuration
a. Submittals (Structural I)
1) Verify mill test reports and other submitted documentation for compliance with contract documents.
b. Materials (Technical I)
1) Verify materials delivered to site comply with contract documents and approved shop drawings. Materials include bolts, electrodes, mechanical fasteners and deck gauge.
c. Detail Compatibility (Structural I) On a periodic basis:
1) Review project documents affecting integrity of the structure, including contract documents and pertinent submittals (approved shop drawings)
2) Visit site, at intervals appropriate to the stage of construction, to perform review of the structure and visually confirm general compliance with the project documents.
3) Inspect the following to verify member orientation, configuration, type and size comply with details indicated on the contract documents and approved shop drawings:
a) Bracing and stiffening members
b) Proper applications of joint details at connections for structural members.
c) Other work critical to the integrity of the building structure.

D. Conventional Testing and Inspection Requirements
1. High Strength Bolting
a. Bolt Material Test (Technical II)
1) Test a minimum of two bolts of each ASTM class specified, for bolt hardness and tensile properties.
b. Fabrication and Erection Tolerances (Owner's Construction Manager)
1) Verify in-place structure satisfies specified tolerances

3.7 PROTECTION

A. Galvanized Surfaces: Clean areas where galvanizing is damaged or missing, and repair galvanizing to comply with ASTM A780/A780M.

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B. Touchup Painting: Cleaning and touchup painting are specified in Section 09 91 13 "Exterior Painting." Section 09 91 23 "Interior Painting."

C. Touchup Priming: Cleaning and touchup priming are specified in Section 09 96 00 "High-Performance Coatings."

END OF SECTION 05 12 00

SECTION 053123 - STEEL ROOF DECK

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the following:

1. Roof deck.

B. Related Requirements:

1. Division 01 Section “Structural Testing and Special Inspections”.
2. Division 05 Section “Structural Steel”.
3. Division 05 Section “Steel Joists and Joist Girders”.
4. Division 07 Sections for thermal and moisture protection.

1.3 REFERENCES

A. American Iron and Steel Institute (AISI):

1. North American Specification for the Design of Cold-Formed Steel Structural Members.
2. Cold-Formed Steel Framing Standards.

B. American Society for Testing and Materials (ASTM).

C. American Welding Society (AWS):

1. AWS D1.1 - Structural Welding Code - Steel.
2. AWS D1.3 - Structural Welding Code – Sheet Metal.

D. Factory Mutual Global (FMG): Approval Guide, Building Materials.

E. International Code Council - Evaluation Service (ICC-ES): Evaluation Reports.

F. Steel Deck Institute (SDI): Steel Deck Institute Design Manual for Composite Decks, Form Decks, and Roof Decks - Publication No. 31.

G. The Society for Protective Coatings (SSPC): SSPC Paint 20 - Zinc-Rich Coating.

1.4 ACTION SUBMITTALS

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

1. Include name of deck manufacturer as well as type, depth, gauge and finish of deck.

B. Shop Drawings:

1. Show layout and types of deck panels, anchorage details, attachment patterns, field welding requirements, side lap fastenings, pans, cut deck openings, special jointing, accessories, and attachments to other construction required for complete installation of decking.
2. Include deck manufacturer's ICC-ES Evaluation Report Number.

C. Certificates:

1. Product Certificates: For each type of steel deck, signed by product manufacturer.
2. Welding certificates signed by contractor certifying that welders comply with requirements of Article 1.4 – "Quality Assurance.

D. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, indicating that each of the following complies with requirements:

E. FMG Listings for description of roofing products evaluated to meet minimum requirements for Factory Mutual Research Approval recognition.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: Fabricate panels to comply with dimensional parameters as defined in "Design Manual for Composite Decks, Form Decks, and Roof Decks" in SDI Publication No. 31. Section properties shall be based in accordance with the AISI Specification for the Design of Cold-Formed Steel Structural Members.

B. Installer Qualifications: An experienced installer who has completed steel deck similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.

C. Welding Qualifications: Qualify procedures and personnel according to AWS D1.1 and D1.3 Structural Welding Codes.

D. Testing Agency Qualifications: An independent testing agency, acceptable to authorities having jurisdiction, qualified according to ASTM E 329 for testing indicated.

E. FMG Listing: Provide steel roof deck evaluated by FMG and listed in its "Approval Guide, Building Materials" for Class 1 fire rating and Class1-90 windstorm ratings.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Protect steel deck from corrosion, deformation, and other damage during delivery, storage, and handling.

B. Stack steel deck on platforms or pallets and slope to provide drainage. Protect with a waterproof covering and ventilate to avoid condensation.

C. Keep construction loads and stored materials, including other decking, off steel deck until it is permanently fastened and inspected.

D. Do not overload deck beyond 75% rated capacity with stored materials or equipment.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

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

1. Canam Steel Corp.
2. Epic Metals Corporation.
3. Nucor Corp.; Vulcraft Division.
4. Verco Manufacturing Co.

2.2 ROOF DECK

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

1. Prime-Painted Steel Sheet: ASTM A 1008, Grade 33 minimum, shop primed with manufacturer's standard baked-on, rust-inhibitive primer.

    a. Color: Manufacturer's standard.

2. Deck Profile: Type WR, wide rib.
3. Profile Depth: 1-1/2 inches.
4. Design Uncoated-Steel Thickness0.0358 inch (20-ga).
5. Span Condition: Triple span or more.
6. Side Laps: Overlapped.

2.3 ACCESSORIES

A. General: Provide manufacturer's standard accessory materials for deck that comply with requirements indicated.

B. Side-Lap Fasteners: Corrosion-resistant, hexagonal washer head; self-drilling, carbon-steel screws, No. 10 minimum diameter.

C. Miscellaneous Sheet Metal Deck Accessories: Steel sheet, minimum yield strength of 33,000 psi, of same thickness, material and finish as deck; of profile indicated or required for application.

D. Repair Paint: Manufacturer's standard rust-inhibitive primer of same color as primer.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine supporting frame and field conditions for compliance with requirements for installation tolerances and other conditions affecting performance.

3.2 INSTALLATION, GENERAL

A. Install deck panels and accessories according to applicable specifications and commentary in SDI Publication No. 31, manufacturer's written instructions, and requirements in this Section.

B. Install temporary shoring before placing deck panels, if required to meet deflection limitations.

C. Locate deck bundles to prevent overloading of supporting members.

D. Place deck panels on supporting frame and adjust to final position with ends accurately aligned and bearing on supporting frame before being permanently fastened. Do not stretch or contract side-lap interlocks.

E. Place deck panels flat and square and fasten to supporting frame without warp or deflection.

F. Cut and neatly fit deck panels and accessories around openings and other work projecting through or adjacent to deck.

G. Provide additional reinforcement and closure pieces at openings as required for strength, continuity of deck, and support of other work.

H. Comply with AWS requirements and procedures for manual shielded metal arc welding, appearance and quality of welds, and methods used for correcting welding work.

3.3 ROOF-DECK INSTALLATION

A. Fasten roof-deck panels to steel supporting members by arc spot (puddle) welds of the surface diameter indicated or arc seam welds with an equal perimeter that is not less than 1-1/2 inches long, and as follows:

1. Weld Diameter: 5/8 inch, nominal.
2. Weld Spacing: Weld edge and interior ribs of deck units with a minimum of two welds per deck unit at each support. Space welds as indicated on drawings but not less than 12 inches apart, maximum and 6 inches apart at openings and perimeter.
3. Cover weld burn holes with metallic tape.

B. Side-Lap and Perimeter Edge Fastening: Fasten side laps and perimeter edges of panels between supports as indicated on drawings. Where not specifically indicated, provide at intervals not exceeding the lesser of 1/2 of the span or 36 inches, and as follows:

1. Mechanically fasten with self-drilling, No. 10 diameter or larger, carbon-steel screws.

C. End Bearing: Install deck ends over supporting frame with a minimum end bearing of 1-1/2 inches, with end joints as follows:

1. End Joints: Lapped 2 inches minimum.

D. Roof Sump Pans and Sump Plates: Install over openings provided in roof deck and weld flanges to top of deck. Space welds not more than 8 inches apart with at least one weld at each corner.

1. Install reinforcing channels or zees in ribs to span between supports and weld.

E. Miscellaneous Roof-Deck Accessories: Install ridge and valley plates, finish strips, end closures, and reinforcing channels according to deck manufacturer's written instructions. Weld to substrate to provide a complete deck installation.

1. Weld cover plates at changes in direction of roof-deck panels, unless otherwise indicated.

3.4 PROTECTION AND REPAIR

A. Repair Painting: Wire brush and clean rust spots, welds, and abraded areas on both surfaces of prime-painted deck immediately after installation, and apply repair paint.

1. Apply repair paint, of same color as adjacent shop-primed deck, to bottom surfaces of deck exposed to view.

B. Provide final protection and maintain conditions to ensure that steel deck is without damage or deterioration at time of Substantial Completion.

C. No hangers, fasteners or loads shall be hung from the underside of the deck unless specifically indicated thus on the structural drawings. Such items as mechanical/electrical equipment, utility lines, architectural bulkheads, ceilings, signage, etc, shall have their own sub-framing designed, supplied and installed by their related trade, as required span to adjacent beams, joists or walls for any support needed.

3.5 FIELD QUALITY CONTROL

A. Testing and Inspecting: Owner will engage special inspector and qualified testing and inspecting agency to perform field tests and inspections and prepare test reports in accordance with Division 01 Section “Structural Testing and Special Inspections”.

B. Inspections:

1. Visually inspect size, location, length and burn-through for 100% of puddle welds on metal deck, per AWS D1.3, Section 6. (Technical I).
2. Visually inspect size, location, and seating for 100% of powder-actuated or pneumatically driven fasteners on metal deck, per AWS D1.3, Section 6. (Technical I).

3. Report inspection results promptly and in writing to Contractor and Architect.

C. Inspection Procedure:

1. After five to ten squares of roof deck have been erected, arrange for inspection agency to visually inspect fastening system for size, quality and spacing at interior supporting members, perimeter supports and side laps.
2. Demonstrate corrective procedures for deficiencies found by inspection agency to satisfaction of the Architect and inspection agency before erection of roof deck is resumed.
3. Use approved fastening system, including corrective procedures, as standard for comparison for remaining deck fastening.
4. When erection of roof deck is completed, but before placing roofing materials, arrange for inspection agency to make inspection of complete deck installation and submit written report to Architect.

D. Deck panels shall be clean, dry, and in firm contact with substrate prior to welding.

E. Remove and replace work that does not comply with specified requirements.

F. Additional inspecting, at Contractor's expense, will be performed to determine compliance of corrected work with specified requirements.

END OF SECTION 053123

SECTION 05 40 00 - COLD-FORMED METAL FRAMING

PART 1 - **GENERAL**

1.1 SUMMARY

A. Section Includes:
1. Load bearing wall framing
2. Exterior non-load-bearing wall framing.
3. Interior non-load-bearing wall framing exceeding height limitations ofstandard, nonstructural metal framing.
4. Floor joist framing
5. Roof rafter framing
6. Ceiling joist framing.
7. Soffit framing.

B. Related Requirements:
1. Section 05 50 00 "Metal Fabrications" for miscellaneous steel shapes, masonry shelf angles, and connections used with cold-formed metal framing.
2. Section 09 21 16.23 "Gypsum Board Shaft Wall Assemblies" for interior non-load-bearing, metal-stud-framed, shaft-wall assemblies, with height limitations.
3. Section 09 22 16 "Non-Structural Metal Framing" for standard, interior non-load-bearing, metal-stud framing, with height limitations and ceiling-suspension assemblies.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings:
1. Include layout, spacings, sizes, thicknesses, and types of cold-formed steel framing; fabrication; and fastening and anchorage details, including mechanical fasteners.
2. Indicate reinforcing channels, opening framing, supplemental framing, strapping, bracing, bridging, splices, accessories, connection details, and attachment to adjoining work.

