



**BID PROPOSAL NO. 1149
REPLACE ROOF
AT BOYCE CAMPUS
GENERAL
HVAC
PLUMBING**

A mandatory pre-bid meeting and site visitation will be held on Thursday, May 14, 2026, at 2:00 p.m. Meet at the Boyce Campus Security Office, inside front entrance, 595 Beatty Road, Monroeville, PA 15146.

PROJECT LABOR AGREEMENT APPLIES TO THIS PROJECT.

**BIDS MUST DELIVERED TO THE CCAC PURCHASING DEPARTMENT,
800 ALLEGHENY AVE., PITTSBURGH, PA, 15233
NO LATER THAN:**

Wednesday, May 20, 2026, at 2:00 p.m.

BID PROPOSAL NO. 1149
REPLACE ROOF AT BOYCE CAMPUS

PRE-BID INFORMATION REQUEST

RFI# _____
(Assigned by CCAC)

DATE: _____
(Date Submitted)

Use of this Form is required (email to the following):

TO:
Mike Cvetic
Email: mcvetic@ccac.edu
CCAC Purchasing Department

FROM: _____

FIRM: _____

TRADE: _____

Dwg/Sheet: _____

Spec Section: _____

Detail #: _____

Paragraph #: _____

INFORMATION REQUESTED:

Distribution: All questions must be received electronically or in writing no later than Friday May 15, 2026.
All responses will be issued via addenda by CCAC prior to bid.

INVITATION TO BID
from
COMMUNITY COLLEGE OF ALLEGHENY COUNTY
PURCHASING DEPARTMENT
800 ALLEGHENY AVENUE, PITTSBURGH, PENNSYLVANIA 15233

BID PROPOSAL NO. 1149
REPLACE ROOF AT BOYCE CAMPUS
GENERAL, HVAC, AND PLUMBING (THREE PRIME CONTRACTS)

PROJECT LABOR AGREEMENT APPLIES

Sealed proposals will be received and publicly opened by a Purchasing Agent of the Community College of Allegheny County.

Proposals must be received by the Purchasing Department, 800 Allegheny Avenue, Pittsburgh, Pennsylvania 15233 on or before **2:00 PM on Wednesday, May 20, 2026.**

Proposals received after this deadline will be considered as a "late bid" and returned unopened to the offerer.

BID SCOPE

Provide all labor, material, equipment, permits and supervision required to perform roof replacement at CCAC Boyce Campus (General, HVAC, and Plumbing) in accordance with all specifications, terms and conditions contained herein.

A mandatory pre-bid meeting and site visitation will be held on Thursday, May 14, 2026, at 2:00 p.m. Meet at the Boyce Campus Security Office, inside front entrance, 595 Beatty Road, Monroeville, PA 15146.

For questions, use the pre-bid information request form contained herein. Email as shown.

BID REQUIREMENTS (where checked)

- ☒ Bid Bond. 10% of total base bid amount (Submit with Bid)
- ☒ Performance Bond. 100% of total contract amount (Awardee Only)
- ☒ Payment Bond. 100% of total contract amount (Awardee Only)
- ☒ Form of Agreement between Owner and Contractor - AIA Forms (Awardee Only)
- ☒ No Lien Agreement (Awardee Only)
- ☒ Insurance Certificate (Awardee Only)

BID BOND: Bid must include the required bid bond or certified check, which will be returned to the unsuccessful bidder approximately 45 days after the bid due date.

PERFORMANCE BOND: The successful bidder will be required to enter into a written contract with the College and to furnish a contractor's bond conditioned for the faithful and full performance of the contract with sufficient surety in the amount stated above. Any surety cosigning the contractor's bond shall be an Incorporated surety company approved by the Court of Common Pleas of Allegheny County. Bond with surety must be furnished within 20 days after receipt of the contract. The Board of Trustees reserves the right to reject any bond furnished where it is in the best interest of the College to do so.

The College requires Power of Attorney attached to bonds to be dated concurrently, sealed, and executed by a proper **live** (not facsimile) **signature**.

PAYMENT BOND: The bidder to whom the contract is awarded shall furnish a bond to guarantee the payment of third-party subcontractors involved in fulfillment of services rendered against College contracts. Such bonds shall be with sufficient surety and in the amount stated above. Failure on the part of the contractor to furnish such bond shall be just cause for cancellation of award.

NO LIEN AGREEMENT AND/OR INSURANCE CERTIFICATES: As required by the College, the No Lien Agreement and/or Insurance Certificate may be requested of the successful bidder.

THE BOARD OF TRUSTEES RESERVES THE RIGHT TO REJECT ANY OR ALL BIDS.

*******ADVERTISEMENT*******

Sealed bid proposals are hereby solicited for the Community College of Allegheny County, 800 Allegheny Avenue, Pittsburgh PA 15233 on the following items:

**BID PROPOSAL NO. 1149
ROOF REPLACEMENT – BOYCE CAMPUS
(THREE PRIME CONTRACTS -GENERAL, PLUMBING, AND HVAC)**

A mandatory pre-bid meeting and site visitation will be held on Thursday, May 14, 2026, at 2:00 p.m. Meet at the Boyce Campus Security Office, inside front entrance, 595 Beatty Road, Monroeville, PA 15146.

Bids will be received at the Purchasing Department until 2:00 P.M. Prevailing Time on Wednesday, May 20, 2026, at which time they will be publicly opened.

PROJECT LABOR AGREEMENT COMPLIANCE IS REQUIRED.

Any bid or proposals received after this deadline will be considered as a “late bid” and will be returned unopened to the offerer.

Proposals may require Bid Bonds, Performance Bonds, Payment Bonds, and Surety as dictated by the specifications.

No bidder may withdraw his bid or proposal for a period of ninety (90) days after the scheduled closing time for receipt of bids.

The Board of Trustees reserves the right to reject any and all bids.

The Community College of Allegheny County is an Affirmative Action/Equal Employment Opportunity Employer and encourages bids from Minority/Disadvantaged owned businesses.

For more information, contact Michael Cvetic at mcvetic@ccac.edu.

Bid forms are also available on the CCAC website: www.ccac.edu. Community College of Allegheny County
Purchasing Department
800 Allegheny Ave.
Pittsburgh, PA 15233

COMMUNITY COLLEGE OF ALLEGHENY COUNTY

INDEX TO SPECIFICATIONS
FOR

BID PROPOSAL NO. 1149
REPLACE ROOF – BOYCE CAMPUS
GENERAL, HVAC, AND PLUMBING
(THREE PRIME CONTRACTS)

COVER SHEET	1
PRE-BID INFORMATION REQUEST FORM	2
INVITATION TO BID	3
ADVERTISEMENT	4
INDEX TO SPECIFICATIONS	5
INSTRUCTIONS TO BIDDERS	6-7
BIDDER SIGNATURE FORM	8
BID SHEETS	9-12
NON-COLLUSION AFFIDAVIT & INSTRUCTIONS	13-14
MINORITY PARTICIPATION GOALS	15-16
EXTENSION OF CONTRACT EXECUTION REQUIREMENTS	17
LETTER OF ASSENT	18
 DOCUMENTS REQUIRED BY AWARDEE ONLY:	
PERFORMANCE BOND	19
PAYMENT BOND	20
NO-LIEN AGREEMENT	21
INSURANCE REQUIREMENTS	See AIA A201 Supplementary
AGREEMENT (AIA 101/201 Series)	Enclosed

GENERAL CONDITIONS FOR CONSTRUCTION AND RENOVATION
PROJECT LABOR AGREEMENT
PREVAILING WAGES

Asbestos Information (GC) and Report

Desmone Bid Documents 011000 – 221423-4

DRAWINGS <https://desmone.files.com/f/0020db96cc20e531> 21 pages

NOTE: FAX OR ELECTRONIC RESPONSES TO BID PROPOSALS ARE NOT ACCEPTABLE.

In the event a sealed bid is hand carried, it is the sole responsibility of the bidder to assure the bid is in possession of the CCAC Purchasing Department prior to the time set for opening.

COMMUNITY COLLEGE OF ALLEGHENY COUNTY

INSTRUCTIONS TO BIDDERS

1. All prices quoted shall be F.O.B. destination and include all freight and delivery charges to actual point of delivery.
2. **Bids that vary from specifications/addendum(s) may be rejected by the College.** Any and all changes to specifications will be issued by addenda via fax/mail. It is the responsibility of bidders to provide the College with company name, address, telephone, and fax numbers and contact names if applicable.
3. Bidders must be recognized dealers in specified materials and qualified to advise in the application and/or use of the materials. When requested, the bidder must satisfy the Community College of Allegheny County that they have the organization, capital, and stock availability and experience to fulfill their bid offer.
4. Bids may be rejected or award cancelled by the College if a bidder intends to sublet any/all of the required work.
5. Completely executed bid documents must be submitted in a **sealed envelope bearing the offering company's name and address; and, the bid number must appear on the sealed envelope.** No College representative will bear any responsibility for the premature opening of a bid which is not properly addressed and identified.
6. Whenever the words "Purchasing Agent" or a pronoun referring to a College Agent appears in either the specifications and/or Articles of Agreement, the Agent is acting only under the authority of and subject to the approval of the Board of Trustees of the Community College of Allegheny County.
7. The College reserves the right to award all or any items, separately or in a lump sum whichever is in the best interest of the College.
8. Bids for supplies shall be submitted to the College in accordance with the numbered item(s) on the price sheet. Unit prices(s) shall prevail where extension of prices is requested.
9. Contracts will not be awarded by the College to any corporation, firm, or individual that has failed in any former contract with the College to perform work or complete work or, in the College's sole judgment, to satisfactorily deliver or provide the quality of materials, fulfill a guarantee(s) or complete work in accordance with the schedule for such prior contract."
10. If the College Agent is of the opinion that the awarded work/products are unnecessarily delayed, the rate of progress of delivery is unsatisfactory, or that the corporation, firm, or individual contractor is willfully violating any of the contract requirements or conditions or is acting in bad faith, the College's Agent shall take whatever action necessary for the completion of the work and/or delivery of the products to the College. Resulting expenses to the College will be deducted from monies due the contractor and the bondsman will be held liable for any balance due at the completion of the contract.
11. Inspection of materials and workmanship of the contractor by a College Agent will not lessen the responsibility of the contractor from the obligation to perform and deliver satisfactory work/materials to the College. The contractor is expected to pay for the cost of tests for defective materials. This cost may be deducted from any monies due the contractor from the College.
12. The contractor will not receive instructions from a College Agent relative to the work or delivery until a contract has been duly signed and the bond, if required, is approved.
13. Companies may quote price(s) on work/material to any and all bidders and may also directly submit a bid to the College for the work/material.
14. When samples are requested by the College, the bidder must supply them free of charge. Samples will not be returned to the bidder.

15. The bidder is solely at risk when using unauthorized patented material.
16. Quantities requested by the College are for bidding purposes only. The College may purchase more or less than the estimated quantities.
17. The College reserves the right to reject any and all bids, and to waive minor discrepancies in the bids or specifications, when in the best interest of the College. The College may purchase any part, all, or none of the materials specified.
18. The College will reject materials that do not meet specifications, even if the bidder lists trade names, or names of such materials on the bid.
19. All prices quoted must be held firm for the contract period. Bids containing escalation or other clauses for price change may be rejected. Discounts or other uncalled for allowances quoted will not be considered in making the award and the bid may be rejected.
20. Unless otherwise specified, materials, supplies, and/or equipment must be delivered thirty (30) days from the date of the purchase order.
21. Unless otherwise specified, materials, supplies, and/or equipment must be new, current stock, and unused.

SIGNING OF AGREEMENT AND BOND

22. Successful bidders are required to sign Contract Articles of Agreement and bond forms as follows:

If trading as an Individual: All copies of Contract Articles of Agreement and bond(s) must be signed by the individual to whom the award is made and signature must be witnessed by the same witness.

If trading as a Partnership: All copies of Contract Articles of Agreement and bond(s) must be signed by **every partner** comprising the Partnership, regardless of number, and these signatures must be witnessed by the same witness.

If trading as a Corporation: All copies of Contract Articles of Agreement and bond(s) must be signed by the **President (or Vice President)** and attested by the Secretary or Assistant Secretary and Corporate seal must appear on all copies.

The County requires that Power of Attorney forms be attached to bonds, bear the same date as that appearing on the bonds and that the forms are sealed and executed by a proper **live signature**.

FICTITIOUS NAME REGISTRATION

23. To comply with a provision of the law regarding registration under the Fictitious Name Act of the Commonwealth of Pennsylvania, successful bidders trading as an **Individual or a Partnership** must submit a certified copy of their Fictitious Name Registration with their contract. Fictitious Name Registration forms are issued by the Office of the Prothonotary of Allegheny County, or the county in which the business is located.

PREVENTION OF DELAY

24. A contractor will be considered in **default** if the contractor has work performed or means employed in the carrying out of the contract that would in any way cause or result in a suspension or delay of, or strike upon the work to be performed of any of the trades working in or about the premises described, or in or about any other building of the Community College of Allegheny County.
25. When trade names or catalog numbers are used, bidders may quote on any equal (unless otherwise stated by the College) but such bids must show trade names and/or catalog numbers of the products.

COMMUNITY COLLEGE OF ALLEGHENY COUNTY

RETURN BID PROPOSAL FORM

FOR

**BID PROPOSAL NO. 1149
REPLACE ROOF – BOYCE CAMPUS
GENERAL, HVAC, AND PLUMBING
(THREE PRIME CONTRACTS)**

Complete this form and submit with your bid.

- The undersigned agrees to comply with the Instructions to Bidders and Specifications for the price(s) quoted on the Return Price Form. Price(s) quoted include all allowable cash and/or credit discounts.
- The College may reject bids quoting unspecified discounts and/or allowances.

Submitted by:

Company Name Bidding
(Please print)

Contact Person at Company
(Please print)

Signature Title
(Handwritten signature must appear here in ink.)

Address _____

Telephone Number (Include Area Code.)

Fax Number (Include Area Code.)

Trading as: (Check one.) Please print.

_____ Individual Owner _____

_____ Partnership Partner _____ Partner _____

_____ Corporation Exact Name _____

State Incorporated _____

THE BOARD OF TRUSTEES OF THE COLLEGE RESERVES THE RIGHT TO REJECT ANY OR ALL BIDS.

**BID PROPOSAL NO. 1149
REPLACE ROOF – BOYCE CAMPUS
GENERAL, HVAC, AND PLUMBING
(THREE PRIME CONTRACTS)**

GENERAL CONSTRUCTION

BID PAGE

BASE BID GC – The total lump sum for performing all Structural and General Construction in accordance with all plans and specifications contained herein shall be:

\$_____

Deduct Alternate A-GC: Roof AC/NW (\$_____)

Deduct Alternate B-GC: Roof AD/NW (\$_____)

Deduct Alternate C-GC: Roof J/NW & H/NW (\$_____)

Company Name: _____

RETURN FORM 2.0 (GC)

**BID PROPOSAL NO. 1149
REPLACE ROOF – BOYCE CAMPUS
GENERAL, HVAC, AND PLUMBING
(THREE PRIME CONTRACTS)**

HVAC CONSTRUCTION

BID PAGE

BASE BID H – The total lump sum for performing all HVAC Construction in accordance with all plans and specifications contained herein shall be:

\$_____

Deduct Alternate A-HC: Roof AC/NW (\$_____)

Deduct Alternate B-HC: Roof AD/NW (\$_____)

Deduct Alternate C-HC: Roof J/NW & H/NW (\$_____)

Company Name: _____

**BID PROPOSAL NO. 1149
REPLACE ROOF – BOYCE CAMPUS
GENERAL, HVAC, AND PLUMBING
(THREE PRIME CONTRACTS)**

PLUMBING CONSTRUCTION

BID PAGE

BASE BID P – The total lump sum for performing all Plumbing Construction in accordance with all plans and specifications contained herein shall be:

\$_____

Deduct Alternate A-PC: Roof AC/NW (\$_____)

Deduct Alternate B-PC: Roof AD/NW (\$_____)

Deduct Alternate C-PC: Roof J/NW & H/NW (\$_____)

Add Alternate D-PC: Underground Storm Sanitary Piping: +\$_____

Company Name: _____

COMMUNITY COLLEGE OF ALLEGHENY COUNTY

NON-COLLUSION AFFIDAVIT

Contract/Bid No. 1149

State of _____ : :s.s.

County of _____ :

I state that I am _____ of _____
(title) (name of my firm)

and that I am authorized to make this affidavit on behalf of my firm, and its owners, directors, and officers. I am the person responsible in my firm for the price(s) and the amount of this bid.

I state that:

- (1) The price(s) and amount of this bid have been arrived at independently and without consultation, communication or agreement with any bidder or potential bidder.
- (2) Neither the price(s) nor the amount of this bid, and neither the approximate price(s) nor approximate amount of this bid, have been disclosed to any other firm or person who is a bidder or potential bidder, and they will not be disclosed before bid opening.
- (3) No attempt has been made or will be made to induce any firm or person to refrain from bidding on this contract, or to submit a bid higher than this bid, or to submit any intentionally high or noncompetitive bid or other form of complementary bid.
- (4) The bid of my firm is made in good faith and not pursuant to any agreement or discussion with, or inducement from, any firm or person to submit a complementary or other noncompetitive bid.
- (5) _____, its affiliates,
(name of my firm)

subsidiaries, officers, directors and employees are not currently under investigation by any governmental agency and have not in the last four years been convicted or found liable for any act prohibited by State or Federal law in any jurisdiction, involving conspiracy or collusion with respect to bidding on any public contract, except as follows:

I state that _____ understands and
(name of my firm)

acknowledges that the above representations are material and important, and will be relied on by the Community College of Allegheny County in awarding the contract(s) for which this bid is submitted. I understand and my firm understands that any misstatement in this affidavit is and shall be treated as fraudulent concealment from the Community College of Allegheny County of the true facts relating to the submission of bids for this contract.

Signature _____ Title _____
(MUST BE SIGNED HERE IN HANDWRITING, IN INK.)

Sworn to and subscribed before me this _____ day of _____, 20_____

Notary Public _____ My Commission Expires: _____

RETURN FORM 3.0

INSTRUCTIONS FOR NON-COLLUSION AFFIDAVIT

1. This Non-collusion Affidavit is material to any contract awarded pursuant to this bid. According to the Pennsylvania Antibid-Rigging Act, 73 P.S. § 1611 et seq., governmental agencies may require Non-collusion Affidavits to be submitted together with bids.
2. This Non-collusion Affidavit must be executed by the member, officer or employee of the bidder who makes the final decision on prices and the amount quoted in the bid.
3. Bid rigging and other efforts to restrain competition and the making of false sworn statements in connection with the submission of bids are unlawful and may be subject to criminal prosecution. The person who signs the Affidavit should examine it carefully before signing and assure himself or herself that each statement is true and accurate, making diligent inquiry, as necessary, of all other persons employed by or associated with the bidder with responsibilities for the preparation, approval or submission of the bid.
4. In the case of a bid submitted by a joint venture, each party to the venture must be identified in the bid documents, and an Affidavit must be submitted separately on behalf of each party.
5. The term “complementary bid” as used in the Affidavit has the meaning commonly associated with that term in the bidding process, and includes the knowing submission of bids higher than the bid of another firm, any intentionally high or noncompetitive bid, and any other form of bid submitted for the purpose of giving a false appearance of competition.
6. Failure to file an Affidavit in compliance with these instructions will result in disqualification of the bid.

COMMUNITY COLLEGE OF ALLEGHENY COUNTY

MBE/WBE PARTICIPATION: CCAC encourages the participation of minority and women-owned businesses in all of its contracts and is committed to providing maximum opportunities for qualified minority and/or women-owned business enterprises ("MBE/WBEs") to participate in its work. Bidder agrees (1) if qualified, to take reasonable and timely steps to obtain appropriate certification as an MBE and/or WBE, (2) to ensure that MBE and/or WBEs are appropriately considered as subcontractors and/or suppliers under this Agreement; and (3) to report moneys spent for MBE and/or WBE subcontractors and/or suppliers for work as CCAC may from time to time reasonably request. **CCAC's goal for MBE/WBE participation is 20% (13% MBE and 7% WBE/DBE).** Please provide documentation as to your firm's good faith effort to reach this goal by describing all applicable details of MBE/WBE participation that may be included in the resulting agreement.

COMMUNITY COLLEGE OF ALLEGHENY COUNTY

MINORITY PARTICIPATION GOALS – BID PROPOSAL NO. 1149

The following must be included with your bid.

Reference: General Conditions for Construction and Renovation Contracts - Item 6, Page 2 – Minority & Disadvantaged Participation Goals

A 20% M/W/DBE work participation is established (13% MBE and 7 % WBE). Document your firm's good faith effort to obtain the 20% Goal:

M/W/DBE Company	M/W/D circle one	Contact Person	Phone Number	\$Amount or Objective %
_____	M W D	_____	_____	_____
_____	M W D	_____	_____	_____
_____	M W D	_____	_____	_____

_____ I am an M/W/DBE. (ATTACH CERTIFICATION)

Total: _____

Bidder acknowledges that CCAC may communicate with listed firms to verify the extent of the contact.

Bidding Company's Name: _____

Signature: _____

Title: _____

Date: _____

Revised: 04/30/08

RETURN FORM 4.0

COMMUNITY COLLEGE OF ALLEGHENY COUNTY

BID PROPOSAL NO. 1149

**COMMONWEALTH OF PENNSYLVANIA
BID AWARD & RETENTION LAW
ACT NO. 1978-317, SENATE BILL 68, NOVEMBER 26, 1978**

EXTENSION OF CONTRACT EXECUTION REQUIREMENTS

In the event the contract(s)/purchase order(s) resulting from the above specified bid proposal is/are in excess of \$50,000.00, the above specified Act will apply.

This Act requires the awarding of a contract to the lowest responsible bidder within sixty (60) days of the date of bid opening and the execution of a contract within thirty (30) days after award by the College Board of Trustees. Thirty (30) day extensions of the date for award and for execution are permitted by the mutual written consent of the College and the successful bidder.

Due to the extent of the approval actions required prior to award and execution of any contract, it may not be possible for the College to complete contract award and execution within the sixty (60) day and thirty (30) day periods. Accordingly, each bidder is requested to indicate their agreement with a thirty (30) day extension of the sixty (60) day award date and thirty (30) day execution date by signing this form and returning it with their bid.

Name of Company

Authorized Company Representative

Signature

Title

MUST BE SIGNED HERE IN HANDWRITING, IN INK

RETURN FORM 5.0

LETTER OF ASSENT

BID PROPOSAL NO. 1149

This is to certify that the undersigned Contractor, _____, has examined a copy of the Project Labor Agreement between the Community College of Allegheny County and the Pittsburgh Regional Building & Construction Trades Council, AFL-CIO dated February 15, 2011 and hereby agrees to comply with all terms and execution of this Agreement. It is understood that the execution of this Letter of Assent shall be as binding on the Contractor as though the Contractor had signed the aforementioned Agreement.

This Letter of Assent will remain in effect through completion of Contractor's work on the above-captioned project at the Community College of Allegheny County's Allegheny Campus location.

The undersigned Contractor further agrees that upon notification by the College, the Contractor will furnish documented proof to the College that the employer complies with the terms and conditions of the Agreement.

This Letter of Assent shall become effective and binding upon the Contractor this _____ day of _____, 20____ and shall remain in effect as set forth above.

Name (Please print)

Signature

(MUST BE SIGNED HERE IN HANDWRITING, IN BLUE INK.)

Title

Name of Contractor

RETURN FORM 6.0

COMMUNITY COLLEGE OF ALLEGHENY COUNTY
800 ALLEGHENY AVENUE, PITTSBURGH PA 15233

Bond Number _____

PERFORMANCE BOND

Know all men by these Presents that we _____ **“TO BE COMPLETED ONLY BY AWARDEES”** _____
(hereinafter called “Principal”) as Principal, and _____
authorized to do business in the Commonwealth of Pennsylvania (hereinafter called “Surety”) as Surety, are held and
firmly bound unto the Community College of Allegheny County, through its Board of Trustees,
_____ in the sum of _____

to be paid to the said College aforesaid, its certain attorney, or assigns. To which payment will and truly be made,
said principal and said surety to bind themselves their respective successors or assigns jointly and severally, firmly
by these presents.

WITNESS our hands and seals, the _____ day of _____ 20____.

WHEREAS the above bounded _____
_____ has filed with the Community College of Allegheny County,
proposals for the _____

The Condition of the above Obligation is such that if the said _____
shall perform _____

In accordance with the agreement between _____
and the Community College of Allegheny County of even date herewith and the specifications and proposals
attached to and made part of the agreement, and shall indemnify and save harmless the said Community College of
Allegheny County from all liens, charges, demands, loss and damages of every kind and nature, whatsoever. Then
this obligation to be void, otherwise to be and remain in full force and virtue.