C. Delegated-Design Submittal: For cold-formed steel framing.

1.3 INFORMATIONAL SUBMITTALS

A. Qualification Data: For testing agency.

B. Welding certificates.

C. Product Test Reports: For each listed product, for tests performed by manufacturer and witnessed by a qualified testing agency or performed by a qualified testing agency.
1. Steel sheet.
2. Expansion anchors.
3. Power-actuated anchors.

4. Mechanical fasteners.
5. Vertical deflection clips.
6. Horizontal drift deflection clips
7. Miscellaneous structural clips and accessories.

D. Evaluation Reports: For nonstandard cold-formed steel framing post-installed anchors and power-actuated fasteners, from ICC-ES or other qualified testing agency acceptable to authorities having jurisdiction.

1.4 QUALITY ASSURANCE

A. Testing Agency Qualifications: Qualified according to ASTM E329 for testing indicated.

B. 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 cold-formed metal framing that are similar to those indicated for this Project in material, design, and extent.

C. Product Tests: Mill certificates or data from a qualified independent testing agency, or in-house testing with calibrated test equipment, indicating steel sheet complies with requirements, including base-metal thickness, yield strength, tensile strength, total elongation, chemical requirements, and metallic-coating thickness.

D. Code-Compliance Certification of Studs and Tracks: Provide documentation that framing members are certified according to the product-certification program of the Certified Steel Stud Association the Steel Framing Industry Association or the Steel Stud Manufacturers Association.

E. Welding Qualifications: Qualify procedures and personnel according to the following:
1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."
2. AWS D1.3/D1.3M, "Structural Welding Code - Sheet Steel."

1.5 DELIVERY, STORAGE, AND HANDLING

A. Protect and store cold-formed steel framing from corrosion, moisture staining, deformation, and other damage during delivery, storage, and handling as required in AISI S202.

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. AllSteel & Gypsum Products, Inc.
2. ClarkDietrich.
3. MarinoWARE.
4. SCAFCO Steel Stud Company.

5. Super Stud Building Products Inc.
6. The Steel Network, Inc.
7. United Metal Products, Inc.

2.2 PERFORMANCE REQUIREMENTS

A. Delegated Design: Engage a qualified professional engineer, as defined in Section 01 40 00 "Quality Requirements," to design cold-formed steel framing.

B. Structural Performance: Provide cold-formed steel framing capable of withstanding design loads within limits and under conditions indicated.
   1. Design Loads: As indicated on Drawings.
   2. Deflection Limits: Design framing systems to withstand design loads without deflections greater than the following:
      a. Exterior Non-Load-Bearing Framing providing backup for masonry veneer or EIFS: Horizontal deflection of 1/600 of the wall height.
      b. Interior Non-Load-Bearing Framing: Horizontal deflection of 1/360 of the wall height under a horizontal load of 5 lbf/sq. ft.
   3. Design framing system to maintain clearances at openings, to allow for construction tolerances, and to accommodate live load deflection of primary building structure as follows:
      a. Upward and downward movement of 3/4 inch of 1/360 of span of structure above whichever is greater.
   4. Design exterior non-load-bearing wall framing to accommodate horizontal deflection without regard for contribution of sheathing materials.
   5. Design framing and connections, including stud kickers, web stiffeners, clip angles, continuous angles, anchors, fasteners, and stud girts as required to provide a complete and stable wall-framing system.

C. Cold-Formed Steel Framing Standards: Unless more stringent requirements are indicated, framing complies with AISI S100 and AISI S240

D. Fire-Resistance Ratings: Comply with ASTM E119; 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 acceptable to authorities having jurisdiction.

2.3 COLD-FORMED STEEL FRAMING MATERIALS

A. Framing Members, General: Comply with AISI S240 for conditions indicated.

B. Steel Sheet: ASTM A1003/A1003M, Structural Grade, Type H, metallic coated, of grade and coating designation as follows:
   1. Grade: ST33H or ST50H As required by structural performance Insert grade.
   2. Coating: G60

C. Steel Sheet for Vertical Deflection Clips: ASTM A653/A653M, structural steel, zinc coated, of grade and coating as follows:
   1. Grade: As required by structural performance, 33 min.
   2. Coating: G60, min.

2.4 EXTERIOR NON-LOAD-BEARING WALL FRAMING

A. Steel Studs: Manufacturer's standard C-shaped steel studs, of web depths indicated, punched, with stiffened flanges, and as follows:
   1. Minimum Base-Metal Thickness: 0.0538 inch or larger as required by engineering analysis.
   2. Flange Width: 1-5/8 inches minimum or as required by design

B. Steel Track: Manufacturer's standard U-shaped steel track, of web depths indicated, unpunched, with unstiffened flanges, and as follows:
   1. Minimum Base-Metal Thickness: Matching steel studs.
   2. Flange Width: 1-1/4 inches.

C. Vertical Deflection Clips: Manufacturer's standard bypass or head clips, capable of accommodating upward and downward vertical displacement of primary structure through positive mechanical attachment to stud web.

   1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

      a. Clark Dietrich.
      b. MarinoWARE.
      c. SCAFCO Steel Stud Company.
      d. Simpson Strong-Tie Co., Inc.
      e. The Steel Network, Inc.

D. Single Deflection Track: Manufacturer's single, deep-leg, U-shaped steel track; unpunched, with unstiffened flanges, of web depth to contain studs while allowing free vertical movement, with flanges designed to support horizontal loads and transfer them to the primary structure.

E. Double Deflection Tracks: Manufacturer's double, deep-leg, U-shaped steel tracks, consisting of nested inner and outer tracks; unpunched, with unstiffened flanges.
   1. Outer Track: Of web depth to allow free vertical movement of inner track, with flanges designed to support horizontal loads and transfer them to the primary structure.
   2. Inner Track: Of web depth indicated

2.5 INTERIOR NON-LOAD-BEARING WALL FRAMING

A. Steel Studs: Manufacturer's standard C-shaped steel studs, of web depths indicated, punched, with stiffened flanges, and as follows:
   1. Minimum Base-Metal Thickness: As required by design.
   2. Flange Width: 1-5/8 inches minimum or as required by design

B. Steel Track: Manufacturer's standard U-shaped steel track, of web depths indicated, unpunched, with unstiffened flanges, and as follows:
   1. Minimum Base-Metal Thickness: Matching steel studs or as required by design.
   2. Flange Width: As required by design.

C. Vertical Deflection Clips: Manufacturer's standard bypass or head clips, capable of accommodating upward and downward vertical displacement of primary structure through positive mechanical attachment to stud web.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. ClarkDietrich.
b. MarinoWARE.
c. SCAFCO Steel Stud Company.
d. Simpson Strong-Tie Co., Inc.
e. The Steel Network, Inc.

D. Single Deflection Track: Manufacturer's single, deep-leg, U-shaped steel track; unpunched, with unstiffened flanges, of web depth to contain studs while allowing free vertical movement, with flanges designed to support horizontal loads and transfer them to the primary structure.

E. Double Deflection Tracks: Manufacturer's double, deep-leg, U-shaped steel tracks, consisting of nested inner and outer tracks; unpunched, with unstiffened flanges.
1. Outer Track: Of web depth to allow free vertical movement of inner track, with flanges designed to support horizontal loads and transfer them to the primary structure.
2. Inner Track: Of web depth indicated.

2.6 SOFFIT FRAMING

A. Exterior Soffit Frame: Manufacturer's standard C-shaped steel sections, of web depths indicated, with stiffened flanges, and as follows:
1. Minimum Base-Metal Thickness: As required by design.
2. Flange Width: 1-5/8 inches minimum unless otherwise required by design

2.7 FRAMING ACCESSORIES

A. Fabricate steel-framing accessories from ASTM A1003/A1003M, Structural Grade, Type H, metallic coated steel sheet, of same grade and coating designation used for framing members.

B. Provide accessories of manufacturer's standard thickness and configuration, unless otherwise indicated, as follows:
1. Supplementary framing.
2. Bracing, bridging, and solid blocking.
3. Web stiffeners.
4. Anchor clips.
5. End clips.
6. Foundation clips.
7. Gusset plates.
8. Stud kickers and knee braces.
9. Joist hangers and end closures.
10. Hole-reinforcing plates.
11. Backer plates.

2.8 ANCHORS, CLIPS, AND FASTENERS

A. Steel Shapes and Clips: ASTM A36/A36M, zinc coated by hot-dip process according to ASTM A123/A123M.

B. Power-Actuated Anchors: Fastener systems with working capacity greater than or equal to the design load, according to an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC70.

C. Mechanical Fasteners: ASTM C1513, corrosion-resistant-coated, self-drilling, self-tapping, steel drill screws.
   1. Head Type: Low-profile head beneath sheathing; manufacturer's standard elsewhere.

D. Welding Electrodes: Comply with AWS standards.

2.9 MISCELLANEOUS MATERIALS

A. Galvanizing Repair Paint: ASTM A780/A780M

B. Sealer Gaskets: Closed-cell neoprene foam, 1/4 inch (6 mm) thick, selected from manufacturer's standard widths to match width of bottom track or rim track members as required.

2.10 FABRICATION

A. Fabricate cold-formed steel framing and accessories plumb, square, and true to line, and with connections securely fastened, according to referenced AISI's specifications and standards, manufacturer's written instructions, and requirements in this Section.
   1. Fabricate framing assemblies using jigs or templates.
   2. Cut framing members by sawing or shearing; do not torch cut.
   3. Fasten cold-formed steel framing members by welding, screw fastening, clinch fastening, pneumatic pin fastening, or riveting as standard with fabricator. Wire tying of framing members is not permitted.
      a. Comply with AWS D1.3/D1.3M requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.
      b. Locate mechanical fasteners and install according to Shop Drawings, with screws penetrating joined members by no fewer than three exposed screw threads.
   4. Fasten other materials to cold-formed steel framing by welding, bolting, pneumatic pin fastening, or screw fastening, according to Shop Drawings.

B. Reinforce, stiffen, and brace framing assemblies to withstand handling, delivery, and erection stresses. Lift fabricated assemblies by means that prevent damage or permanent distortion.

C. Tolerances: Fabricate assemblies level, plumb, and true to line to a maximum allowable variation of 1/8 inch in 10 feet (1:960) and as follows:

1. Spacing: Space individual framing members no more than plus or minus 1/8 inch (3 mm) from plan location. Cumulative error shall not exceed minimum fastening requirements of sheathing or other finishing materials.
2. Squareness: Fabricate each cold-formed steel framing assembly to a maximum out-of-square tolerance of 1/8 inch (3 mm).

PART 3 - **EXECUTION**

3.1 EXAMINATION

A. Examine substrates, areas, conditions, and abutting structural framing for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Before sprayed fire-resistive materials are applied, attach continuous angles, supplementary framing, or tracks to structural members indicated to receive sprayed fire-resistive materials.

B. After applying sprayed fire-resistive materials, remove only as much of these materials as needed to complete installation of cold-formed framing without reducing thickness of fire-resistive materials below that required to obtain fire-resistance ratings indicated. Protect remaining fire-resistive materials from damage.

C. Install load-bearing shims or grout between the underside of load-bearing wall bottom track and the top of foundation wall or slab at locations with a gap larger than 1/4 inch (6 mm) to ensure a uniform bearing surface on supporting concrete or masonry construction.