Attest: _____ (SEAL)
CONTRACTOR

SECRETARY PRESIDENT _____ (SEAL)

Signed, Sealed and delivered in presence of

SURETY COMPANY _____ (SEAL)

ADDRESS _____ (SEAL)

TITLE _____ (SEAL)

COMMUNITY COLLEGE OF ALLEGHENY COUNTY
800 ALLEGHENY AVENUE, PITTSBURGH PA 15233

LABOR AND MATERIAL

PAYMENT BOND

KNOW ALL MEN BY THESE PRESENTS:

That we _____ **"TO BE COMPLETED ONLY BY AWARDEES"** _____
_____ as Principal
hereinafter called Principal, and _____
_____ as Surety, hereinafter called Surety, are held and firmly bound unto the
COMMUNITY COLLEGE OF ALLEGHENY COUNTY, through its Board of Trustees as Oblige, hereinafter called Owner, for the use and benefit of claimants
as hereinbelow defined, in the amount of _____
_____ Dollars (\$ _____),
for the payment whereof Principal and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these
presents.

WHEREAS, Principal has by written agreement, dated _____ 20_____, entered into a contract with Owner
for _____
in accordance with drawings and specifications prepared by _____

(Here insert full name, title and address)

_____ which contract is by reference made a part hereof, and is
hereinafter referred to as the Contract.

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

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

Signed and sealed this _____ day of _____ 20____

_____ By _____
Witness (Seal) Principal

_____ By _____
Witness (Seal) Surety

This bond is issued simultaneously with performance bond in favor of the Owner conditioned on the full and faithful performance of the Contract.
Original – January 1980

COMMUNITY COLLEGE OF ALLEGHENY COUNTY
800 ALLEGHENY AVENUE, PITTSBURGH, PA 15233

NO-LIEN AGREEMENT

"TO BE COMPLETED ONLY BY AWARDEES"

Bid 1149

Made the _____ day of _____, 20____ between _____
_____, Pittsburgh, Pennsylvania Contractor and Community College of Allegheny County,
Pittsburgh, Pennsylvania, Owner.

Whereas, by separate written contract dated and executed the day and year first above written. The Owner and Contractor have entered into a No-Lien Contract (herein described for convenience as the Contract) to furnish all labor, materials, supplies, tools, and equipment necessary to complete the Contract in accordance with the specifications prepared by the Owner, and the provisions on the Contract between the Owner and Contractor, as more particularly recited therein.

NOW, THEREFORE, in consideration of the execution of said Contract for the purchases of and delivery on the premises of the owner and terms and conditions thereof, the Contractor covenants and agrees as follows:

1. The contractor covenants and agrees that no mechanics' claims or liens shall be entered or filed by the Contractor or by any subcontractor or materialsman or by an other person against the building or property of the Owner described more particularly hereinafter, for or on account of any work or labor done, materials, supplies, tools and equipment furnished in, upon, or about the building and property of the Owner described more particularly hereinafter.
2. Any and all right of lien is hereby waived and the Contractor, all subcontractors, all materialsmen, all persons supplying labor, and/or materials and all other persons shall look exclusively to and hold the Contractor and not the property liable for any sums due, however arising.
3. The property as to which this No-Lien Agreement is filed is located at Community College of Allegheny County, _____.

Block/Lot _____

IN WITNESS WHEREOF, the parties hereto, with the intent to be bound legally thereby have duly executed this No-Lien Agreement the day and year first above written.

COMMUNITY COLLEGE OF ALLEGHENY COUNTY (OWNER)

VP BUSINESS AND ADMINISTRATION/CFO

(WITNESS)

(CONTRACTOR)

Form of Agreement

“TO BE SUBMITTED ONLY BY AWARDEES”

CCAC will be using American Institute of Architects (AIA) A101/A201/A201 Supplementary Series as the final contract agreement.

COMMUNITY COLLEGE OF ALLEGHENY COUNTY
800 ALLEGHENY AVENUE PITTSBURGH, PA 15233

INSURANCE REQUIREMENTS

“TO BE SUBMITTED ONLY BY AWARDEES”

See A201 Supplementary Conditions - Section 11.2

AIA® Document A101® – 2017

Standard Form of Agreement Between Owner and Contractor where the basis of payment is a Stipulated Sum

AGREEMENT made as of the [] day of [] in the year 2026
(In words, indicate day, month and year.)

BETWEEN the Owner:
(Name, legal status, address and other information)

Community College of Allegheny County
800 Allegheny Avenue
Pittsburgh, PA 15233

and the Contractor:
(Name, legal status, address and other information)

[]
[]
[]
[]

for the following Project:
Roof Replacement

[]
CCAC Boyce Campus,
595 Beatty Road
Monroeville, Pennsylvania

The Architect:
(Name, legal status, address and other D)

Desmone
[]
[]

The Owner and Contractor agree as follows.

ADDITIONS AND DELETIONS:
The author of this document may have revised the text of the original AIA standard form. An *Additions and Deletions Report* that notes revisions to the standard form text is available from the author and should be reviewed. A vertical line in the left margin of this document indicates where the author has added to or deleted from the original AIA text.

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

The parties should complete A101®–2017, Exhibit A, Insurance and Bonds, contemporaneously with this Agreement. AIA Document A201®–2017, General Conditions of the Contract for Construction, is adopted in this document by reference. Do not use with other general conditions unless this document is modified.

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

TABLE OF ARTICLES

- 1 THE CONTRACT DOCUMENTS
- 2 THE WORK OF THIS CONTRACT
- 3 DATE OF COMMENCEMENT AND SUBSTANTIAL COMPLETION
- 4 CONTRACT SUM
- 5 PAYMENTS
- 6 DISPUTE RESOLUTION
- 7 TERMINATION OR SUSPENSION
- 8 MISCELLANEOUS PROVISIONS
- 9 ENUMERATION OF CONTRACT DOCUMENTS

EXHIBIT A INSURANCE AND BONDS

ARTICLE 1 THE CONTRACT DOCUMENTS

The Contract Documents consist of this Agreement, Conditions of the Contract (General, Supplementary, and other Conditions), Drawings, Specifications, Addenda issued prior to execution of this Agreement, other documents listed in this Agreement, and Modifications issued after execution of this Agreement, all of which form the Contract, and are as fully a part of the Contract as if attached to this Agreement or repeated herein. The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations, or agreements, either written or oral. An enumeration of the Contract Documents, other than a Modification, appears in Article 9.

ARTICLE 2 THE WORK OF THIS CONTRACT

The Contractor shall fully execute the Work described in the Contract Documents, except as specifically indicated in the Contract Documents to be the responsibility of others.

ARTICLE 3 DATE OF COMMENCEMENT AND SUBSTANTIAL COMPLETION

§ 3.1 The date of commencement of the Work shall be: **To be determined.**

(Check one of the following boxes.)

☐ The date of this Agreement.

☐ A date set forth in a notice to proceed issued by the Owner.

☐ Established as follows:

(Insert a date or a means to determine the date of commencement of the Work.)

☐

§ 3.2 The Contract Time shall be measured from the date of commencement of the Work.

§ 3.3 Substantial Completion

§ 3.3.1 Subject to adjustments of the Contract Time as provided in the Contract Documents, the Contractor shall achieve Substantial Completion of the entire Work: **To be determined.**

(Check one of the following boxes and complete the necessary information.)

[] Not later than () calendar days from the date of commencement of the Work.

[] By the following date:

§ 3.3.2 Subject to adjustments of the Contract Time as provided in the Contract Documents, if portions of the Work are to be completed prior to Substantial Completion of the entire Work, the Contractor shall achieve Substantial Completion of such portions by the following dates:

Portion of Work	Substantial Completion Date

§ 3.3.3 If the Contractor fails to achieve Substantial Completion as provided in this Section 3.3, liquidated damages, if any, shall be assessed as set forth in Section 4.5.

ARTICLE 4 CONTRACT SUM

§ 4.1 The Owner shall pay the Contractor the Contract Sum in current funds for the Contractor's performance of the Contract. The Contract Sum shall be (\$), subject to additions and deductions as provided in the Contract Documents.

§ 4.2 Alternates

§ 4.2.1 Alternates, if any, included in the Contract Sum:

Item	Price

§ 4.2.2 Subject to the conditions noted below, the following alternates may be accepted by the Owner following execution of this Agreement. Upon acceptance, the Owner shall issue a Modification to this Agreement.
(Insert below each alternate and the conditions that must be met for the Owner to accept the alternate.)

Item	Price	Conditions for Acceptance

§ 4.3 Allowances, if any, included in the Contract Sum:
(Identify each allowance.)

Item	Price

§ 4.4 Unit prices, if any:
(Identify the item and state the unit price and quantity limitations, if any, to which the unit price will be applicable.)

Item	Units and Limitations	Price per Unit (\$0.00)

§ 4.5 Liquidated damages, if any:
(Insert terms and conditions for liquidated damages, if any.)

Notwithstanding anything in the Contract Documents to the contrary, the Project shall be deemed "substantially complete" if and only if a certificate of occupancy has been obtained. Contractor and Owner agree to timely cooperate with each other to obtain a temporary and final certificate of occupancy. For each day that the Project is not Substantially Complete after the Substantial Completion Date set forth above, or as extended, in accordance with the provisions of the Contract Documents, that the Project is not substantially complete, Owner shall be entitled to recover from Contractor, and Contractor shall be required to pay Owner, the sum of \$500 per day, weekends and holidays included, as liquidated damages for such delay. The parties hereto agree that such liquidated damages do not constitute

a penalty, that the actual damages to be suffered by Owner in the event of any delay in substantial completion are difficult to ascertain but are certain to occur, and that the liquidated damages called for herein are a reasonable estimate of Owner's damages relating solely to the loss of use of Project as they relate to estimated costs to continue to retain appropriate professionals to manage and coordinate the Project, such as the Construction Manager and Architect, during periods of extended construction and closeout activities necessitated by the delay. The liquidated damages set forth herein are a non-exclusive remedy for Contractor's delay in substantially completing the Project. Owner's recovery of such liquidated damages shall not preclude Owner from seeking to recover and recovering other direct costs incurred by virtue of such delay. Furthermore, the parties hereto agree that this provision in no manner limits Owner's right to recover damages or pursue other legal remedies in the event of some other breach of the Contract Documents by the Contractor.

§ 4.6 Other:

(Insert provisions for bonus or other incentives, if any, that might result in a change to the Contract Sum.)

Not applicable.

ARTICLE 5 PAYMENTS

§ 5.1 Progress Payments

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

§ 5.1.2 The period covered by each Application for Payment shall be one calendar month ending on the last day of the month.

§ 5.1.3 Provided that an Application for Payment is received by the Architect no later than the last business day of a month, the Owner shall make payment of the certified amount in the Application for Payment to the Contractor not later than the 30th day of the following month. If an Application for Payment is received by the Architect after the application date fixed above, payment of the amount certified shall be made by the Owner not later than thirty (30) days after the Architect receives the Application for Payment.

§ 5.1.4 Each Application for Payment shall be based on the most recent schedule of values submitted by the Contractor in accordance with the Contract Documents. The schedule of values shall allocate the entire Contract Sum among the various portions of the Work. The schedule of values shall be prepared in such form, and supported by such data to substantiate its accuracy, as the Architect may require. This schedule of values shall be used as a basis for reviewing the Contractor's Applications for Payment.

§ 5.1.5 Applications for Payment shall show the percentage of completion of each portion of the Work as of the end of the period covered by the Application for Payment.

§ 5.1.6 In accordance with AIA Document A201™–2017, General Conditions of the Contract for Construction, as amended by the Supplementary Conditions, and subject to other provisions of the Contract Documents, the amount of each progress payment shall be computed as follows:

§ 5.1.6.1 The amount of each progress payment shall first include:

- .1 That portion of the Contract Sum properly allocable to completed Work;
- .2 That portion of the Contract Sum properly allocable to materials and equipment delivered and suitably stored at the site for subsequent incorporation in the completed construction, or, if approved in advance by the Owner, suitably stored off the site at a location agreed upon in writing; and
- .3 That portion of Construction Change Directives that the Architect determines, in the Architect's professional judgment, to be reasonably justified.