D. Install sealer gaskets at the underside of wall bottom track or rim track and at the top of foundation wall or slab at stud or joist locations.

3.3 INSTALLATION, GENERAL

A. Cold-formed steel framing may be shop or field fabricated for installation, or it may be field assembled.

B. Install cold-formed steel framing according to AISI S200, AISI S202, and manufacturer's written instructions unless more stringent requirements are indicated.

C. Install shop- or field-fabricated, cold-formed framing and securely anchor to supporting structure.
1. Screw, bolt, or weld wall panels at horizontal and vertical junctures to produce flush, even, true-to-line joints with maximum variation in plane and true position between fabricated panels not exceeding 1/16 inch (1.6 mm).

D. Install cold-formed steel framing and accessories plumb, square, and true to line, and with connections securely fastened.

1. Cut framing members by sawing or shearing; do not torch cut.
2. Fasten cold-formed steel framing members by welding, screw fastening, clinch fastening, or riveting. Wire tying of framing members is not permitted.
   a. Comply with AWS D1.3/D1.3M requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.
   b. Locate mechanical fasteners, install according to Shop Drawings, and comply with requirements for spacing, edge distances, and screw penetration.

E. Install framing members in one-piece lengths unless splice connections are indicated for track or tension members.

F. Install temporary bracing and supports to secure framing and support loads equal to those for which structure was designed. Maintain braces and supports in place, undisturbed, until entire integrated supporting structure has been completed and permanent connections to framing are secured.

G. Do not bridge building expansion joints with cold-formed steelframing. Independently frame both sides of joints.

H. Install insulation, specified in Section 07 21 00 "Thermal Insulation," inframing-assembly members, such as headers, sills, boxed joists, and multiple studs at openings, that are inaccessible on completion of framing work.

I. Fasten hole-reinforcing plate over web penetrations that exceed size of manufacturer's approved or standard punched openings.

J. Install miscellaneous framing and connections, including stud kickers, web stiffeners, clip angles, continuous angles, anchors, fasteners, and stud girts, as required to provide a complete and stable framing system.

3.4 EXTERIOR NON-LOAD-BEARING WALL INSTALLATION

A. Install continuous tracks sized to match studs. Align tracks accurately and securely anchor to supporting structure.

B. Fasten both flanges of studs to bottom track and top track unless otherwise indicated. Space studs as follows:
   1. Stud Spacing: 16 inches (406 mm) or less as indicated on shop drawings

C. Set studs plumb, except as needed for diagonal bracing or required for nonplumbwalls or warped surfaces and similar requirements.

D. Isolate non-load-bearing steel framing from building structure to prevent transfer of vertical loads while providing lateral support.
   1. Install single deep-leg deflection tracks and anchor to building structure.
   2. Install double deep-leg deflection tracks and anchor outer track to building structure.
   3. Connect vertical deflection clips to studs where required and anchor to building structure.

E. Install horizontal bridging in wall studs, spaced vertically in rows indicated on Shop Drawings but not more than 48 inches (1220 mm) apart. Fasten at each stud intersection.
   1. Channel Bridging: Cold-rolled steel channel, welded or mechanically fastened to webs of punched studs.
   2. Strap Bridging: Combination of flat, taut, steel sheet straps of width and thickness indicated and stud-track solid blocking of width and thickness to match studs. Fasten flat straps to stud flanges and secure solid blocking to stud webs or flanges.
   3. Bar Bridging: Proprietary bridging bars installed according to manufacturer's written instructions.

F. Top Bridging for Single Deflection Track: Install row of horizontal bridging within 12 inches (305 mm) of single deflection track. Install a combination of bridging and stud or stud-track solid blocking of width and thickness matching studs, secured to stud webs or flanges.
   1. Install solid blocking at 96-inch (2440-mm) centers.

G. Install miscellaneous framing and connections, including stud kickers, web stiffeners, clip angles, continuous angles, anchors, and fasteners, to provide a complete and stable wall-framing system.

3.5 INTERIOR NON-LOAD-BEARING WALL INSTALLATION

A. Install continuous tracks sized to match studs. Align tracks accurately and securely anchor to supporting structure.

B. Fasten both flanges of studs to top and bottom track unless otherwise indicated. Space studs as follows:
   1. Stud Spacing: 16 inches (406 mm) or less as indicated on shop drawings

C. Set studs plumb, except as needed for diagonal bracing or required for nonplumb walls or warped surfaces and similar requirements.

D. Isolate non-load-bearing steel framing from building structure to prevent transfer of vertical loads while providing lateral support.
   1. Install single deep-leg deflection tracks and anchor to building structure.
   2. Install double deep-leg deflection tracks and anchor outer track to building structure.
   3. Connect vertical deflection clips to studs and anchor to building structure.

E. Install horizontal bridging in wall studs, spaced vertically in rows indicated on Shop Drawings but not more than 48 inches (1220 mm) apart. Fasten at each stud intersection.
   1. Channel Bridging: Cold-rolled steel channel, welded or mechanically fastened to webs of punched studs.
   2. Strap Bridging: Combination of flat, taut, steel sheet straps of width and thickness indicated and stud-track solid blocking of width and thickness to match studs. Fasten flat straps to stud flanges and secure solid blocking to stud webs or flanges.

3. Bar Bridging: Proprietary bridging bars installed according to manufacturer's written instructions.

F. Top Bridging for Single Deflection Track: Install row of horizontal bridging within 12 inches (305 mm) of single deflection track. Install a combination of bridging and stud or stud-track solid blocking of width and thickness matching studs, secured to stud webs or flanges.
1. Install solid blocking at 96-inch (2440-mm) centers.

G. Install miscellaneous framing and connections, including stud kickers, web stiffeners, clip angles, continuous angles, anchors, and fasteners, to provide a complete and stable wall-framing system.

3.6 ERECTION TOLERANCES

A. Install cold-formed steel framing level, plumb, and true to line to a maximum allowable tolerance variation of 1/8 inch in 10 feet (1:960) and as follows:
1. Space individual framing members no more than plus or minus 1/8 inch (3 mm) from plan location. Cumulative error shall not exceed minimum fastening requirements of sheathing or other finishing materials.

3.7 FIELD QUALITY CONTROL

A. Testing: Owner will engage a qualified independent testing and inspecting agency to perform field tests and inspections and prepare test reports.

B. Field and shop welds will be subject to testing and inspecting.

C. Testing agency will report test results promptly and in writing to Contractor and Architect.

D. Cold-formed steel framing will be considered defective if it does not pass tests and inspections.

E. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.8 REPAIRS AND PROTECTION

A. Galvanizing Repairs: Prepare and repair damaged galvanized coatings on fabricated and installed cold-formed steel framing with galvanized repair paint according to ASTM A780/A780M and manufacturer's written instructions.

B. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, that ensure that cold-formed steel framing is without damage or deterioration at time of Substantial Completion.

END OF SECTION 05 40 00

SECTION 055000 - METAL FABRICATIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Miscellaneous framing supports.
2. Steel framing and supports for overhead grilles.
3. Steel framing and supports for countertops.
4. Steel tube reinforcement for low partitions.
5. Steel shapes for supporting elevator door sills.
6. Shelf angles.
7. Metal ladders.
8. Ladder safety cages.
9. Elevator pit sump covers.
10. Miscellaneous steel trim.
11. Metal bollards.
12. Pipe and downspout guards.
13. Abrasive metal nosings, treads, and thresholds.

B. Products furnished, but not installed, under this Section include the following:

1. Loose steel lintels.
2. Anchor bolts, steel pipe sleeves, slotted-channel inserts, and wedge-type inserts indicated to be cast into concrete or built into unit masonry.
3. Steel weld plates and angles for casting into concrete for applications where they are not specified in other Sections.

C. Related Requirements:

1. Section 033000 "Cast-in-Place Concrete" for installing anchor bolts, steel pipe sleeves, slotted-channel inserts, wedge-type inserts, and other items cast into concrete.
2. Section 044300 "Stone Masonry" for installing loose lintels, anchor bolts, and other items built into stone masonry.
3. Section 051200 "Structural Steel Framing."

1.3 COORDINATION

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

B. Coordinate installation of metal fabrications that are anchored to or that receive other work. 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.

1.4 ACTION SUBMITTALS

A. Product Data: For the following:

1. Nonslip aggregates and nonslip-aggregate surface finishes.
2. Metal nosings and treads.

B. Delegated-Design Submittal: For ladders, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.5 QUALITY ASSURANCE

A. Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."

B. Welding Qualifications: Qualify procedures and personnel according to the following:

1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."
2. AWS D1.2/D1.2M, "Structural Welding Code - Aluminum."
3. AWS D1.6/D1.6M, "Structural Welding Code - Stainless Steel."

1.6 FIELD CONDITIONS

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

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design ladders.

B. Structural Performance of Aluminum Ladders: Aluminum ladders, including landings, shall withstand the effects of loads and stresses within limits and under conditions specified in ANSI A14.3.

C. Structural Performance of Alternating Tread Devices: Alternating tread devices shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated.

1. Uniform Load: 100 lbf/sq. ft. (4.79 kN/sq. m).
2. Concentrated Load: 300 lbf (1.33 kN) applied on an area of 4 sq. in. (2580 sq. mm).
3. Uniform and concentrated loads need not be assumed to act concurrently.

4. Alternating Tread Device Framing: Capable of withstanding stresses resulting from railing loads in addition to loads specified above.

D. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes acting on exterior metal fabrications by preventing buckling, opening of joints, overstressing of components, failure of connections, and other detrimental effects.

1. Temperature Change: 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

2.2 METALS

A. Metal Surfaces, General: Provide materials with smooth, flat surfaces unless otherwise indicated. For metal fabrications exposed to view in the completed Work, provide materials without seam marks, roller marks, rolled trade names, or blemishes.

B. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.

C. Stainless-Steel Sheet, Strip, and Plate: ASTM A 240/A 240M or ASTM A 666, Type 304.

D. Stainless-Steel Bars and Shapes: ASTM A 276, Type 304.

E. Rolled-Steel Floor Plate: ASTM A 786/A 786M, rolled from plate complying with ASTM A 36/A 36M or ASTM A 283/A 283M, Grade C or D.

F. Rolled-Stainless-Steel Floor Plate: ASTM A 793.

G. Steel Tubing: ASTM A 500/A 500M, cold-formed steel tubing.

H. Steel Pipe: ASTM A 53/A 53M, Standard Weight (Schedule 40) unless otherwise indicated.

I. Zinc-Coated Steel Wire Rope: ASTM A 741.

1. Wire-Rope Fittings: Hot-dip galvanized-steel connectors with capability to sustain, without failure, a load equal to minimum breaking strength of wire rope with which they are used.

J. Cast Iron: Either gray iron, ASTM A 48/A 48M, or malleable iron, ASTM A 47/A 47M, unless otherwise indicated.

K. Aluminum Plate and Sheet: ASTM B 209 (ASTM B 209M), Alloy 6061-T6.

L. Aluminum Extrusions: ASTM B 221 (ASTM B 221M), Alloy 6063-T6.

M. Aluminum-Alloy Rolled Tread Plate: ASTM B 632/B 632M, Alloy 6061-T6.

N. Aluminum Castings: ASTM B 26/B 26M, Alloy 443.0-F.

O. Nickel Silver Extrusions: ASTM B 151/B 151M, Alloy UNS No. C74500.

P. Nickel Silver Castings: ASTM B 584, Alloy UNS No. C97600 (20 percent leaded nickel bronze).

2.3 FASTENERS

A. General: Unless otherwise indicated, provide Type 304 stainless-steel fasteners for exterior use and zinc-plated fasteners with coating complying with ASTM B 633 or ASTM F 1941 (ASTM F 1941M), Class Fe/Zn 5, at exterior walls. Select fasteners for type, grade, and class required.