§ 5.1.6.2 The amount of each progress payment shall then be reduced by:

- .1 The aggregate of any amounts previously paid by the Owner;
- .2 The amount, if any, for Work that remains uncorrected and for which the Architect has previously withheld a Certificate for Payment as provided in Article 9 of AIA Document A201–2017;

- .3 Any amount for which the Contractor does not intend to pay a Subcontractor or material supplier, unless the Work has been performed by others the Contractor intends to pay;
- .4 For Work performed or defects discovered since the last payment application, any amount for which the Architect may withhold payment, or nullify a Certificate of Payment in whole or in part, as provided in Article 9 of AIA Document A201–2017; and
- .5 Retainage withheld pursuant to Section 5.1.7.
- .6 Liquidated damages assessed under Section 4.5.

§ 5.1.7 Retainage

§ 5.1.7.1 For each progress payment made prior to Substantial Completion of the Work, the Owner may withhold the following amount, as retainage, from the payment otherwise due: Ten (10) percent.

§ 5.1.7.1.1 Not used.

§ 5.1.7.2 Not used.

§ 5.1.7.3 Except as set forth in this Section 5.1.7.3, upon Substantial Completion of the Work, the Contractor may submit an Application for Payment that includes fifty (50) percent of the retainage withheld from prior Applications for Payment pursuant to this Section 5.1.7.

§ 5.1.8 Not used.

§ 5.1.9 Except with the Owner's prior written approval, the Contractor shall not make advance payments to suppliers for materials or equipment which have not been delivered and stored at the site.

§ 5.2 Final Payment

§ 5.2.1 Final payment, constituting the entire unpaid balance of the Contract Sum, shall be made by the Owner to the Contractor when

- .1 the Contractor has fully performed the Contract except for the Contractor's responsibility to correct Work as provided in Article 12 of AIA Document A201–2017, as amended, and to satisfy other requirements, if any, which extend beyond final payment; and
- .2 a final Certificate for Payment has been issued by the Architect.

§ 5.2.2 The Owner's final payment to the Contractor shall be made no later than 30 days after the issuance of the Architect's final Certificate for Payment.

§ 5.3 Interest

Payments due and unpaid under the Contract shall bear interest at .5 percent per month.

ARTICLE 6 DISPUTE RESOLUTION

§ 6.1 Initial Decision Maker

The Architect will serve as the Initial Decision Maker pursuant to Article 15 of AIA Document A201–2017.

§ 6.2 Binding Dispute Resolution

For any Claim subject to, but not resolved by, mediation pursuant to Article 15 of AIA Document A201–2017, the method of binding dispute resolution shall be as follows:

(Check the appropriate box.)

- ☒ [X] Arbitration pursuant to Section 15.4 of AIA Document A201–2017, as amended by the Supplementary Conditions, except where Owner elects litigation pursuant to Section 15.4.1 of the Supplementary Conditions.

ARTICLE 7 TERMINATION OR SUSPENSION

§ 7.1 The Contract may be terminated by the Owner or the Contractor as provided in Article 14 of AIA Document A201–2017, as amended by the Supplementary Conditions.

§ 7.1.1 Not used.

§ 7.2 The Work may be suspended by the Owner as provided in Article 14 of AIA Document A201–2017, as amended by the Supplementary Conditions.

ARTICLE 8 MISCELLANEOUS PROVISIONS

§ 8.1 Where reference is made in this Agreement to a provision of AIA Document A201–2017 or another Contract Document, the reference refers to that provision as amended or supplemented by other provisions of the Contract Documents.

§ 8.2 The Owner's representative:

(Name, address, email address, and other information)

§ 8.3 The Contractor's representative:

(Name, address, email address, and other information)

§ 8.4 Neither the Owner's nor the Contractor's representative shall be changed without ten days' prior notice to the other party.

§ 8.5 Insurance and Bonds

§ 8.5.1 The Owner and the Contractor shall purchase and maintain insurance as set forth in Article 11 of AIA Document A201–2017, as amended by the Supplementary Conditions.

§ 8.5.2 The Contractor shall provide performance and payment bonds for one hundred (100) percent of the Contract Sum.

§ 8.6 Notice in electronic format, pursuant to Article 1 of AIA Document A201–2017, may be given in accordance with a building information modeling exhibit, if completed, or as otherwise set forth below:

(If other than in accordance with a building information modeling exhibit, insert requirements for delivering notice in electronic format such as name, title, and email address of the recipient and whether and how the system will be required to generate a read receipt for the transmission.)

Electronic mail to the Owner's and Contractor's representatives in Sections 8.2 and 8.3.

§ 8.7 Other provisions:

Not applicable.

ARTICLE 9 ENUMERATION OF CONTRACT DOCUMENTS

§ 9.1 This Agreement is comprised of the following documents:

- .1 AIA Document A101™–2017, Standard Form of Agreement Between Owner and Contractor, as amended.
- .2 AIA Document A201™–2017, General Conditions of the Contract for Construction, as amended by the Supplementary Conditions.
- .3 Project Manual, CCAC Biology Lab Renovations, Boyce Campus, Bid Documents, Specifications prepared by AE Works.
- .4 Drawings titled “BID DOCUMENTS”, prepared by AE Works, including General, Abatement, Structural, Architectural, Mechanical, Plumbing, and Electrical drawings, dated April 14, 2026.
- .4 Bid Proposal No. 1148 titled Biology Lab Renovation at Boyce Campus General, Electrical, HVAC, Plumbing.

If there is a conflict or ambiguity among the Contract Documents: (1) the more stringent requirement relating to performance of the Work shall control, as determined by the Owner, and (2) the Supplementary Conditions shall control over the standard form printed terms.

This Agreement entered into as of the day and year first written above.

OWNER (Signature)

(Printed name and title)

CONTRACTOR (Signature)

(Printed name and title)

AIA® Document A201® – 2017

General Conditions of the Contract for Construction (Amended by Supplementary Conditions)

for the following PROJECT:

Roof Replacment
CCAC Boyce Campus,
595 Beatty Road
Monroeville, Pennsylvania

THE OWNER:

(Name, legal status and address)

Community College of Allegheny County
800 Allegheny Avenue
Pittsburgh, PA 15233

THE ARCHITECT:

(Name, legal status and address)

Desmone

TABLE OF ARTICLES

- 1 GENERAL PROVISIONS**
- 2 OWNER**
- 3 CONTRACTOR**
- 4 ARCHITECT**
- 5 SUBCONTRACTORS**
- 6 CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS**
- 7 CHANGES IN THE WORK**
- 8 TIME**
- 9 PAYMENTS AND COMPLETION**
- 10 PROTECTION OF PERSONS AND PROPERTY**

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

For guidance in modifying this document to include supplementary conditions, see AIA Document A503™–2017, Guide for Supplementary Conditions.

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- 11 INSURANCE AND BONDS
- 12 UNCOVERING AND CORRECTION OF WORK
- 13 MISCELLANEOUS PROVISIONS
- 14 TERMINATION OR SUSPENSION OF THE CONTRACT
- 15 CLAIMS AND DISPUTES



INDEX

(Topics and numbers in bold are Section headings.)

Acceptance of Nonconforming Work

9.6.6, 9.9.3, **12.3**

Acceptance of Work

9.6.6, 9.8.2, 9.9.3, 9.10.1, 9.10.3, 12.3

Access to Work

3.16, 6.2.1, 12.1

Accident Prevention

10

Acts and Omissions

3.2, 3.3.2, 3.12.8, 3.18, 4.2.3, 8.3.1, 9.5.1, 10.2.5, 10.2.8, 13.3.2, 14.1, 15.1.2, 15.2

Addenda

1.1.1

Additional Costs, Claims for

3.7.4, 3.7.5, 10.3.2, 15.1.5

Additional Inspections and Testing

9.4.2, 9.8.3, 12.2.1, **13.4**

Additional Time, Claims for

3.2.4, 3.7.4, 3.7.5, 3.10.2, 8.3.2, **15.1.6**

Administration of the Contract

3.1.3, **4.2**, 9.4, 9.5

Advertisement or Invitation to Bid

1.1.1

Aesthetic Effect

4.2.13

Allowances

3.8

Applications for Payment

4.2.5, 7.3.9, 9.2, **9.3**, 9.4, 9.5.1, 9.5.4, 9.6.3, 9.7, 9.10

Approvals

2.1.1, 2.3.1, 2.5, 3.1.3, 3.10.2, 3.12.8, 3.12.9, 3.12.10.1, 4.2.7, 9.3.2, 13.4.1

Arbitration

8.3.1, 15.3.2, **15.4**

ARCHITECT

4

Architect, Definition of

4.1.1

Architect, Extent of Authority

2.5, 3.12.7, 4.1.2, 4.2, 5.2, 6.3, 7.1.2, 7.3.4, 7.4, 9.2, 9.3.1, 9.4, 9.5, 9.6.3, 9.8, 9.10.1, 9.10.3, 12.1, 12.2.1, 13.4.1, 13.4.2, 14.2.2, 14.2.4, 15.1.4, 15.2.1

Architect, Limitations of Authority and Responsibility

2.1.1, 3.12.4, 3.12.8, 3.12.10, 4.1.2, 4.2.1, 4.2.2, 4.2.3, 4.2.6, 4.2.7, 4.2.10, 4.2.12, 4.2.13, 5.2.1, 7.4, 9.4.2, 9.5.4, 9.6.4, 15.1.4, 15.2

Architect's Additional Services and Expenses

2.5, 12.2.1, 13.4.2, 13.4.3, 14.2.4

Architect's Administration of the Contract

3.1.3, 3.7.4, 15.2, 9.4.1, 9.5

Architect's Approvals

2.5, 3.1.3, 3.5, 3.10.2, 4.2.7

Architect's Authority to Reject Work

3.5, 4.2.6, 12.1.2, 12.2.1

Architect's Copyright

1.1.7, 1.5

Architect's Decisions

3.7.4, 4.2.6, 4.2.7, 4.2.11, 4.2.12, 4.2.13, 4.2.14, 6.3, 7.3.4, 7.3.9, 8.1.3, 8.3.1, 9.2, 9.4.1, 9.5, 9.8.4, 9.9.1, 13.4.2, 15.2

Architect's Inspections

3.7.4, 4.2.2, 4.2.9, 9.4.2, 9.8.3, 9.9.2, 9.10.1, 13.4

Architect's Instructions

3.2.4, 3.3.1, 4.2.6, 4.2.7, 13.4.2

Architect's Interpretations

4.2.11, 4.2.12

Architect's Project Representative

4.2.10

Architect's Relationship with Contractor

1.1.2, 1.5, 2.3.3, 3.1.3, 3.2.2, 3.2.3, 3.2.4, 3.3.1, 3.4.2, 3.5, 3.7.4, 3.7.5, 3.9.2, 3.9.3, 3.10, 3.11, 3.12, 3.16, 3.18, 4.1.2, 4.2, 5.2, 6.2.2, 7, 8.3.1, 9.2, 9.3, 9.4, 9.5, 9.7, 9.8, 9.9, 10.2.6, 10.3, 11.3, 12, 13.3.2, 13.4, 15.2

Architect's Relationship with Subcontractors

1.1.2, 4.2.3, 4.2.4, 4.2.6, 9.6.3, 9.6.4, 11.3

Architect's Representations

9.4.2, 9.5.1, 9.10.1

Architect's Site Visits

3.7.4, 4.2.2, 4.2.9, 9.4.2, 9.5.1, 9.9.2, 9.10.1, 13.4

Asbestos

10.3.1

Attorneys' Fees

3.18.1, 9.6.8, 9.10.2, 10.3.3

Award of Separate Contracts

6.1.1, 6.1.2

Award of Subcontracts and Other Contracts for Portions of the Work

5.2

Basic Definitions

1.1

Bidding Requirements

1.1.1

Binding Dispute Resolution

8.3.1, 9.7, 11.5, 13.1, 15.1.2, 15.1.3, 15.2.1, 15.2.5, 15.2.6.1, 15.3.1, 15.3.2, 15.3.3, 15.4.1

Bonds, Lien

7.3.4.4, 9.6.8, 9.10.2, 9.10.3

Bonds, Performance, and Payment

7.3.4.4, 9.6.7, 9.10.3, **11.1.2**, 11.1.3, **11.5**

Building Information Models Use and Reliance

1.8

Building Permit

3.7.1

Capitalization

1.3

Certificate of Substantial Completion

9.8.3, 9.8.4, 9.8.5

Certificates for Payment

4.2.1, 4.2.5, 4.2.9, 9.3.3, **9.4**, 9.5, 9.6.1, 9.6.6, 9.7, 9.10.1, 9.10.3, 14.1.1.3, 14.2.4, 15.1.4