1. Provide stainless-steel fasteners for fastening aluminum.
2. Provide stainless-steel fasteners for fastening stainless steel.
3. Provide stainless-steel fasteners for fastening nickel silver.

B. Steel Bolts and Nuts: Regular hexagon-head bolts, ASTM A 307, Grade A (ASTM F 568M, Property Class 4.6); with hex nuts, ASTM A 563 (ASTM A 563M); and, where indicated, flat washers.

C. Steel Bolts and Nuts: Regular hexagon-head bolts, ASTM A 325, Type 3 (ASTM A 325M, Type 3); with hex nuts, ASTM A 563, Grade C3 (ASTM A 563M, Class 8S3); and, where indicated, flat washers.

D. Stainless-Steel Bolts and Nuts: Regular hexagon-head annealed stainless-steel bolts, ASTM F 593 (ASTM F 738M); with hex nuts, ASTM F 594 (ASTM F 836M); and, where indicated, flat washers; Alloy Group 1 (A1).

E. Anchor Bolts: ASTM F 1554, Grade 36, of dimensions indicated; with nuts, ASTM A 563 (ASTM A 563M); and, where indicated, flat washers.

1. Hot-dip galvanize or provide mechanically deposited, zinc coating where item being fastened is indicated to be galvanized.

F. Anchors, General: Anchors capable of sustaining, without failure, a load equal to six times the load imposed when installed in unit masonry and four times the load imposed when installed in concrete, as determined by testing according to ASTM E 488/E 488M, conducted by a qualified independent testing agency.

G. Cast-in-Place Anchors in Concrete: Either threaded type or wedge type unless otherwise indicated; galvanized ferrous castings, either ASTM A 47/A 47M malleable iron or ASTM A 27/A 27M cast steel. Provide bolts, washers, and shims as needed, all hot-dip galvanized per ASTM F 2329.

H. Post-Installed Anchors: Torque-controlled expansion anchors.

1. Material for Interior Locations: Carbon-steel components zinc plated to comply with ASTM B 633 or ASTM F 1941 (ASTM F 1941M), Class Fe/Zn 5, unless otherwise indicated.
2. Material for Exterior Locations and Where Stainless Steel Is Indicated: Alloy Group 1 (A1) stainless-steel bolts, ASTM F 593 (ASTM F 738M), and nuts, ASTM F 594 (ASTM F 836M).

I. Slotted-Channel Inserts: Cold-formed, hot-dip galvanized-steel box channels (struts) complying with MFMA-4, 1-5/8 by 7/8 inches (41 by 22 mm) by length indicated with anchor straps or studs not less than 3 inches (75 mm) long at not more than 8 inches (200 mm) o.c. Provide with temporary filler and tee-head bolts, complete with washers and nuts, all zinc-plated to comply with ASTM B 633, Class Fe/Zn 5, as needed for fastening to inserts.

2.4 MISCELLANEOUS MATERIALS

A. Universal Shop Primer: Fast-curing, lead- and chromate-free, universal modified-alkyd primer complying with MPI#79 and compatible with topcoat.

1. Use primer containing pigments that make it easily distinguishable from zinc-rich primer.

B. Epoxy Zinc-Rich Primer: Complying with MPI#20 and compatible with topcoat.

C. Shop Primer for Galvanized Steel: Primer formulated for exterior use over zinc-coated metal and compatible with finish paint systems indicated.

D. Galvanizing Repair Paint: High-zinc-dust-content paint complying with SSPC-Paint 20 and compatible with paints specified to be used over it.

E. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187/D 1187M.

F. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107/C 1107M. Provide grout specifically recommended by manufacturer for interior and exterior applications.

G. Concrete: Comply with requirements in Section 033000 "Cast-in-Place Concrete" for normal-weight, air-entrained, concrete with a minimum 28-day compressive strength of 3000 psi (20 MPa).

2.5 FABRICATION, GENERAL

A. Shop Assembly: Preassemble items in the shop to greatest extent possible. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.

B. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch (1 mm) unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.

C. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.

D. Form exposed work with accurate angles and surfaces and straight edges.

E. Weld corners and seams continuously to comply with the following:

1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
2. Obtain fusion without undercut or overlap.
3. Remove welding flux immediately.
4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing.

F. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners or welds where possible. Where exposed fasteners are required, use Phillips flat-head (countersunk) fasteners unless otherwise indicated. Locate joints where least conspicuous.

G. Fabricate seams and other connections that are exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate.

H. Cut, reinforce, drill, and tap metal fabrications as indicated to receive finish hardware, screws, and similar items.

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

J. Where units are indicated to be cast into concrete or built into masonry, equip with integrally welded steel strap anchors, 1/8 by 1-1/2 inches (3.2 by 38 mm), with a minimum 6-inch (150-mm) embedment and 2-inch (50-mm) hook, not less than 8 inches (200 mm) from ends and corners of units and 24 inches (600 mm) o.c., unless otherwise indicated.

2.6 MISCELLANEOUS FRAMING AND SUPPORTS

A. General: Provide steel framing and supports not specified in other Sections as needed to complete the Work.

B. Fabricate units from steel shapes, plates, and bars of welded construction unless otherwise indicated. Fabricate to sizes, shapes, and profiles indicated and as necessary to receive adjacent construction.

1. Fabricate units from slotted channel framing where indicated.
2. Furnish inserts for units installed after concrete is placed.

C. Galvanize miscellaneous framing and supports where indicated.

D. Prime miscellaneous framing and supports with zinc-rich primer where indicated.

2.7 SHELF ANGLES

A. Fabricate shelf angles from steel angles of sizes indicated and for attachment to concrete framing. Provide horizontally slotted holes to receive 3/4-inch (19-mm) bolts, spaced not more than 6 inches (150 mm) from ends and 24 inches (600 mm) o.c., unless otherwise indicated.

1. Provide mitered and welded units at corners.
2. Provide open joints in shelf angles at expansion and control joints. Make open joint approximately 2 inches (50 mm) larger than expansion or control joint.

B. For cavity walls, provide vertical channel brackets to support angles from backup masonry and concrete.

C. Galvanize shelf angles located in exterior walls.

D. Furnish wedge-type concrete inserts, complete with fasteners, to attach shelf angles to cast-in-place concrete.

2.8 METAL LADDERS

A. General:

1. Comply with ANSI A14.3, except for elevator pit ladders.
2. For elevator pit ladders, comply with ASME A17.1/CSA B44.

B. Steel Ladders:

1. Space siderails 18 inches (457 mm) apart unless otherwise indicated.
2. Siderails: Continuous, 1/2-by-2-1/2-inch (12.7-by-64-mm) steel flat bars, with eased edges.
3. Rungs: 1-inch- (25-mm-) square steel bars.
4. Fit rungs in centerline of siderails; plug-weld and grind smooth on outer rail faces.
5. Provide nonslip surfaces on top of each rung, either by coating rung with aluminum-oxide granules set in epoxy-resin adhesive or by using a type of manufactured rung filled with aluminum-oxide grout.
6. Provide nonslip surfaces on top of each rung by coating with abrasive material metallically bonded to rung.
7. Provide platforms as indicated fabricated from welded or pressure-locked steel bar grating, supported by steel angles. Limit openings in gratings to no more than 1/2 inch (12 mm) in least dimension.
8. Support each ladder at top and bottom and not more than 60 inches (1500 mm) o.c. with welded or bolted steel brackets.
9. Galvanize exterior ladders, including brackets.
10. Prime ladders, including brackets and fasteners.

2.9 LADDER SAFETY CAGES

A. General:

1. Fabricate ladder safety cages to comply with ANSI A14.3. Assemble by welding or with stainless-steel fasteners.
2. Provide primary hoops at tops and bottoms of cages and spaced not more than 20 feet (6 m) o.c. Provide secondary intermediate hoops spaced not more than 48 inches (1200 mm) o.c. between primary hoops.
3. Fasten assembled safety cage to ladder rails and adjacent construction by welding or with stainless-steel fasteners unless otherwise indicated.

B. Steel Ladder Safety Cages:

1. Primary Hoops: 1/4-by-4-inch (6.4-by-100-mm) flat bar hoops.
2. Secondary Intermediate Hoops: 1/4-by-2-inch (6.4-by-50-mm) flat bar hoops.
3. Vertical Bars: 3/16-by-1-1/2-inch (4.8-by-38-mm) flat bars secured to each hoop.
4. Galvanize ladder safety cages, including brackets and fasteners.

2.10 ELEVATOR PIT SUMP COVERS

A. Fabricate from welded or pressure-locked steel bar grating Limit openings in gratings to no more than 1/2 inch (12 mm) in least dimension.

B. Provide steel angle supports as indicated.

2.11 METAL BOLLARDS

A. Fabricate metal bollards from steel shapes, as indicated.

1. Cap bollards with 1/4-inch- (6.4-mm-) thick steel plate.
2. Where bollards are indicated to receive controls for door operators, provide cutouts for controls and holes for wire.
3. Where bollards are indicated to receive light fixtures, provide cutouts for fixtures and holes for wire.

B. Fabricate bollards with 3/8-inch- (9.5-mm-) thick steel baseplates for bolting to concrete slab. Drill baseplates at all four corners for 3/4-inch (19-mm) anchor bolts.

1. Where bollards are to be anchored to sloping concrete slabs, angle baseplates for plumb alignment of bollards.

C. Fabricate sleeves for bollard anchorage from steel pipe or tubing with 1/4-inch- (6.4-mm-) thick steel plate welded to bottom of sleeve. Make sleeves not less than 8 inches (200 mm) deep and 3/4 inch (19 mm) larger than OD of bollard.

D. Fabricate internal sleeves for removable bollards from Schedule 40 steel pipe or 1/4-inch (6.4-mm) wall-thickness steel tubing with an OD approximately 1/16 inch (1.5 mm) less than ID of bollards. Match drill sleeve and bollard for 3/4-inch (19-mm) steel machine bolt.

E. Prime bollards with zinc-rich primer.

2.12 ABRASIVE METAL NOSINGS

A. Extruded Units: Aluminum, with abrasive filler consisting of aluminum oxide, silicon carbide, or a combination of both, in an epoxy-resin binder. Fabricate units in lengths necessary to accurately fit openings or conditions.

1. Provide solid-abrasive-type units without ribs.
2. Nosings: Square-back units, ~~1-7/8~~ 3 inches (~~48~~ 76 mm) wide, for casting into concrete steps.

B. Drill for mechanical anchors and countersink. Locate holes not more than 4 inches (100 mm) from ends and not more than 12 inches (300 mm) o.c., evenly spaced between ends, unless otherwise indicated. Provide closer spacing if recommended by manufacturer.

1. Provide two rows of holes for units more than 5 inches (125 mm) wide, with two holes aligned at ends and intermediate holes staggered.

C. Apply bituminous paint to concealed surfaces of cast-metal units.

D. Apply clear lacquer to concealed surfaces of extruded units.

2.13 LOOSE BEARING AND LEVELING PLATES

A. Provide loose bearing and leveling plates for steel items bearing on masonry or concrete construction. Drill plates to receive anchor bolts and for grouting.

B. Galvanize plates.

2.14 LOOSE STEEL LINTELS

A. Fabricate loose steel lintels from steel angles and shapes of size indicated for openings and recesses in masonry walls and partitions at locations indicated. Fabricate in single lengths for each opening unless otherwise indicated. Weld adjoining members together to form a single unit where indicated.

B. Size loose lintels to provide bearing length at each side of openings equal to 1/12 of clear span, but not less than 8 inches (200 mm) unless otherwise indicated.

C. Galvanize loose steel lintels located in exterior walls.

2.15 STEEL WELD PLATES AND ANGLES

A. Provide steel weld plates and angles not specified in other Sections, for items supported from concrete construction as needed to complete the Work. Provide each unit with no fewer than two integrally welded steel strap anchors for embedding in concrete.

2.16 FINISHES, GENERAL

A. Finish metal fabrications after assembly.

B. Finish exposed surfaces to remove tool and die marks and stretch lines, and to blend into surrounding surface.

2.17 STEEL AND IRON FINISHES

A. Galvanizing: Hot-dip galvanize items as indicated to comply with ASTM A 153/A 153M for steel and iron hardware and with ASTM A 123/A 123M for other steel and iron products.

1. Do not quench or apply post galvanizing treatments that might interfere with paint adhesion.

B. Preparation for Shop Priming Galvanized Items: After galvanizing, thoroughly clean railings of grease, dirt, oil, flux, and other foreign matter, and treat with metallic phosphate process.

C. Shop prime iron and steel items not indicated to be galvanized unless they are to be embedded in concrete, sprayed-on fireproofing, or masonry, or unless otherwise indicated.

D. Preparation for Shop Priming: Prepare surfaces to comply with requirements indicated below:

1. Exterior Items: SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
2. Items Indicated to Receive Zinc-Rich Primer: SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
3. Other Items: SSPC-SP 3, "Power Tool Cleaning."

E. Shop Priming: Apply shop primer to comply with SSPC-PA 1, "Paint Application Specification No. 1: Shop, Field, and Maintenance Painting of Steel," for shop painting.

2.18 ALUMINUM FINISHES

A. As-Fabricated Finish: AA-M12.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing metal fabrications. Set metal fabrications accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.

B. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations. Do not weld, cut, or abrade surfaces of exterior units that have been hot-dip galvanized after fabrication and are for bolted or screwed field connections.

C. Field Welding: Comply with the following requirements:

1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
2. Obtain fusion without undercut or overlap.
3. Remove welding flux immediately.
4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.

D. Fastening to In-Place Construction: Provide anchorage devices and fasteners where metal fabrications are required to be fastened to in-place construction. Provide threaded

fasteners for use with concrete and masonry inserts, toggle bolts, through bolts, lag screws, wood screws, and other connectors.

E. Provide temporary bracing or anchors in formwork for items that are to be built into concrete, masonry, or similar construction.

F. Corrosion Protection: Coat concealed surfaces of aluminum that come into contact with grout, concrete, masonry, wood, or dissimilar metals with the following:

1. Cast Aluminum: Heavy coat of bituminous paint.
2. Extruded Aluminum: Two coats of clear lacquer.

3.2 INSTALLING MISCELLANEOUS FRAMING AND SUPPORTS

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

B. Anchor supports for overhead grilles securely to, and rigidly brace from, building structure.

C. Support steel girders on solid grouted masonry, concrete, or steel pipe columns. Secure girders with anchor bolts embedded in grouted masonry or concrete or with bolts through top plates of pipe columns.

1. Where grout space under bearing plates is indicated for girders supported on concrete or masonry, install as specified in "Installing Bearing and Leveling Plates" Article.

D. Install pipe columns on concrete footings with grouted baseplates. Position and grout column baseplates as specified in "Installing Bearing and Leveling Plates" Article.

1. Grout baseplates of columns supporting steel girders after girders are installed and leveled.

3.3 INSTALLING METAL BOLLARDS

A. Fill metal-capped bollards solidly with concrete and allow concrete to cure seven days before installing.

1. Do not fill removable bollards with concrete.

B. Anchor bollards in concrete in formed or core-drilled holes not less than 8 inches (200 mm) deep and 3/4 inch (19 mm) larger than OD of bollard. Fill annular space around bollard solidly with nonshrink grout; mixed and placed to comply with grout manufacturer's written instructions. Slope grout up approximately 1/8 inch (3 mm) toward bollard.

C. Fill bollards solidly with concrete, mounding top surface to shed water.

1. Do not fill removable bollards with concrete.

3.4 INSTALLING NOSINGS, TREADS, AND THRESHOLDS

A. Center nosings on tread widths unless otherwise indicated.

B. For nosings embedded in concrete steps or curbs, align nosings flush with riser faces and level with tread surfaces.

3.5 INSTALLING BEARING AND LEVELING PLATES

A. Clean concrete and masonry bearing surfaces of bond-reducing materials and roughen to improve bond to surfaces. Clean bottom surface of plates.

B. Set bearing and leveling plates on wedges, shims, or leveling nuts. After bearing members have been positioned and plumbed, tighten anchor bolts. Do not remove wedges or shims but, if protruding, cut off flush with edge of bearing plate before packing with nonshrink grout. Pack grout solidly between bearing surfaces and plates to ensure that no voids remain.

3.6 ADJUSTING AND CLEANING

A. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas. Paint uncoated and abraded areas with the same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.

1. Apply by brush or spray to provide a minimum 2.0-mil (0.05-mm) dry film thickness.

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

END OF SECTION 055000

SECTION 070150.19 - PREPARATION FOR REROOFING

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. Full tear-off of roof areas indicated.
2. Removal of base flashings.
3. Temporary roofing.

1.3 DEFINITIONS

A. Roofing Terminology: Definitions in ASTM D 1079 and glossary of NRCA's "The NRCA Roofing and Waterproofing Manual" apply to work of this Section.

B. Roof Re-Cover Preparation: Existing roofing system is to remain and be prepared for new roof installed over it.

C. Full Roof Tear-Off: Removal of existing roofing system from deck.

D. Partial Roof Tear-Off: Removal of selected components and accessories from existing roofing system.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: Approved by warrantor of existing roofing system to work on existing roofing.

B. Regulatory Requirements: Comply with governing EPA notification regulations before beginning roofing removal. Comply with hauling and disposal regulations of authorities having jurisdiction.

C. Reroofing Conference: Conduct conference at Project site.

1. Meet with Owner; Architect; Owner's insurer if applicable; testing and inspecting agency representative; roofing system manufacturer's representative; roofing Installer, including project manager, superintendent, and foreman; and installers whose work interfaces with or affects reroofing, including installers of roof deck, roof accessories, and roof-mounted equipment.
2. Review methods and procedures related to roofing system tear-off and replacement, including, but not limited to, the following:

    a. Reroofing preparation, including roofing system manufacturer's written instructions.

b. Temporary protection requirements for existing roofing system components that are to remain.
c. Existing roof drains and roof drainage during each stage of reroofing, and roof-drain plugging and plug removal.
d. Construction schedule and availability of materials, Installer's personnel, equipment, and facilities needed to avoid delays.
e. Existing roof deck conditions requiring notification of Architect.
f. Existing roof deck removal procedures and Owner notifications.
g. Condition and acceptance of existing roof deck and base flashing substrate for reuse.
h. Structural loading limitations of roof deck during reroofing.
i. Base flashings, special roofing details, drainage, penetrations, equipment curbs, and condition of other construction that affect reroofing.
j. HVAC shutdown and sealing of air intakes.
k. Shutdown of fire-suppression, -protection, and -alarm and -detection systems.
l. Asbestos removal and discovery of asbestos-containing materials.
m. Governing regulations and requirements for insurance and certificates if applicable.
n. Existing conditions that may require notification of Architect before proceeding.

1.5 FIELD CONDITIONS

A. Owner will occupy portions of building immediately below reroofing area. Conduct reroofing so Owner's operations are not disrupted. Provide Owner with not less than 72 hours' notice of activities that may affect Owner's operations.

1. Coordinate work activities daily with Owner so Owner can place protective dust and water-leakage covers over sensitive equipment and furnishings, shut down HVAC and fire-alarm or -detection equipment if needed, and evacuate occupants from below work area.
2. Before working over structurally impaired areas of deck, notify Owner to evacuate occupants from below affected area. Verify that occupants below work area have been evacuated before proceeding with work over impaired deck area.

B. Protect building to be reroofed, adjacent buildings, walkways, site improvements, exterior plantings, and landscaping from damage or soiling from reroofing operations.

C. Maintain access to existing walkways, corridors, and other adjacent occupied or used facilities.

D. Limit construction loads on roof for rooftop equipment wheel loads and for uniformly distributed loads.

E. Weather Limitations: Proceed with reroofing preparation only when existing and forecasted weather conditions permit Work to proceed without water entering existing roofing system or building.

1. Remove only as much roofing in one day as can be made watertight in the same day.

F. Hazardous Materials: It is not expected that hazardous materials, such as asbestos-containing materials, will be encountered in the Work.

1. Hazardous materials will be removed by Owner before start of the Work. Existing roof will be left no less watertight than before removal.
2. If materials suspected of containing hazardous materials are encountered, do not disturb; immediately notify Architect and Owner. Hazardous materials will be removed by Owner under a separate contract.

G. Hazardous Materials: A report on the presence of hazardous materials is on file for review and use. Examine report to become aware of locations where hazardous materials are present.

1. Hazardous material remediation is specified elsewhere in the Contract Documents.
2. Do not disturb hazardous materials or items suspected of containing hazardous materials except according to procedures specified elsewhere in the Contract Documents.
3. Coordinate reroofing preparation with hazardous material remediation to prevent water from entering existing roofing system or building.

1.6 WARRANTY

A. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during reroofing, by methods and with materials so as not to void existing roofing system warranty. Notify warrantor before proceeding.

1. Notify warrantor of existing roofing system on completion of reroofing, and obtain documentation verifying that existing roofing system has been inspected and warranty remains in effect. Submit documentation at Project closeout.

PART 2 - PRODUCTS

2.1 TEMPORARY PROTECTION MATERIALS

A. Expanded Polystyrene (EPS) Insulation: ASTM C 578.

B. Plywood: DOC PS1, Grade CD Exposure 1.

C. OSB: DOC PS2, Exposure 1.

2.2 TEMPORARY ROOFING MATERIALS

A. Design and selection of materials for temporary roofing are Contractor's responsibilities.

B. Sheathing Paper: Red-rosin type, minimum 3 lb/100 sq. ft. (0.16 kg/sq. m).

C. Base Sheet: ASTM D 4601, Type II, nonperforated, asphalt-impregnated and -coated, glass-fiber sheet.

D. Glass-Fiber Felts: ASTM D 2178, Type IV, asphalt-impregnated, glass-fiber felt.

E. Asphalt Primer: ASTM D 41/D 41M.

F. Roofing Asphalt: ASTM D 312, Type III or IV.

G. Base Sheet Fasteners: Capped head, factory-coated steel fasteners, listed in FM Global's "Approval Guide."

2.3 INFILL AND REPLACEMENT MATERIALS

A. Use infill materials matching existing roofing system materials unless otherwise indicated.

1. Infill materials are specified in Section 075423 "Thermoplastic Polyolefin (TPO) Roofing" unless otherwise indicated.

B. Steel deck is specified in Section 053100 "Steel Decking."

C. Parapet Sheathing is specified in Section 061600 "Sheathing."

2.4 AUXILIARY REROOFING MATERIALS

A. General: Use auxiliary reroofing preparation materials recommended by roofing system manufacturer for intended use and compatible with components of existing and new roofing system.

PART 3 - EXECUTION

3.1 PREPARATION

A. Shut off rooftop utilities and service piping before beginning the Work.

B. Test existing roof drains to verify that they are not blocked or restricted. Immediately notify Architect of any blockages or restrictions.