Certificates of Inspection, Testing or Approval

13.4.4

Certificates of Insurance

9.10.2

Change Orders

1.1.1, 3.4.2, 3.7.4, 3.8.2.3, 3.11, 3.12.8, 4.2.8, 5.2.3, 7.1.2, 7.1.3, **7.2**, 7.3.2, 7.3.7, 7.3.9, 7.3.10, 8.3.1, 9.3.1.1, 9.10.3, 10.3.2, 11.2, 11.5, 12.1.2

Change Orders, Definition of

7.2.1

CHANGES IN THE WORK

2.2.2, 3.11, 4.2.8, 7, 7.2.1, 7.3.1, 7.4, 8.3.1, 9.3.1.1, 11.5

Claims, Definition of

15.1.1

Claims, Notice of

1.6.2, 15.1.3

CLAIMS AND DISPUTES

3.2.4, 6.1.1, 6.3, 7.3.9, 9.3.3, 9.10.4, 10.3.3, **15**, 15.4

Claims and Timely Assertion of Claims

15.4.1

Claims for Additional Cost

3.2.4, 3.3.1, 3.7.4, 7.3.9, 9.5.2, 10.2.5, 10.3.2, **15.1.5**

Claims for Additional Time

3.2.4, 3.3.1, 3.7.4, 6.1.1, 8.3.2, 9.5.2, 10.3.2, **15.1.6**

Concealed or Unknown Conditions, Claims for

3.7.4

Claims for Damages

3.2.4, 3.18, 8.3.3, 9.5.1, 9.6.7, 10.2.5, 10.3.3, 11.3, 11.3.2, 14.2.4, 15.1.7

Claims Subject to Arbitration

15.4.1

Cleaning Up

3.15, 6.3

Commencement of the Work, Conditions Relating to

2.2.1, 3.2.2, 3.4.1, 3.7.1, 3.10.1, 3.12.6, 5.2.1, 5.2.3, 6.2.2, 8.1.2, 8.2.2, 8.3.1, 11.1, 11.2, **15.1.5**

Commencement of the Work, Definition of

8.1.2

Communications

3.9.1, **4.2.4**

Completion, Conditions Relating to

3.4.1, 3.11, 3.15, 4.2.2, 4.2.9, 8.2, 9.4.2, 9.8, 9.9.1, 9.10, 12.2, 14.1.2, 15.1.2

COMPLETION, PAYMENTS AND

9

Completion, Substantial

3.10.1, 4.2.9, 8.1.1, 8.1.3, 8.2.3, 9.4.2, 9.8, 9.9.1, 9.10.3, 12.2, 15.1.2

Compliance with Laws

2.3.2, 3.2.3, 3.6, 3.7, 3.12.10, 3.13, 9.6.4, 10.2.2, 13.1, 13.3, 13.4.1, 13.4.2, 13.5, 14.1.1, 14.2.1.3, 15.2.8, 15.4.2, 15.4.3

Concealed or Unknown Conditions

3.7.4, 4.2.8, 8.3.1, 10.3

Conditions of the Contract

1.1.1, 6.1.1, 6.1.4

Consent, Written

3.4.2, 3.14.2, 4.1.2, 9.8.5, 9.9.1, 9.10.2, 9.10.3, 13.2, 15.4.4.2

Consolidation or Joinder

15.4.4

CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS

1.1.4, **6**

Construction Change Directive, Definition of

7.3.1

Construction Change Directives

1.1.1, 3.4.2, 3.11, 3.12.8, 4.2.8, 7.1.1, 7.1.2, 7.1.3, **7.3**, 9.3.1.1

Construction Schedules, Contractor's

3.10, 3.11, 3.12.1, 3.12.2, 6.1.3, 15.1.6.2

Contingent Assignment of Subcontracts

5.4, 14.2.2.2

Continuing Contract Performance

15.1.4

Contract, Definition of

1.1.2

CONTRACT, TERMINATION OR SUSPENSION OF THE

5.4.1.1, 5.4.2, 11.5, **14**

Contract Administration

3.1.3, 4, 9.4, 9.5

Contract Award and Execution, Conditions Relating to

3.7.1, 3.10, 5.2, 6.1

Contract Documents, Copies Furnished and Use of

1.5.2, 2.3.6, 5.3

Contract Documents, Definition of

1.1.1

Contract Sum

2.2.2, 2.2.4, 3.7.4, 3.7.5, 3.8, 3.10.2, 5.2.3, 7.3, 7.4, **9.1**, 9.2, 9.4.2, 9.5.1.4, 9.6.7, 9.7, 10.3.2, 11.5, 12.1.2, 12.3, 14.2.4, 14.3.2, 15.1.4.2, **15.1.5**, **15.2.5**

Contract Sum, Definition of

9.1

Contract Time

1.1.4, 2.2.1, 2.2.2, 3.7.4, 3.7.5, 3.10.2, 5.2.3, 6.1.5, 7.2.1.3, 7.3.1, 7.3.5, 7.3.6, 7, 7, 7.3.10, 7.4, 8.1.1, 8.2.1, 8.2.3, 8.3.1, 9.5.1, 9.7, 10.3.2, 12.1.1, 12.1.2, 14.3.2, 15.1.4.2, 15.1.6.1, 15.2.5

Contract Time, Definition of

8.1.1

CONTRACTOR

3

Contractor, Definition of

3.1, **6.1.2**

Contractor's Construction and Submittal Schedules

3.10, 3.12.1, 3.12.2, 4.2.3, 6.1.3, 15.1.6.2

Contractor's Employees

2.2.4, 3.3.2, 3.4.3, 3.8.1, 3.9, 3.18.2, 4.2.3, 4.2.6, 10.2, 10.3, 11.3, 14.1, 14.2.1.1

Contractor's Liability Insurance

11.1

Contractor's Relationship with Separate Contractors and Owner's Forces

3.12.5, 3.14.2, 4.2.4, 6, 11.3, 12.2.4

Contractor's Relationship with Subcontractors

1.2.2, 2.2.4, 3.3.2, 3.18.1, 3.18.2, 4.2.4, 5, 9.6.2, 9.6.7, 9.10.2, 11.2, 11.3, 11.4

Contractor's Relationship with the Architect

1.1.2, 1.5, 2.3.3, 3.1.3, 3.2.2, 3.2.3, 3.2.4, 3.3.1, 3.4.2, 3.5.1, 3.7.4, 3.10, 3.11, 3.12, 3.16, 3.18, 4.2, 5.2, 6.2.2, 7, 8.3.1, 9.2, 9.3, 9.4, 9.5, 9.7, 9.8, 9.9, 10.2.6, 10.3, 11.3, 12, 13.4, 15.1.3, 15.2.1

Contractor's Representations

3.2.1, 3.2.2, 3.5, 3.12.6, 6.2.2, 8.2.1, 9.3.3, 9.8.2

Contractor's Responsibility for Those Performing the Work

3.3.2, 3.18, 5.3, 6.1.3, 6.2, 9.5.1, 10.2.8

Contractor's Review of Contract Documents

3.2

Contractor's Right to Stop the Work

2.2.2, 9.7

Contractor's Right to Terminate the Contract

14.1

Contractor's Submittals

3.10, 3.11, 3.12, 4.2.7, 5.2.1, 5.2.3, 9.2, 9.3, 9.8.2, 9.8.3, 9.9.1, 9.10.2, 9.10.3

Contractor's Superintendent

3.9, 10.2.6

Contractor's Supervision and Construction Procedures

1.2.2, 3.3, 3.4, 3.12.10, 4.2.2, 4.2.7, 6.1.3, 6.2.4, 7.1.3, 7.3.4, 7.3.6, 8.2, 10, 12, 14, 15.1.4

Coordination and Correlation

1.2, 3.2.1, 3.3.1, 3.10, 3.12.6, 6.1.3, 6.2.1

Copies Furnished of Drawings and Specifications

1.5, 2.3.6, 3.11

Copyrights

1.5, **3.17**

Correction of Work

2.5, 3.7.3, 9.4.2, 9.8.2, 9.8.3, 9.9.1, 12.1.2, **12.2**, 12.3, 15.1.3.1, 15.1.3.2, 15.2.1

Correlation and Intent of the Contract Documents

1.2

Cost, Definition of

7.3.4

Costs

2.5, 3.2.4, 3.7.3, 3.8.2, 3.15.2, 5.4.2, 6.1.1, 6.2.3, 7.3.3.3, 7.3.4, 7.3.8, 7.3.9, 9.10.2, 10.3.2, 10.3.6, 11.2, 12.1.2, 12.2.1, 12.2.4, 13.4, 14

Cutting and Patching

3.14, 6.2.5

Damage to Construction of Owner or Separate Contractors

3.14.2, 6.2.4, 10.2.1.2, 10.2.5, 10.4, 12.2.4

Damage to the Work

3.14.2, 9.9.1, 10.2.1.2, 10.2.5, 10.4, 12.2.4

Damages, Claims for

3.2.4, 3.18, 6.1.1, 8.3.3, 9.5.1, 9.6.7, 10.3.3, 11.3.2, 11.3, 14.2.4, 15.1.7

Damages for Delay

6.2.3, 8.3.3, 9.5.1.6, 9.7, 10.3.2, 14.3.2

Date of Commencement of the Work, Definition of

8.1.2

Date of Substantial Completion, Definition of

8.1.3

Day, Definition of

8.1.4

Decisions of the Architect

3.7.4, 4.2.6, 4.2.7, 4.2.11, 4.2.12, 4.2.13, 6.3, 7.3.4, 7.3.9, 8.1.3, 8.3.1, 9.2, 9.4, 9.5.1, 9.8.4, 9.9.1, 13.4.2, 14.2.2, 14.2.4, 15.1, 15.2

Decisions to Withhold Certification

9.4.1, **9.5**, 9.7, 14.1.1.3

Defective or Nonconforming Work, Acceptance, Rejection and Correction of

2.5, 3.5, 4.2.6, 6.2.3, 9.5.1, 9.5.3, 9.6.6, 9.8.2, 9.9.3, 9.10.4, 12.2.1

Definitions

1.1, 2.1.1, 3.1.1, 3.5, 3.12.1, 3.12.2, 3.12.3, 4.1.1, 5.1, 6.1.2, 7.2.1, 7.3.1, 8.1, 9.1, 9.8.1, 15.1.1

Delays and Extensions of Time

3.2, **3.7.4**, 5.2.3, 7.2.1, 7.3.1, **7.4**, **8.3**, 9.5.1, **9.7**, 10.3.2, **10.4**, 14.3.2, **15.1.6**, 15.2.5

Digital Data Use and Transmission

1.7

Disputes

6.3, 7.3.9, 15.1, 15.2

Documents and Samples at the Site

3.11

Drawings, Definition of

1.1.5

Drawings and Specifications, Use and Ownership of

3.11

Effective Date of Insurance

8.2.2

Emergencies

10.4, 14.1.1.2, 15.1.5

Employees, Contractor's

3.3.2, 3.4.3, 3.8.1, 3.9, 3.18.2, 4.2.3, 4.2.6, 10.2, 10.3.3, 11.3, 14.1, 14.2.1.1

Equipment, Labor, or Materials

1.1.3, 1.1.6, 3.4, 3.5, 3.8.2, 3.8.3, 3.12, 3.13, 3.15.1, 4.2.6, 4.2.7, 5.2.1, 6.2.1, 7.3.4, 9.3.2, 9.3.3, 9.5.1.3, 9.10.2, 10.2.1, 10.2.4, 14.2.1.1, 14.2.1.2

Execution and Progress of the Work

1.1.3, 1.2.1, 1.2.2, 2.3.4, 2.3.6, 3.1, 3.3.1, 3.4.1, 3.7.1, 3.10.1, 3.12, 3.14, 4.2, 6.2.2, 7.1.3, 7.3.6, 8.2, 9.5.1, 9.9.1, 10.2, 10.3, 12.1, 12.2, 14.2, 14.3.1, 15.1.4

Extensions of Time

3.2.4, 3.7.4, 5.2.3, 7.2.1, 7.3, 7.4, 9.5.1, 9.7, 10.3.2, 10.4, 14.3, 15.1.6, **15.2.5**

Failure of Payment

9.5.1.3, **9.7**, 9.10.2, 13.5, 14.1.1.3, 14.2.1.2

Faulty Work

(See Defective or Nonconforming Work)