C. Protect existing roofing system that is not to be reroofed.

1. Loosely lay 1-inch- (25-mm-) minimum thick, expanded polystyrene (EPS) insulation over existing roofing in areas indicated. Loosely lay 15/32-inch (12-mm) plywood or OSB panels over EPS. Extend EPS past edges of plywood or OSB panels a minimum of 1 inch (25 mm).
2. Limit traffic and material storage to areas of existing roofing that have been protected.
3. Maintain temporary protection and leave in place until replacement roofing has been completed. Remove temporary protection on completion of reroofing.

D. Coordinate with Owner to shut down air-intake equipment in the vicinity of the Work. Cover air-intake louvers before proceeding with reroofing work that could affect indoor air quality or activate smoke detectors in the ductwork.

E. During removal operations, have sufficient and suitable materials on-site to facilitate rapid installation of temporary protection in the event of unexpected rain.

F. Maintain roof drains in functioning condition to ensure roof drainage at end of each workday. Prevent debris from entering or blocking roof drains and conductors. Use roof-drain plugs specifically designed for this purpose. Remove roof-drain plugs at end of each workday, when no work is taking place, or when rain is forecast.

1. If roof drains are temporarily blocked or unserviceable due to roofing system removal or partial installation of new roofing system, provide alternative drainage method to remove water and eliminate ponding. Do not permit water to enter into or under existing roofing system components that are to remain.

3.2 ROOF TEAR-OFF

A. General: Notify Owner each day of extent of roof tear-off proposed for that day.

B. Remove aggregate ballast from roofing.

C. Remove loose aggregate from aggregate-surfaced built-up bituminous roofing using a power broom.

D. Remove pavers and accessories from roofing.

E. Remove ballast, protection mat, and extruded-polystyrene insulation from protected roofing membrane.

1. Discard extruded-polystyrene insulation that is damaged or exceeds 8 lb/cu. ft. (128 kg/cu. m).
2. Store extruded-polystyrene insulation for reuse and protect from physical damage.
3. Store ballast for reuse.

F. Full Roof Tear-Off: Where indicated, remove existing roofing and other roofing system components down to the deck.

1. Remove substrate board vapor retarder roof insulation and cover board.
2. Remove wood blocking, curbs, and nailers.
3. Bitumen and felts that are firmly bonded to concrete decks are permitted to remain if felts are dry. Remove unadhered bitumen, unadhered felts, and wet felts.
4. Remove excess asphalt from steel deck. A maximum of 15 lb/100 sq. ft. (0.72 kg/sq. m) of asphalt is permitted to remain on steel decks.
5. Remove fasteners from deck or cut fasteners off slightly above deck surface.

3.3 DECK PREPARATION

A. Inspect deck after tear-off of roofing system.

B. Verify that concrete substrate is visibly dry and free of moisture. Test for capillary moisture by plastic sheet method according to ASTM D 4263 or by pouring 1 pint (0.5 L) of hot roofing asphalt on deck at start of each day's work and at start of each roof area or plane. Do not proceed with roofing work if moisture condenses under plastic sheet or if asphalt test sample foams or can be easily and cleanly stripped after cooling.

C. If broken or loose fasteners that secure deck panels to one another or to structure are observed, or if deck appears or feels inadequately attached, immediately notify Architect. Do not proceed with installation until directed by Architect.

D. If deck surface is unsuitable for receiving new roofing or if structural integrity of deck is suspect, immediately notify Architect. Do not proceed with installation until directed by Architect.

E. Provide additional deck securement as indicated on Drawings.

F. Replace steel deck as indicated on Drawings.

G. Replace steel deck as directed by Architect. Deck replacement will be paid for by adjusting the Contract Sum according to unit prices included in the Contract Documents.

H. Prepare and paint steel deck surface. Painting and preparation for painting is specified in Section 099113 "Exterior Painting."

I. Replace plywood roof sheathing as indicated on Drawings.

J. Replace plywood roof sheathing as directed by Architect. Roof sheathing replacement will be paid for by adjusting the Contract Sum according to unit prices included in the Contract Documents.

3.4 TEMPORARY ROOFING

A. Install approved temporary roofing over area to be reroofed.

B. Install temporary roofing over area to be reroofed. Mechanically fasten base sheet and install a glass-fiber felt, lapping each sheet 19 inches (483 mm) over preceding sheet. Embed glass-fiber felt in a solid mopping of hot roofing asphalt applied within equiviscous temperature range. Glaze-coat completed surface with hot roofing asphalt.

C. Remove temporary roofing before installing new roofing.

D. Prepare temporary roof to receive new roofing according to approved temporary roofing proposal. Restore temporary roofing to watertight condition. Obtain approval for temporary roof substrate from roofing manufacturer and Architect before installing new roof.

3.5 BASE FLASHING REMOVAL

A. Remove existing base flashings. Clean substrates of contaminants, such as asphalt, sheet materials, dirt, and debris.

B. Do not damage metal counterflashing that are to remain. Replace metal counterflashing damaged during removal with counterflashing specified in Section 076200 "Sheet Metal Flashing and Trim."

C. Inspect parapet sheathing, wood blocking, curbs, and nailers for deterioration and damage. If parapet sheathing, wood blocking, curbs, or nailers have deteriorated, immediately notify Architect.

D. Remove existing parapet sheathing and replace with new parapet sheathing to comply with Section 061600 "Sheathing." If parapet framing, wood blocking, curbs, or nailers have deteriorated, immediately notify Architect.

E. When directed by Architect, replace parapet framing, wood blocking, curbs, and nailers to comply with Section 061000 "Rough Carpentry."

3.6 FASTENER PULL-OUT TESTING

A. Perform fastener pull-out tests according to SPRI FX-1 and submit test report to roofing manufacturer before installing new roofing system.

1. Obtain roofing manufacturer's approval to proceed with specified fastening pattern. Roofing manufacturer may furnish revised fastening pattern commensurate with pull-out test results.

3.7 DISPOSAL

A. Collect demolished materials and place in containers. Promptly dispose of demolished materials. Do not allow demolished materials to accumulate on-site.

1. Storage or sale of demolished items or materials on-site is not permitted.

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

END OF SECTION 070150.19

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SECTION 072100 – THERMAL INSULATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions, Standard Specifications, Proposal Documents, Special Provisions, Supplemental Specifications, Bid Item Manual and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:
1. Below grade perimeter insulation and below slab insulation - extruded-polystyrene board insulation.
2. Glass-fiber blanket
3. Interior framed wall sound attenuation batt insulation.
4. Vapor Retarder for locations where indicated.

B. Related Sections:
1. Refer to Division 3 Concrete Sections for underslab vapor barriers.
2. Exterior Cavity Wall Insulation: Refer to Section 044300.
3. Roof Insulation: Refer to Section 075423
4. Insulation at Metal Wall Panels: Refer to Section 074213

1.3 SUBMITTALS

A. Product Data: Provide data on materials, describing insulation properties, surface burning characteristics.

B. Product Test Reports: Based on evaluation of comprehensive test performed by qualified testing agency, for each product.

C. Manufacturer's Installation Instructions: Indicate special procedures and perimeter conditions requiring special treatment.

D. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

1.4 QUALITY ASSURANCE

A. Source Limitations: Obtain each type of building insulation through one source from a single manufacturer.

B. Fire-Test-Response Characteristics: Provide insulation and related materials with the fire-test-response characteristics indicated, as determined by testing identical products per test method indicated below by UL or another testing and inspecting agency acceptable to authorities having jurisdiction. Identify materials with appropriate markings of applicable testing and inspecting agency.
1. Surface-Burning Characteristics: ASTM E 84.
2. Fire-Resistance Ratings: ASTM E 119.
3. Combustion Characteristics: ASTM E 136.

1.5 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing the products specified in this section with minimum three (3) years experience.

B. Applicator: Company specializing in performing the work of this section and certified by the manufacturer.

1.6 ENVIRONMENTAL REQUIREMENTS

A. Toxicity/Hazardous Materials:
   1. Outgassing/Reactivity:
      a. Formaldehyde: Products containing urea-formaldehyde will not be permitted.
      b. Chlorofluorocarbons (CFCs)/HCFCs: Products and equipment requiring or using CFCs or HCFCs during the manufacturing process will not be permitted.
   2. Airtightness: Meet specific standards of the Energy Star Program of 1.5 Air Changes/Hour at 50 Pa.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly indicating manufacturer and material.

B. Store materials in an area protected from overheating damage and comply with manufacturer's written instructions for handling, storing, and protecting during installation.

PART 2 - PRODUCTS

2.1 BELOW GRADE PERIMETER AND UNDER SLAB INSULATION:

A. Basis-of Design Manufacturer
   1. Contractor Option: Provide below-grade perimeter and under slab insulation from one of the following two choices with Basis of Design as indicated.

B. Materials
   1. Extruded-Polystyrene Board Insulation: ASTM C 578, of type and density indicated below, with maximum flame-spread and smoke-developed indexes of 75 and 450, respectively:
      a. Available Manufacturers:
         1) Basis of Design: “Foamular 250”, Owens Corning Corporation, One Owens Corning Parkway, Toledo, Ohio 43659
         2) Dow Chemical Company
         3) Pactiv Building Products Division
      b. Type IV, 1.60 lb/cu. Ft. (26 kg/cu.m), unless otherwise indicated.

c. Site: 2” thickness (unless indicated otherwise), 48 inch x 96 inch board
d. R-value: R4.4 per inch at 75F degrees (minimum).
e. Compressive: strength: 25 psi, unless indicated otherwise

2. Expanded Polystyrene Board Insulation: Molded Polystyrene Board, Type IX, ASTM C 578, Type IX, 25-psi (173-kPa) minimum compressive strength.

a. Available Manufacturers:

1) Basis of Design: “Foam-Control Plus+ 250”, ACH Foam Technologies, Denver, CO, www.achfoam.com.
2) Substitutions: Allowed in accordance with the requirements of Division 1

b. Type IX, 1.8 lb/cu. Ft., unless otherwise indicated
c. Size: 2” thickness (unless otherwise indicated), 48 inch x 96 inch board
d. R-value: R4.4 per inch at 75F degrees, R5.0 per inch at 25F degrees
e. Compressive Strength: 25 psi, unless indicated otherwise
f. Water Vapor Permeance of 1.0 in.thickness, max perm: 2.5
g. Water Absorption by total immersion, max., volume %: 2.0”

2.2 EXTERIOR FRAMED WALL GLASS-FIBER BLANKET

A. Glass-Fiber Blanket, Unfaced: ASTM C 665, Type I; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively, per ASTM E 84; passing ASTM E 136 for combustion characteristics.

1. Available Manufacturers:

a. CertainTeed Corporation.
b. Johns Manville.
c. Owens Corning.

2. 6 1/4 inches (159 mm) with D thermal resistance of 13 deg. F x hx sq./BTU at 75 deg F. equal to R-19.

2.3 INTERIOR FRAMED WALL UNFACED GLASS-FIBER BATT INSULATION

A. Flexible Glass-Fiber Board Insulation: ASTM C 553, Type I, with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively; and of the following nominal density and thermal resistivity:

1. Available Manufacturers:

a. CertainTeed Corporation.
b. Johns Manville.
c. Owens Corning.

2. 6 1/4 inches (159 mm) with D thermal resistance of 13 deg. F x hx sq./BTU at 75 deg F. equal to R-19.

2.4 INTERIOR FRAMED WALL SOUND ATTENUATION INSULATION

A. Unfaced, Glass-Fiber Blanket Insulation: ASTM C 665, Type I (blankets without membrane facing); consisting of fibers; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively; passing ASTM E 136 for combustion characteristics.

1. Available Manufacturers:

    a. CertainTeed Corporation.
    b. Johns Manville.
    c. Owens Corning.

2.5 SPRAY POLYURETHANE FOAM INSULATION

A. Closed-Cell Polyurethane Foam Insulation: ASTM C 1029, Type II, with maximum flame-spread and smoke-developed indexes of 75 and 450, respectively, per ASTM E 84.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

    a. BASF Corporation.
    b. Dow Chemical Company (The).
    c. ERSystems, Inc.
    d. Gaco Western Inc.
    e. Henry Company.
    f. NCFI; Division of Barnhardt Mfg. Co.
    g. SWD Urethane Company.
    h. Volatile Free, Inc.
    i. Icynene; “MD-C200 (Closed Cell)

2. Minimum density of 1.5 lb/cu. ft. (24 kg/cu. m), thermal resistivity of 6.2 deg F x h x sq. ft./Btu x in. at 75 deg F (43 K x m/W at 24 deg C).

2.6 VAPOR RETARDERS AT WALL CONDITIONS

A. Vapor Retarder: Polyimide film vapor retarder. Material has a permeance of 1 perm or less when tested to ASTM E96 Dry Cup method, and increases to greater than 10 perms using the wet cup method.

1. Water Vapor Permeance:

    a. ASTM E96, dry cup method: 1.0 perms (57/ng/Pa*s*m^2)
    b. ASTM E96, we cup method: 10.0 perms (1144ng/Pa*s*m^2)

2. Fire Hazard Classification: ASTM E84

    a. Maximum Flam Spread Index: 20.
    b. Maximum Smoke Development Index: 55.

2.7 AUXILIARY INSULATING MATERIALS

A. Vapor-Retarder Tape: Pressure-sensitive tape of type recommended by insulation manufacturers for sealing joints and penetrations in vapor-retarder facings.

B. Adhesive for Bonding Insulation: Product with demonstrated capability to bond insulation securely to substrates indicated without damaging insulation and substrates.

2.8 INSULATION FASTENERS

A. Anchor Adhesive: Product with demonstrated capability to bond insulation anchors securely to substrates indicated without damaging insulation, fasteners, and substrates.

PART 3 - EXECUTION

3.1 PREPARATION

A. Clean substrates of substances that are harmful to insulation or vapor retarders, including removing projections capable of puncturing vapor retarders, or that interfere with insulation attachment.

3.2 INSTALLATION, GENERAL

A. Comply with insulation manufacturer's written instructions applicable to products and application indicated. If no specific method is indicated, bond units to substrate with adhesive or use mechanical anchorage to provide permanent placement and support of units.

B. Install insulation that is undamaged, dry, and unsoiled and that has not been left exposed at any time to ice, rain, and snow.

C. Extend insulation in thickness indicated to envelop entire area to be insulated. Cut and fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.

D. Water-Piping Coordination: If water piping is located within insulated exterior walls, coordinate location of piping to ensure that it is placed on conditioned side of insulation and insulation encapsulates piping.

E. For preformed insulating units, provide sizes to fit applications indicated and selected from manufacturer's standard thicknesses, widths, and lengths. Apply single layer of insulation units to produce thickness indicated unless multiple layers are otherwise shown or required to make up total thickness.

3.3 INSTALLATION OF BELOW-GRADE INSULATION

A. On vertical surfaces, set insulation units using manufacturer's recommended adhesive according to manufacturer's written instructions.

B. On horizontal surfaces, loosely lay insulation units according to manufacturer's written instructions. Stagger end joints and tightly abut insulation units.

3.4 INSTALLATION OF INSULATION FOR FRAMED CONSTRUCTION

A. Install glass-fiber insulation in cavities formed by framing members at walls and ceilings according to the following requirements:
   1. Use insulation widths and lengths that fill the cavities formed by framing members. If more than one length is required to fill cavity, provide lengths that will produce a snug fit between ends.
   2. Place insulation in cavities formed by framing members to produce a friction fit between edges of insulation and adjoining framing members.

3. Maintain 3-inch (76-mm) clearance of insulation around recessed lighting fixtures.
4. For metal stud-framed construction, install glass-fiber blankets according to ASTM C 1320 and as follows:

    a. With faced batts having stapling flanges, secure insulation by inset, stapling flanges to sides of framing members.

B. Miscellaneous Voids: Install insulation in miscellaneous voids and cavity spaces where required to prevent gaps in insulation using the following materials:
1. Spray Polyurethane Insulation: Apply according to manufacturer's written instructions.

3.5 INSTALLATION OF VAPOR RETARDERS

A. Where vapor retarders are indicated, place vapor retarders on side of construction indicated on Drawings. Extend vapor retarders to extremities of areas to protect from vapor transmission. Secure vapor retarders in place with adhesives or other anchorage system as indicated. Extend vapor retarders to cover miscellaneous voids in insulated substrates, including those filled with loose-fiber insulation.

B. Repair tears or punctures in vapor retarders immediately before concealment by other work. Cover with vapor-retarder tape or another layer of vapor retarders.

3.6 PROTECTION

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

END OF SECTION 072100

SECTION 075423 - THERMOPLASTIC POLYOLEFIN (TPO) ROOFING

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. Adhered thermoplastic polyolefin (TPO) roofing system.
2. Vapor retarder.
3. Roof insulation.

B. Section includes the installation of insulation strips in ribs of roof deck. Insulation strips are furnished under Section 053100 "Steel Decking."

C. Related Requirements:

1. Section 061000 "Rough Carpentry" for wood nailers, curbs, and blocking; and for wood-based, structural-use roof deck panels.
2. Section 061600 "Sheathing" for parapet wall sheathing.
3. Section 070150.19 "Preparation for Re-Roofing" for re-cover board beneath new roofing.
4. Section 076200 "Sheet Metal Flashing and Trim" for metal roof flashings and counterflashings.
5. Section 077129 "Manufactured Roof Expansion Joints" for proprietary manufactured roof expansion-joint assemblies.
6. Section 079200 "Joint Sealants" for joint sealants, joint fillers, and joint preparation.
7. Section 221030 "Plumbing Specialties" for roof drains.

1.3 DEFINITIONS

A. Roofing Terminology: Definitions in ASTM D 1079 and glossary in NRCA's "The NRCA Roofing and Waterproofing Manual" apply to work of this Section.

1.4 PREINSTALLATION MEETINGS

A. Preinstallation Roofing Conference: Conduct conference at Project site.

1. Meet with Owner, Architect, Owner's insurer if applicable, testing and inspecting agency representative, roofing Installer, roofing system manufacturer's representative, deck Installer, and installers whose work interfaces with or affects roofing, including installers of roof accessories and roof-mounted equipment.
2. Review methods and procedures related to roofing installation, including manufacturer's written instructions.

3. Review and finalize construction schedule, and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
4. Examine deck substrate conditions and finishes for compliance with requirements, including flatness and fastening.
5. Review structural loading limitations of roof deck during and after roofing.
6. Review base flashings, special roofing details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that affects roofing system.
7. Review governing regulations and requirements for insurance and certificates if applicable.
8. Review temporary protection requirements for roofing system during and after installation.
9. Review roof observation and repair procedures after roofing installation.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: For roofing system. Include plans, elevations, sections, details, and attachments to other work, including:

1. Base flashings and membrane terminations.
2. Tapered insulation, including slopes.
3. Roof plan showing orientation of steel roof deck and orientation of roofing, fastening spacing, and patterns for mechanically fastened roofing.
4. Insulation fastening patterns for corner, perimeter, and field-of-roof locations.

C. Samples for Verification: For the following products:

1. Sheet roofing, of color required.
2. Walkway pads or rolls, of color required.

1.6 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer and manufacturer.

B. Manufacturer Certificates: Signed by roofing manufacturer certifying that roofing system complies with requirements specified in "Performance Requirements" Article.

1. Submit evidence of compliance with performance requirements.

C. Product Test Reports: For components of roofing system, tests performed by manufacturer and witnessed by a qualified testing agency.

D. Research/Evaluation Reports: For components of roofing system, from ICC-ES.

E. Field quality-control reports.

F. Sample Warranties: For manufacturer's special warranties.

1.7 CLOSEOUT SUBMITTALS

A. Maintenance Data: For roofing system to include in maintenance manuals.

1.8 QUALITY ASSURANCE

A. Manufacturer Qualifications: A qualified manufacturer that is UL listed for roofing system identical to that used for this Project.

B. Installer Qualifications: A qualified firm that is approved, authorized, or licensed by roofing system manufacturer to install manufacturer's product and that is eligible to receive manufacturer's special warranty.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Deliver roofing materials to Project site in original containers with seals unbroken and labeled with manufacturer's name, product brand name and type, date of manufacture, approval or listing agency markings, and directions for storing and mixing with other components.

B. Store liquid materials in their original undamaged containers in a clean, dry, protected location and within the temperature range required by roofing system manufacturer. Protect stored liquid material from direct sunlight.

1. Discard and legally dispose of liquid material that cannot be applied within its stated shelf life.

C. Protect roof insulation materials from physical damage and from deterioration by sunlight, moisture, soiling, and other sources. Store in a dry location. Comply with insulation manufacturer's written instructions for handling, storing, and protecting during installation.

D. Handle and store roofing materials, and place equipment in a manner to avoid permanent deflection of deck.

1.10 FIELD CONDITIONS

A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit roofing system to be installed according to manufacturer's written instructions and warranty requirements.

1.11 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace components of roofing system that fail in materials or workmanship within specified warranty period.

1. Special warranty includes roofing, base flashings, roof insulation, fasteners, cover boards, substrate board, roofing accessories, and other components of roofing system.
2. Warranty Period: 20 years from date of Substantial Completion.

B. Special Project Warranty: Submit roofing Installer's warranty, on warranty form at end of this Section, signed by Installer, covering the Work of this Section, including all components of roofing system such as roofing, base flashing, roof insulation, fasteners, cover boards, substrate boards, vapor retarders, roof pavers, and walkway products, for the following warranty period:

1. Warranty Period: Two years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Basis-of-Design Product: Subject to compliance with requirements, provide Elevate's UltraPly TPO Membrane roofing assembly; or a comparable product by one of the following:

1. Carlisle SynTec Incorporated.
2. GAF Materials Corporation.
3. GenFlex Roofing Systems.
4. Johns Manville; a Berkshire Hathaway company.

B. Source Limitations: Obtain components including roof insulation fasteners for roofing system from same manufacturer as membrane roofing.

2.2 PERFORMANCE REQUIREMENTS

A. General Performance: Installed roofing and base flashings shall withstand specified uplift pressures, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Roofing and base flashings shall remain watertight.

1. Accelerated Weathering: Roofing system shall withstand 2000 hours of exposure when tested according to ASTM G 152, ASTM G 154, or ASTM G 155.
2. Impact Resistance: Roofing system shall resist impact damage when tested according to ASTM D 3746 or ASTM D 4272.

B. Material Compatibility: Roofing materials shall be compatible with one another and adjacent materials under conditions of service and application required, as demonstrated by roofing manufacturer based on testing and field experience.

C. FM Global Listing: Roofing, base flashings, and component materials shall comply with requirements in FM Global 4450 or FM Global 4470 as part of a built-up roofing system and shall be listed in FM Global's "RoofNav" for Class 1 or noncombustible construction, as applicable. Identify materials with FM Global markings.

1. Fire/Windstorm Classification: Class 1A-90.
2. Hail-Resistance Rating: SH.

D. Exterior Fire-Test Exposure: ASTM E 108 or UL 790, Class C; for application and roof slopes indicated; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

2.3 TPO ROOFING

A. TPO Sheet: ASTM D 6878, internally fabric- or scrim-reinforced, uniform, flexible TPO sheet.

1. Thickness: 60 mils (1.5 mm), nominal.
2. Exposed Face Color: White.

2.4 AUXILIARY ROOFING MATERIALS

A. General: Auxiliary materials recommended by roofing system manufacturer for intended use and compatible with roofing.

1. Liquid-type auxiliary materials shall comply with VOC limits of authorities having jurisdiction.

B. Sheet Flashing: Manufacturer's standard unreinforced TPO sheet flashing, 55 mils (1.4 mm) thick, minimum, of same color as TPO sheet.