Final Completion and Final Payment

4.2.1, 4.2.9, 9.8.2, **9.10**, 12.3, 14.2.4, 14.4.3

Financial Arrangements, Owner's

2.2.1, 13.2.2, 14.1.1.4

GENERAL PROVISIONS

1

Governing Law

13.1

Guarantees (See Warranty)

Hazardous Materials and Substances

10.2.4, **10.3**

Identification of Subcontractors and Suppliers

5.2.1

Indemnification

3.17, **3.18**, 9.6.8, 9.10.2, 10.3.3, 11.3

Information and Services Required of the Owner

2.1.2, **2.2**, 2.3, 3.2.2, 3.12.10.1, 6.1.3, 6.1.4, 6.2.5, 9.6.1, 9.9.2, 9.10.3, 10.3.3, 11.2, 13.4.1, 13.4.2, 14.1.1.4, 14.1.4, 15.1.4

Initial Decision

15.2

Initial Decision Maker, Definition of

1.1.8

Initial Decision Maker, Decisions

14.2.4, 15.1.4.2, 15.2.1, 15.2.2, 15.2.3, 15.2.4, 15.2.5

Initial Decision Maker, Extent of Authority

14.2.4, 15.1.4.2, 15.2.1, 15.2.2, 15.2.3, 15.2.4, 15.2.5

Injury or Damage to Person or Property

10.2.8, 10.4

Inspections

3.1.3, 3.3.3, 3.7.1, 4.2.2, 4.2.6, 4.2.9, 9.4.2, 9.8.3, 9.9.2, 9.10.1, 12.2.1, 13.4

Instructions to Bidders

1.1.1

Instructions to the Contractor

3.2.4, 3.3.1, 3.8.1, 5.2.1, 7, 8.2.2, 12, 13.4.2

Instruments of Service, Definition of

1.1.7

Insurance

6.1.1, 7.3.4, 8.2.2, 9.3.2, 9.8.4, 9.9.1, 9.10.2, 10.2.5, **11**

Insurance, Notice of Cancellation or Expiration

11.1.4, 11.2.3

Insurance, Contractor's Liability

11.1

Insurance, Effective Date of

8.2.2, 14.4.2

Insurance, Owner's Liability

11.2

Insurance, Property

10.2.5, 11.2, 11.4, 11.5

Insurance, Stored Materials

9.3.2

INSURANCE AND BONDS

11

Insurance Companies, Consent to Partial Occupancy

9.9.1

Insured loss, Adjustment and Settlement of

11.5

Intent of the Contract Documents

1.2.1, 4.2.7, 4.2.12, 4.2.13

Interest

13.5

Interpretation

1.1.8, 1.2.3, **1.4**, 4.1.1, 5.1, 6.1.2, 15.1.1

Interpretations, Written

4.2.11, 4.2.12

Judgment on Final Award

15.4.2

Labor and Materials, Equipment

1.1.3, 1.1.6, **3.4**, 3.5, 3.8.2, 3.8.3, 3.12, 3.13, 3.15.1, 5.2.1, 6.2.1, 7.3.4, 9.3.2, 9.3.3, 9.5.1.3, 9.10.2, 10.2.1, 10.2.4, 14.2.1.1, 14.2.1.2

Labor Disputes

8.3.1

Laws and Regulations

1.5, 2.3.2, 3.2.3, 3.2.4, 3.6, 3.7, 3.12.10, 3.13, 9.6.4, 9.9.1, 10.2.2, 13.1, 13.3.1, 13.4.2, 13.5, 14, 15.2.8, 15.4

Liens

2.1.2, 9.3.1, 9.3.3, 9.6.8, 9.10.2, 9.10.4, 15.2.8

Limitations, Statutes of

12.2.5, 15.1.2, 15.4.1.1

Limitations of Liability

3.2.2, 3.5, 3.12.10, 3.12.10.1, 3.17, 3.18.1, 4.2.6, 4.2.7, 6.2.2, 9.4.2, 9.6.4, 9.6.7, 9.6.8, 10.2.5, 10.3.3, 11.3, 12.2.5, 13.3.1

Limitations of Time

2.1.2, 2.2, 2.5, 3.2.2, 3.10, 3.11, 3.12.5, 3.15.1, 4.2.7, 5.2, 5.3, 5.4.1, 6.2.4, 7.3, 7.4, 8.2, 9.2, 9.3.1, 9.3.3, 9.4.1, 9.5, 9.6,

9.7, 9.8, 9.9, 9.10, 12.2, 13.4, 14, 15, 15.1.2, 15.1.3, 15.1.5

Materials, Hazardous

10.2.4, 10.3

Materials, Labor, Equipment and

1.1.3, 1.1.6, 3.4.1, 3.5, 3.8.2, 3.8.3, 3.12, 3.13, 3.15.1, 5.2.1, 6.2.1, 7.3.4, 9.3.2, 9.3.3, 9.5.1.3, 9.10.2, 10.2.1.2, 10.2.4, 14.2.1.1, 14.2.1.2

Means, Methods, Techniques, Sequences and Procedures of Construction

3.3.1, 3.12.10, 4.2.2, 4.2.7, 9.4.2

Mechanic's Lien

2.1.2, 9.3.1, 9.3.3, 9.6.8, 9.10.2, 9.10.4, 15.2.8

Mediation

8.3.1, 15.1.3.2, 15.2.1, 15.2.5, 15.2.6, **15.3**, 15.4.1, 15.4.1.1

Minor Changes in the Work

1.1.1, 3.4.2, 3.12.8, 4.2.8, 7.1, **7.4**

MISCELLANEOUS PROVISIONS

13

Modifications, Definition of

1.1.1

Modifications to the Contract

1.1.1, 1.1.2, 2.5, 3.11, 4.1.2, 4.2.1, 5.2.3, 7, 8.3.1, 9.7, 10.3.2

Mutual Responsibility

6.2

Nonconforming Work, Acceptance of

9.6.6, 9.9.3, **12.3**

Nonconforming Work, Rejection and Correction of

2.4, 2.5, 3.5, 4.2.6, 6.2.4, 9.5.1, 9.8.2, 9.9.3, 9.10.4, 12.2

Notice

1.6, 1.6.1, 1.6.2, 2.1.2, 2.2.2., 2.2.3, 2.2.4, 2.5, 3.2.4, 3.3.1, 3.7.4, 3.7.5, 3.9.2, 3.12.9, 3.12.10, 5.2.1, 7.4, 8.2.2 9.6.8, 9.7, 9.10.1, 10.2.8, 10.3.2, 11.5, 12.2.2.1, 13.4.1, 13.4.2, 14.1, 14.2.2, 14.4.2, 15.1.3, 15.1.5, 15.1.6, 15.4.1

Notice of Cancellation or Expiration of Insurance

11.1.4, 11.2.3

Notice of Claims

1.6.2, 2.1.2, 3.7.4, 9.6.8, 10.2.8, **15.1.3**, 15.1.5, 15.1.6, 15.2.8, 15.3.2, 15.4.1

Notice of Testing and Inspections

13.4.1, 13.4.2

Observations, Contractor's

3.2, 3.7.4

Occupancy

2.3.1, 9.6.6, 9.8

Orders, Written

1.1.1, 2.4, 3.9.2, 7, 8.2.2, 11.5, 12.1, 12.2.2.1, 13.4.2, 14.3.1

OWNER

2

Owner, Definition of

2.1.1

Owner, Evidence of Financial Arrangements

2.2, 13.2.2, 14.1.1.4

Owner, Information and Services Required of the

2.1.2, **2.2**, 2.3, 3.2.2, 3.12.10, 6.1.3, 6.1.4, 6.2.5, 9.3.2, 9.6.1, 9.6.4, 9.9.2, 9.10.3, 10.3.3, 11.2, 13.4.1, 13.4.2, 14.1.1.4, 14.1.4, 15.1.4

Owner's Authority

1.5, 2.1.1, 2.3.32.4, 2.5, 3.4.2, 3.8.1, 3.12.10, 3.14.2, 4.1.2, 4.2.4, 4.2.9, 5.2.1, 5.2.4, 5.4.1, 6.1, 6.3, 7.2.1, 7.3.1, 8.2.2, 8.3.1, 9.3.2, 9.5.1, 9.6.4, 9.9.1, 9.10.2, 10.3.2, 11.4, 11.5, 12.2.2, 12.3, 13.2.2, 14.3, 14.4, 15.2.7

Owner's Insurance

11.2

Owner's Relationship with Subcontractors

1.1.2, 5.2, 5.3, 5.4, 9.6.4, 9.10.2, 14.2.2

Owner's Right to Carry Out the Work

2.5, 14.2.2

Owner's Right to Clean Up

6.3

Owner's Right to Perform Construction and to Award Separate Contracts

6.1

Owner's Right to Stop the Work

2.4

Owner's Right to Suspend the Work

14.3

Owner's Right to Terminate the Contract

14.2, 14.4

Ownership and Use of Drawings, Specifications and Other Instruments of Service

1.1.1, 1.1.6, 1.1.7, 1.5, 2.3.6, 3.2.2, 3.11, 3.17, 4.2.12, 5.3

Partial Occupancy or Use

9.6.6, 9.9

Patching, Cutting and

3.14, 6.2.5

Patents

3.17

Payment, Applications for

4.2.5, 7.3.9, 9.2, 9.3, 9.4, 9.5, 9.6.3, 9.7, 9.8.5, 9.10.1, 14.2.3, 14.2.4, 14.4.3

Payment, Certificates for

4.2.5, 4.2.9, 9.3.3, 9.4, 9.5, 9.6.1, 9.6.6, 9.7, 9.10.1, 9.10.3, 14.1.1.3, 14.2.4

Payment, Failure of

9.5.1.3, 9.7, 9.10.2, 13.5, 14.1.1.3, 14.2.1.2

Payment, Final

4.2.1, 4.2.9, 9.10, 12.3, 14.2.4, 14.4.3

Payment Bond, Performance Bond and

7.3.4.4, 9.6.7, 9.10.3, 11.1.2

Payments, Progress

9.3, 9.6, 9.8.5, 9.10.3, 14.2.3, 15.1.4

PAYMENTS AND COMPLETION

9

Payments to Subcontractors

5.4.2, 9.5.1.3, 9.6.2, 9.6.3, 9.6.4, 9.6.7, 14.2.1.2

PCB

10.3.1

Performance Bond and Payment Bond

7.3.4.4, 9.6.7, 9.10.3, 11.1.2

Permits, Fees, Notices and Compliance with Laws

2.3.1, 3.7, 3.13, 7.3.4.4, 10.2.2

PERSONS AND PROPERTY, PROTECTION OF

10

Polychlorinated Biphenyl

10.3.1

Product Data, Definition of

3.12.2

Product Data and Samples, Shop Drawings

3.11, 3.12, 4.2.7

Progress and Completion

4.2.2, 8.2, 9.8, 9.9.1, 14.1.4, 15.1.4

Progress Payments

9.3, 9.6, 9.8.5, 9.10.3, 14.2.3, 15.1.4

Project, Definition of

1.1.4

Project Representatives

4.2.10

Property Insurance

10.2.5, 11.2

Proposal Requirements

1.1.1

PROTECTION OF PERSONS AND PROPERTY

10

Regulations and Laws

1.5, 2.3.2, 3.2.3, 3.6, 3.7, 3.12.10, 3.13, 9.6.4, 9.9.1, 10.2.2, 13.1, 13.3, 13.4.1, 13.4.2, 13.5, 14, 15.2.8, 15.4

Rejection of Work

4.2.6, 12.2.1

Releases and Waivers of Liens

9.3.1, 9.10.2

Representations

3.2.1, 3.5, 3.12.6, 8.2.1, 9.3.3, 9.4.2, 9.5.1, 9.10.1

Representatives

2.1.1, 3.1.1, 3.9, 4.1.1, 4.2.10, 13.2.1

Responsibility for Those Performing the Work

3.3.2, 3.18, 4.2.2, 4.2.3, 5.3, 6.1.3, 6.2, 6.3, 9.5.1, 10

Retainage

9.3.1, 9.6.2, 9.8.5, 9.9.1, 9.10.2, 9.10.3

Review of Contract Documents and Field Conditions by Contractor

3.2, 3.12.7, 6.1.3

Review of Contractor's Submittals by Owner and Architect

3.10.1, 3.10.2, 3.11, 3.12, 4.2, 5.2, 6.1.3, 9.2, 9.8.2

Review of Shop Drawings, Product Data and Samples by Contractor

3.12

Rights and Remedies

1.1.2, 2.4, 2.5, 3.5, 3.7.4, 3.15.2, 4.2.6, 5.3, 5.4, 6.1, 6.3, 7.3.1, 8.3, 9.5.1, 9.7, 10.2.5, 10.3, 12.2.1, 12.2.2, 12.2.4, 13.3, 14, 15.4