C. Bonding Adhesive: Manufacturer's standard.

D. Slip Sheet: Manufacturer's standard, of thickness required for application.

E. Metal Termination Bars: Manufacturer's standard, predrilled stainless-steel or aluminum bars, approximately 1 by 1/8 inch (25 by 3 mm) thick; with anchors.

F. Metal Battens: Manufacturer's standard, aluminum-zinc-alloy-coated or zinc-coated steel sheet, approximately 1 inch wide by 0.05 inch thick (25 mm wide by 1.3 mm thick), prepunched.

G. Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM Global 4470, designed for fastening roofing to substrate, and acceptable to roofing system manufacturer.

H. Miscellaneous Accessories: Provide pourable sealers, preformed cone and vent sheet flashings, preformed inside and outside corner sheet flashings, T-joint covers, lap sealants, termination reglets, and other accessories.

2.5 SUBSTRATE BOARDS

A. Substrate Board: ASTM C 1396/C 1396M, Type X gypsum board, 5/8 inch (16 mm) thick.

B. Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM Global 4470, designed for fastening substrate board to roof deck.

2.6 VAPOR RETARDER

A. Self-Adhering-Sheet Vapor Retarder: Polyethylene film laminated to layer of butyl rubber adhesive, minimum 30-mil- (0.76-mm-) total thickness; maximum permeance rating of 0.1 perm (6 ng/Pa x s x sq. m); cold applied, with slip-resisting surface and release paper backing. Provide primer when recommended by vapor-retarder manufacturer.

2.7 ROOF INSULATION

A. General: Preformed roof insulation boards manufactured or approved by TPO roofing manufacturer, selected from manufacturer's standard sizes suitable for application, of thicknesses indicated.

B. Polyisocyanurate Board Insulation: ASTM C 1289, Type II, Class 1, Grade 2, felt or glass-fiber mat facer on both major surfaces.

C. Tapered Insulation: Provide factory-tapered insulation boards fabricated to slope of 1/4 inch per 12 inches (1:48) unless otherwise indicated.

D. Provide preformed saddles, crickets, tapered edge strips, and other insulation shapes where indicated for sloping to drain. Fabricate to slopes indicated.

2.8 INSULATION ACCESSORIES

A. General: Roof insulation accessories recommended by insulation manufacturer for intended use and compatibility with roofing.

B. Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM Global 4470, designed for fastening roof insulation and cover boards to substrate, and acceptable to roofing system manufacturer.

C. Insulation Adhesive: Insulation manufacturer's recommended adhesive formulated to attach roof insulation to substrate or to another insulation layer as follows:

1. Modified asphaltic, asbestos-free, cold-applied adhesive.
2. Bead-applied, low-rise, one-component or multicomponent urethane adhesive.
3. Full-spread spray-applied, low-rise, two-component urethane adhesive.

D. Cover Board: ASTM C 1177/C 1177M, glass-mat, water-resistant gypsum substrate, 1/4 inch (6 mm) thick.

2.9 WALKWAYS

A. Flexible Walkways: Factory-formed, nonporous, heavy-duty, slip-resisting, surface-textured walkway pads or rolls, approximately 3/16 inch (5 mm) thick and acceptable to roofing system manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements and other conditions affecting performance of the Work:

1. Verify that roof openings and penetrations are in place, curbs are set and braced, and roof-drain bodies are securely clamped in place.
2. Verify that wood blocking, curbs, and nailers are securely anchored to roof deck at penetrations and terminations and that nailers match thicknesses of insulation.
3. Verify that surface plane flatness and fastening of steel roof deck complies with requirements in Section 053100 "Steel Decking."
4. Verify that minimum concrete drying period recommended by roofing system manufacturer has passed.
5. Verify that concrete substrate is visibly dry and free of moisture. Test for capillary moisture by plastic sheet method according to ASTM D 4263.
6. Verify that concrete-curing compounds that will impair adhesion of roofing components to roof deck have been removed.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Clean substrate of dust, debris, moisture, and other substances detrimental to roofing installation according to roofing system manufacturer's written instructions. Remove sharp projections.

B. Prevent materials from entering and clogging roof drains and conductors and from spilling or migrating onto surfaces of other construction. Remove roof-drain plugs when no work is taking place or when rain is forecast.

C. Install insulation strips according to acoustical roof deck manufacturer's written instructions.

3.3 ROOFING INSTALLATION, GENERAL

A. Install roofing system according to roofing system manufacturer's written instructions.

B. Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing system at the end of the workday or when rain is forecast. Remove and discard temporary seals before beginning work on adjoining roofing.

3.4 SUBSTRATE BOARD INSTALLATION

A. Install substrate board with long joints in continuous straight lines, perpendicular to roof slopes with end joints staggered between rows. Tightly butt substrate boards together.

1. Fasten substrate board to top flanges of steel deck according to recommendations in FM Global's "RoofNav" and FM Global Loss Prevention Data Sheet 1-29 for specified Windstorm Resistance Classification.

3.5 VAPOR-RETARDER INSTALLATION

A. Self-Adhering-Sheet Vapor Retarder: Prime substrate if required by manufacturer. Install self-adhering-sheet vapor retarder over area to receive vapor retarder, side and end lapping each sheet a minimum of 3-1/2 inches (90 mm) and 6 inches (150 mm), respectively. Seal laps by rolling.

B. Completely seal vapor retarder at terminations, obstructions, and penetrations to prevent air movement into roofing system.

3.6 INSULATION INSTALLATION

A. Coordinate installing roofing system components, so insulation is not exposed to precipitation or left exposed at the end of the workday.

B. Comply with roofing system and insulation manufacturer's written instructions for installing roof insulation.

C. Install tapered insulation under area of roofing to conform to slopes indicated.

D. Install insulation under area of roofing to achieve required thickness. Where overall insulation thickness is 2.7 inches (68 mm) or greater, install two or more layers with joints of each succeeding layer staggered from joints of previous layer a minimum of 6 inches (150 mm) in each direction.

1. Where installing composite and noncomposite insulation in two or more layers, install noncomposite board insulation for bottom layer and intermediate layers, if applicable, and install composite board insulation for top layer.

E. Trim surface of insulation where necessary at roof drains so completed surface is flush and does not restrict flow of water.

F. Install insulation with long joints of insulation in a continuous straight line with end joints staggered between rows, abutting edges and ends between boards. Fill gaps exceeding 1/4 inch (6 mm) with insulation.

1. Cut and fit insulation within 1/4 inch (6 mm) of nailers, projections, and penetrations.

G. Mechanically Fastened and Adhered Insulation: Install each layer of insulation to deck using mechanical fasteners specifically designed and sized for fastening specified board-type roof insulation to deck type.

1. Fasten first layer of insulation according to requirements in FM Global's "RoofNav" for specified Windstorm Resistance Classification.
2. Fasten first layer of insulation to resist uplift pressure at corners, perimeter, and field of roof.
3. Set each subsequent layer of insulation in ribbons of bead-applied insulation adhesive, firmly pressing and maintaining insulation in place.

H. Loosely Laid Insulation: Loosely lay insulation units over substrate.

I. Install cover boards over insulation with long joints in continuous straight lines with end joints staggered between rows. Offset joints of insulation below a minimum of 6 inches (150 mm) in each direction. Loosely butt cover boards together and fasten to roof deck.

1. Fasten cover boards according to requirements in FM Global's "RoofNav" for specified Windstorm Resistance Classification.

3.7 ADHERED ROOFING INSTALLATION

A. Adhere roofing over area to receive roofing according to roofing system manufacturer's written instructions. Unroll roofing and allow to relax before retaining.

B. Start installation of roofing in presence of roofing system manufacturer's technical personnel.

C. Accurately align roofing and maintain uniform side and end laps of minimum dimensions required by manufacturer. Stagger end laps.

D. Bonding Adhesive: Apply to substrate and underside of roofing at rate required by manufacturer and allow to partially dry before installing roofing. Do not apply to splice area of roofing.

E. In addition to adhering, mechanically fasten roofing securely at terminations, penetrations, and perimeter of roofing.

F. Apply roofing with side laps shingled with slope of roof deck where possible.

G. Seams: Clean seam areas, overlap roofing, and hot-air weld side and end laps of roofing and sheet flashings according to manufacturer's written instructions, to ensure a watertight seam installation.

1. Test lap edges with probe to verify seam weld continuity. Apply lap sealant to seal cut edges of sheet.
2. Verify field strength of seams a minimum of twice daily, and repair seam sample areas.
3. Repair tears, voids, and lapped seams in roofing that do not comply with requirements.

H. Spread sealant bed over deck-drain flange at roof drains, and securely seal roofing in place with clamping ring.

3.8 BASE FLASHING INSTALLATION

A. Install sheet flashings and preformed flashing accessories and adhere to substrates according to roofing system manufacturer's written instructions.

B. Apply bonding adhesive to substrate and underside of sheet flashing at required rate and allow to partially dry. Do not apply to seam area of flashing.

C. Flash penetrations and field-formed inside and outside corners with cured or uncured sheet flashing.

D. Clean seam areas, overlap, and firmly roll sheet flashings into the adhesive. Hot-air weld side and end laps to ensure a watertight seam installation.

E. Terminate and seal top of sheet flashings and mechanically anchor to substrate through termination bars.

3.9 WALKWAY INSTALLATION

A. Flexible Walkways: Install walkway products in locations indicated. Heat weld to substrate or adhere walkway products to substrate with compatible adhesive according to roofing system manufacturer's written instructions.

3.10 FIELD QUALITY CONTROL

A. Testing Agency: Engage a qualified testing agency to inspect substrate conditions, surface preparation, membrane application, flashings, protection, and drainage components, and to furnish reports to Architect.

1. Electric Field Vector Mapping (EFVM): Testing agency shall survey entire roof area for potential leaks using electric field vector mapping (EFVM).

B. Flood Testing: Flood test each roofing area for leaks, according to recommendations in ASTM D 5957, after completing roofing and flashing but before overlying construction is placed. Install temporary containment assemblies, plug or dam drains, and flood with potable water.

1. Flood to an average depth of 2-1/2 inches (65 mm) with a minimum depth of 1 inch (25 mm) and not exceeding a depth of 4 inches (100 mm). Maintain 2 inches (50 mm) of clearance from top of base flashing.
2. Flood each area for 24 hours.
3. After flood testing, repair leaks, repeat flood tests, and make further repairs until roofing and flashing installations are watertight.

C. Final Roof Inspection: Arrange for roofing system manufacturer's technical personnel to inspect roofing installation on completion.

D. Repair or remove and replace components of roofing system where inspections indicate that they do not comply with specified requirements.

E. Additional testing and inspecting, at Contractor's expense, will be performed to determine if replaced or additional work complies with specified requirements.

3.11 PROTECTING AND CLEANING

A. Protect roofing system from damage and wear during remainder of construction period. When remaining construction does not affect or endanger roofing, inspect roofing for deterioration and damage, describing its nature and extent in a written report, with copies to Architect and Owner.

B. Correct deficiencies in or remove roofing system that does not comply with requirements, repair substrates, and repair or reinstall roofing system to a condition free

of damage and deterioration at time of Substantial Completion and according to warranty requirements.

C. Clean overspray and spillage from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

END OF SECTION 075423