Royalties, Patents and Copyrights

3.17

Rules and Notices for Arbitration

15.4.1

Safety of Persons and Property

10.2, 10.4

Safety Precautions and Programs

3.3.1, 4.2.2, 4.2.7, 5.3, 10.1, 10.2, 10.4

Samples, Definition of

3.12.3

Samples, Shop Drawings, Product Data and

3.11, 3.12, 4.2.7

Samples at the Site, Documents and

3.11

Schedule of Values

9.2, 9.3.1

Schedules, Construction

3.10, 3.12.1, 3.12.2, 6.1.3, 15.1.6.2

Separate Contracts and Contractors

1.1.4, 3.12.5, 3.14.2, 4.2.4, 4.2.7, 6, 8.3.1, 12.1.2

Separate Contractors, Definition of

6.1.1

Shop Drawings, Definition of

3.12.1

Shop Drawings, Product Data and Samples

3.11, **3.12**, 4.2.7

Site, Use of

3.13, 6.1.1, 6.2.1

Site Inspections

3.2.2, 3.3.3, 3.7.1, 3.7.4, 4.2, 9.9.2, 9.4.2, 9.10.1, 13.4

Site Visits, Architect's

3.7.4, 4.2.2, 4.2.9, 9.4.2, 9.5.1, 9.9.2, 9.10.1, 13.4

Special Inspections and Testing

4.2.6, 12.2.1, 13.4

Specifications, Definition of

1.1.6

Specifications

1.1.1, **1.1.6**, 1.2.2, 1.5, 3.12.10, 3.17, 4.2.14

Statute of Limitations

15.1.2, 15.4.1.1

Stopping the Work

2.2.2, 2.4, 9.7, 10.3, 14.1

Stored Materials

6.2.1, 9.3.2, 10.2.1.2, 10.2.4

Subcontractor, Definition of

5.1.1

SUBCONTRACTORS

5

Subcontractors, Work by

1.2.2, 3.3.2, 3.12.1, 3.18, 4.2.3, 5.2.3, 5.3, 5.4, 9.3.1.2, 9.6.7

Subcontractual Relations

5.3, 5.4, 9.3.1.2, 9.6, 9.10, 10.2.1, 14.1, 14.2.1

Submittals

3.10, 3.11, 3.12, 4.2.7, 5.2.1, 5.2.3, 7.3.4, 9.2, 9.3, 9.8, 9.9.1, 9.10.2, 9.10.3

Submittal Schedule

3.10.2, 3.12.5, 4.2.7

Subrogation, Waivers of

6.1.1, **11.3**

Substances, Hazardous

10.3

Substantial Completion

4.2.9, 8.1.1, 8.1.3, 8.2.3, 9.4.2, **9.8**, 9.9.1, 9.10.3, 12.2, 15.1.2

Substantial Completion, Definition of

9.8.1

Substitution of Subcontractors

5.2.3, 5.2.4

Substitution of Architect

2.3.3

Substitutions of Materials

3.4.2, 3.5, 7.3.8

Sub-subcontractor, Definition of

5.1.2

Subsurface Conditions

3.7.4

Successors and Assigns

13.2

Superintendent

3.9, 10.2.6

Supervision and Construction Procedures

1.2.2, **3.3**, 3.4, 3.12.10, 4.2.2, 4.2.7, 6.1.3, 6.2.4, 7.1.3, 7.3.4, 8.2, 8.3.1, 9.4.2, 10, 12, 14, 15.1.4

Suppliers

1.5, 3.12.1, 4.2.4, 4.2.6, 5.2.1, 9.3, 9.4.2, 9.5.4, 9.6, 9.10.5, 14.2.1

Surety

5.4.1.2, 9.6.8, 9.8.5, 9.10.2, 9.10.3, 11.1.2, 14.2.2, 15.2.7

Surety, Consent of

9.8.5, 9.10.2, 9.10.3

Surveys

1.1.7, 2.3.4

Suspension by the Owner for Convenience

14.3

Suspension of the Work

3.7.5, 5.4.2, 14.3

Suspension or Termination of the Contract

5.4.1.1, 14

Taxes

3.6, 3.8.2.1, 7.3.4.4

Termination by the Contractor

14.1, 15.1.7

Termination by the Owner for Cause

5.4.1.1, **14.2**, 15.1.7

Termination by the Owner for Convenience

14.4

Termination of the Architect

2.3.3

Termination of the Contractor Employment

14.2.2

TERMINATION OR SUSPENSION OF THE CONTRACT

14

Tests and Inspections

3.1.3, 3.3.3, 3.7.1, 4.2.2, 4.2.6, 4.2.9, 9.4.2, 9.8.3, 9.9.2, 9.10.1, 10.3.2, 12.2.1, **13.4**

TIME

8

Time, Delays and Extensions of

3.2.4, 3.7.4, 5.2.3, 7.2.1, 7.3.1, 7.4, **8.3**, 9.5.1, 9.7, 10.3.2, 10.4, 14.3.2, 15.1.6, 15.2.5

Time Limits

2.1.2, 2.2, 2.5, 3.2.2, 3.10, 3.11, 3.12.5, 3.15.1, 4.2, 5.2, 5.3, 5.4, 6.2.4, 7.3, 7.4, 8.2, 9.2, 9.3.1, 9.3.3, 9.4.1, 9.5, 9.6, 9.7, 9.8, 9.9, 9.10, 12.2, 13.4, 14, 15.1.2, 15.1.3, 15.4

Time Limits on Claims

3.7.4, 10.2.8, 15.1.2, 15.1.3

Title to Work

9.3.2, 9.3.3

UNCOVERING AND CORRECTION OF WORK

12

Uncovering of Work

12.1

Unforeseen Conditions, Concealed or Unknown

3.7.4, 8.3.1, 10.3

Unit Prices

7.3.3.2, 9.1.2

Use of Documents

1.1.1, 1.5, 2.3.6, 3.12.6, 5.3

Use of Site

3.13, 6.1.1, 6.2.1

Values, Schedule of

9.2, 9.3.1

Waiver of Claims by the Architect

13.3.2

Waiver of Claims by the Contractor

9.10.5, 13.3.2, **15.1.7**

Waiver of Claims by the Owner

9.9.3, 9.10.3, 9.10.4, 12.2.2.1, 13.3.2, 14.2.4, **15.1.7**

Waiver of Consequential Damages

14.2.4, 15.1.7

Waiver of Liens

9.3, 9.10.2, 9.10.4

Waivers of Subrogation

6.1.1, **11.3**

Warranty

3.5, 4.2.9, 9.3.3, 9.8.4, 9.9.1, 9.10.2, 9.10.4, 12.2.2, 15.1.2

Weather Delays

8.3, 15.1.6.2

Work, Definition of

1.1.3

Written Consent

1.5.2, 3.4.2, 3.7.4, 3.12.8, 3.14.2, 4.1.2, 9.3.2, 9.10.3, 13.2, 13.3.2, 15.4.4.2

Written Interpretations

4.2.11, 4.2.12

Written Orders

1.1.1, 2.4, 3.9, 7, 8.2.2, 12.1, 12.2, 13.4.2, 14.3.1

ARTICLE 1 GENERAL PROVISIONS

§ 1.1 Basic Definitions

§ 1.1.1 The Contract Documents

The Contract Documents are enumerated in the Agreement between the Owner and Contractor (hereinafter the Agreement) and consist of the Agreement, Conditions of the Contract (General, Supplementary and other Conditions), Drawings, Specifications, Addenda issued prior to execution of the Contract, other documents listed in the Agreement, and Modifications issued after execution of the Contract. A Modification is (1) a written amendment to the Contract signed by both parties, (2) a Change Order, (3) a Construction Change Directive, or (4) a written order for a minor change in the Work issued by the Architect. Unless specifically enumerated in the Agreement, the Contract Documents do not include the advertisement or invitation to bid, Instructions to Bidders, sample forms, other information furnished by the Owner in anticipation of receiving bids or proposals, the Contractor's bid or proposal, or portions of Addenda relating to bidding or proposal requirements.

§ 1.1.2 The Contract

The Contract Documents form the Contract for Construction. The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations, or agreements, either written or oral. The Contract may be amended or modified only by a Modification. The Contract Documents shall not be construed to create a contractual relationship of any kind (1) between the Contractor and the Architect or the Architect's consultants, (2) between the Owner and a Subcontractor or a Sub-subcontractor, (3) between the Owner and the Architect or the Architect's consultants, or (4) between any persons or entities other than the Owner and the Contractor. The Architect shall, however, be entitled to performance and enforcement of obligations under the Contract intended to facilitate performance of the Architect's duties.

§ 1.1.3 The Work

The term "Work" means the construction and services required by the Contract Documents, whether completed or partially completed, and includes all other labor, materials, equipment, and services provided or to be provided by the Contractor to fulfill the Contractor's obligations. The Work may constitute the whole or a part of the Project.

§ 1.1.4 The Project

The Project is the total construction of which the Work performed under the Contract Documents may be the whole or a part and which may include construction by the Owner and by Separate Contractors.

§ 1.1.5 The Drawings

The Drawings are the graphic and pictorial portions of the Contract Documents showing the design, location and dimensions of the Work, generally including plans, elevations, sections, details, schedules, and diagrams.

§ 1.1.6 The Specifications

The Specifications are that portion of the Contract Documents consisting of the written requirements for materials, equipment, systems, standards and workmanship for the Work, and performance of related services.

§ 1.1.7 Instruments of Service

Instruments of Service are representations, in any medium of expression now known or later developed, of the tangible and intangible creative work performed by the Architect and the Architect's consultants under their respective professional services agreements. Instruments of Service may include, without limitation, studies, surveys, models, sketches, drawings, specifications, and other similar materials.

§ 1.1.8 Initial Decision Maker

The Initial Decision Maker is the person identified in the Agreement to render initial decisions on Claims in accordance with Section 15.2. The Initial Decision Maker shall not show partiality to the Owner or Contractor and shall not be liable for results of interpretations or decisions rendered in good faith.

§ 1.2 Correlation and Intent of the Contract Documents

§ 1.2.1 The intent of the Contract Documents is to include all items necessary for the proper execution and completion of the Work by the Contractor. The Contract Documents are complementary, and what is required by one shall be as binding as if required by all; performance by the Contractor shall be required only to the extent consistent with the Contract Documents and reasonably inferable from them as being necessary to produce the indicated results.

§ 1.2.1.1 The invalidity of any provision of the Contract Documents shall not invalidate the Contract or its remaining provisions. If it is determined that any provision of the Contract Documents violates any law, or is otherwise invalid or unenforceable, then that provision shall be revised to the extent necessary to make that provision legal and enforceable. In such case the Contract Documents shall be construed, to the fullest extent permitted by law, to give effect to the parties' intentions and purposes in executing the Contract.

§ 1.2.2 Organization of the Specifications into divisions, sections and articles, and arrangement of Drawings shall not control the Contractor in dividing the Work among Subcontractors or in establishing the extent of Work to be performed by any trade.

§ 1.2.3 Unless otherwise stated in the Contract Documents, words that have well-known technical or construction industry meanings are used in the Contract Documents in accordance with such recognized meanings.

§ 1.3 Capitalization

Terms capitalized in these General Conditions include those that are (1) specifically defined, (2) the titles of numbered articles, or (3) the titles of other documents published by the American Institute of Architects.

§ 1.4 Interpretation

In the interest of brevity the Contract Documents frequently omit modifying words such as "all" and "any" and articles such as "the" and "an," but the fact that a modifier or an article is absent from one statement and appears in another is not intended to affect the interpretation of either statement.

§ 1.5 Ownership and Use of Drawings, Specifications, and Other Instruments of Service

§ 1.5.1 The Architect and the Architect's consultants shall be deemed the authors and owners of their respective Instruments of Service, including the Drawings and Specifications, and retain all common law, statutory, and other reserved rights in their Instruments of Service, including copyrights. The Contractor, Subcontractors, Sub-subcontractors, and suppliers shall not own or claim a copyright in the Instruments of Service. Submittal or distribution to meet official regulatory requirements or for other purposes in connection with the Project is not to be construed as publication in derogation of the Architect's or Architect's consultants' reserved rights.

§ 1.5.2 The Contractor, Subcontractors, Sub-subcontractors, and suppliers are authorized to use and reproduce the Instruments of Service provided to them, subject to any protocols established pursuant to Sections 1.7 and 1.8, solely and exclusively for execution of the Work. All copies made under this authorization shall bear the copyright notice, if any, shown on the Instruments of Service. The Contractor, Subcontractors, Sub-subcontractors, and suppliers may not use the Instruments of Service on other projects or for additions to the Project outside the scope of the Work without the specific written consent of the Owner, Architect, and the Architect's consultants.

§ 1.6 Notice

§ 1.6.1 Except as otherwise provided in Section 1.6.2, where the Contract Documents require one party to notify or give notice to the other party, such notice shall be provided in writing to the designated representative of the party to whom the notice is addressed and shall be deemed to have been duly served if delivered in person, by mail, by courier, or by electronic transmission if a method for electronic transmission is set forth in the Agreement.

§ 1.6.2 Notice of Claims as provided in Section 15.1.3 shall be provided in writing and shall be deemed to have been duly served only if delivered to the designated representative of the party to whom the notice is addressed by certified or registered mail, or by courier providing proof of delivery.

§ 1.7 Digital Data Use and Transmission

The parties shall agree upon written protocols governing the transmission and use of, and reliance on, Instruments of Service or any other information or documentation in digital form.

§ 1.8 Building Information Models Use and Reliance

Any use of, or reliance on, all or a portion of a building information model without agreement to written protocols governing the use of, and reliance on, the information contained in the model shall be at the using or relying party's sole risk and without liability to the other party and its contractors or consultants, the authors of, or contributors to, the

building information model, and each of their agents and employees.

ARTICLE 2 OWNER

§ 2.1 General

§ 2.1.1 The Owner is the person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The Owner shall designate in writing a representative who shall have express authority to bind the Owner with respect to all matters requiring the Owner's approval or authorization. Except as otherwise provided in Section 4.2.1, the Architect does not have such authority. The term "Owner" means the Owner or the Owner's authorized representative.

§ 2.1.2 The Owner shall furnish to the Contractor, within fifteen days after receipt of a written request, information necessary and relevant for the Contractor to evaluate, give notice of, or enforce mechanic's lien rights. Such information shall include a correct statement of the record legal title to the property on which the Project is located, usually referred to as the site, and the Owner's interest therein.

§ 2.2 Evidence of the Owner's Financial Arrangements

§ 2.2.1 Prior to commencement of the Work and upon written request by the Contractor, the Owner shall furnish to the Contractor reasonable evidence that the Owner has made financial arrangements to fulfill the Owner's obligations under the Contract. The Contractor shall have no obligation to commence the Work until the Owner provides such evidence. If commencement of the Work is delayed under this Section 2.2.1, the Contract Time shall be extended appropriately.

§ 2.2.2 Following commencement of the Work and upon written request by the Contractor, the Owner shall furnish to the Contractor reasonable evidence that the Owner has made financial arrangements to fulfill the Owner's obligations under the Contract only if (1) the Owner fails to make payments to the Contractor as the Contract Documents require; (2) the Contractor identifies in writing a reasonable concern regarding the Owner's ability to make payment when due; or (3) a change in the Work materially changes the Contract Sum. If the Owner fails to provide such evidence, as required, within fourteen days of the Contractor's request, the Contractor may immediately stop the Work and, in that event, shall notify the Owner that the Work has stopped. However, if the request is made because a change in the Work materially changes the Contract Sum under (3) above, the Contractor may immediately stop only that portion of the Work affected by the change until reasonable evidence is provided. If the Work is stopped under this Section 2.2.2, the Contract Time shall be extended appropriately and the Contract Sum shall be increased by the amount of the Contractor's reasonable costs of shutdown, delay and start-up, plus interest as provided in the Contract Documents.

§ 2.2.3 After the Owner furnishes evidence of financial arrangements under this Section 2.2, the Owner shall not materially vary such financial arrangements without prior notice to the Contractor.

§ 2.2.4 Where the Owner has designated information furnished under this Section 2.2 as "confidential," the Contractor shall keep the information confidential and shall not disclose it to any other person. However, the Contractor may disclose "confidential" information, after seven (7) days' notice to the Owner, where disclosure is required by law, including a subpoena or other form of compulsory legal process issued by a court or governmental entity, or by court or arbitrator(s) order. The Contractor may also disclose "confidential" information to its employees, consultants, sureties, Subcontractors and their employees, Sub-subcontractors, and others who need to know the content of such information solely and exclusively for the Project and who agree to maintain the confidentiality of such information.

§ 2.3 Information and Services Required of the Owner

§ 2.3.1 Except for permits and fees that are the responsibility of the Contractor under the Contract Documents, including those required under Section 3.7.1, the Owner shall secure and pay for necessary approvals, easements, assessments and charges required for construction, use or occupancy of permanent structures or for permanent changes in existing facilities.

§ 2.3.2 The Owner shall retain an architect lawfully licensed to practice architecture, or an entity lawfully practicing architecture, in the jurisdiction where the Project is located. That person or entity is identified as the Architect in the Agreement and is referred to throughout the Contract Documents as if singular in number.

§ 2.3.3 If the employment of the Architect terminates, the Owner shall employ a successor to whom the Contractor has no reasonable objection and whose status under the Contract Documents shall be that of the Architect.

§ 2.3.4 The Owner shall furnish surveys describing physical characteristics, legal limitations and utility locations for the site of the Project, and a legal description of the site. The Contractor shall be entitled to rely on the accuracy of information furnished by the Owner but shall exercise proper precautions relating to the safe performance of the Work.

§ 2.3.5 The Owner shall furnish information or services required of the Owner by the Contract Documents with reasonable promptness. The Owner shall also furnish any other information or services under the Owner's control and relevant to the Contractor's performance of the Work with reasonable promptness after receiving the Contractor's written request for such information or services.

§ 2.3.6 Unless otherwise provided in the Contract Documents, the Owner shall furnish to the Contractor one copy of the Contract Documents for purposes of making reproductions pursuant to Section 1.5.2.

§ 2.4 Owner's Right to Stop the Work

If the Contractor fails to correct Work that is not in accordance with the requirements of the Contract Documents as required by Section 12.2 or repeatedly fails to carry out Work in accordance with the Contract Documents, the Owner may issue a written order to the Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, the right of the Owner to stop the Work shall not give rise to a duty on the part of the Owner to exercise this right for the benefit of the Contractor or any other person or entity, except to the extent required by Section 6.1.3.

§ 2.5 Owner's Right to Carry Out the Work

If the Contractor defaults or neglects to carry out the Work in accordance with the Contract Documents and fails within a ten-day period after receipt of notice from the Owner to commence and continue correction of such default or neglect with diligence and promptness, the Owner may, without prejudice to other remedies the Owner may have, correct such default or neglect. Such action by the Owner and amounts charged to the Contractor are both subject to prior approval of the Architect and the Architect may, pursuant to Section 9.5.1, withhold or nullify a Certificate for Payment in whole or in part, to the extent reasonably necessary to reimburse the Owner for the reasonable cost of correcting such deficiencies, including Owner's expenses and compensation for the Architect's additional services made necessary by such default, neglect, or failure. If current and future payments are not sufficient to cover such amounts, the Contractor shall pay the difference to the Owner. If the Contractor disagrees with the actions of the Owner or the Architect, or the amounts claimed as costs to the Owner, the Contractor may file a Claim pursuant to Article 15.

ARTICLE 3 CONTRACTOR

§ 3.1 General

§ 3.1.1 The Contractor is the person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The Contractor shall be lawfully licensed, if required in the jurisdiction where the Project is located. The Contractor shall designate in writing a representative who shall have express authority to bind the Contractor with respect to all matters under this Contract. The term "Contractor" means the Contractor or the Contractor's authorized representative.

§ 3.1.2 The Contractor shall perform the Work in accordance with the Contract Documents.

§ 3.1.3 The Contractor shall not be relieved of its obligations to perform the Work in accordance with the Contract Documents either by activities or duties of the Architect in the Architect's administration of the Contract, or by tests, inspections or approvals required or performed by persons or entities other than the Contractor.

§ 3.2 Review of Contract Documents and Field Conditions by Contractor

§ 3.2.1 Execution of the Contract by the Contractor is a representation that the Contractor has visited the site, become generally familiar with local conditions under which the Work is to be performed, and correlated personal observations with requirements of the Contract Documents.

§ 3.2.2 Because the Contract Documents are complementary, the Contractor shall, before starting each portion of the Work, carefully study and compare the various Contract Documents relative to that portion of the Work, as well as the information furnished by the Owner pursuant to Section 2.3.4, shall take field measurements of any existing conditions related to that portion of the Work, and shall observe any conditions at the site affecting it. These obligations are for the

purpose of facilitating coordination and construction by the Contractor and are not for the purpose of discovering errors, omissions, or inconsistencies in the Contract Documents; however, the Contractor shall promptly report to the Architect any errors, inconsistencies or omissions discovered by or made known to the Contractor as a request for information in such form as the Architect may require. It is recognized that the Contractor's review is made in the Contractor's capacity as a contractor and not as a licensed design professional, unless otherwise specifically provided in the Contract Documents.

§ 3.2.3 The Contractor is not required to ascertain that the Contract Documents are in accordance with applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, but the Contractor shall promptly report to the Architect any nonconformity discovered by or made known to the Contractor as a request for information in such form as the Architect may require.

§ 3.2.4 If the Contractor believes that additional cost or time is involved because of clarifications or instructions the Architect issues in response to the Contractor's notices or requests for information pursuant to Sections 3.2.2 or 3.2.3, the Contractor shall submit Claims as provided in Article 15. If the Contractor fails to perform the obligations of Sections 3.2.2 or 3.2.3, the Contractor shall pay such costs and damages to the Owner, subject to Section 15.1.7, as would have been avoided if the Contractor had performed such obligations. If the Contractor performs those obligations, the Contractor shall not be liable to the Owner or Architect for damages resulting from errors, inconsistencies or omissions in the Contract Documents, for differences between field measurements or conditions and the Contract Documents, or for nonconformities of the Contract Documents to applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities.

§ 3.3 Supervision and Construction Procedures

§ 3.3.1 The Contractor shall supervise and direct the Work, using the Contractor's best skill and attention. The Contractor shall be solely responsible for, and have control over, construction means, methods, techniques, sequences, and procedures, and for coordinating all portions of the Work under the Contract. If the Contract Documents give specific instructions concerning construction means, methods, techniques, sequences, or procedures, the Contractor shall evaluate the jobsite safety thereof and shall be solely responsible for the jobsite safety of such means, methods, techniques, sequences, or procedures. If the Contractor determines that such means, methods, techniques, sequences or procedures may not be safe, the Contractor shall give timely notice to the Owner and Architect, and shall propose alternative means, methods, techniques, sequences, or procedures. The Architect shall evaluate the proposed alternative solely for conformance with the design intent for the completed construction. Unless the Architect objects to the Contractor's proposed alternative, the Contractor shall perform the Work using its alternative means, methods, techniques, sequences, or procedures.

§ 3.3.2 The Contractor shall be responsible to the Owner for acts and omissions of the Contractor's employees, Subcontractors and their agents and employees, and other persons or entities performing portions of the Work for, or on behalf of, the Contractor or any of its Subcontractors.

§ 3.3.3 The Contractor shall be responsible for inspection of portions of Work already performed to determine that such portions are in proper condition to receive subsequent Work.

§ 3.4 Labor and Materials

§ 3.4.1 Unless otherwise provided in the Contract Documents, the Contractor shall provide and pay for labor, materials, equipment, tools, construction equipment and machinery, water, heat, utilities, transportation, and other facilities and services necessary for proper execution and completion of the Work, whether temporary or permanent and whether or not incorporated or to be incorporated in the Work.

§ 3.4.2 Except in the case of minor changes in the Work approved by the Architect in accordance with Section 3.12.8 or ordered by the Architect in accordance with Section 7.4, the Contractor may make substitutions only with the consent of the Owner, after evaluation by the Architect and in accordance with a Change Order or Construction Change Directive.

§ 3.4.3 The Contractor shall enforce strict discipline and good order among the Contractor's employees and other persons carrying out the Work. The Contractor shall not permit employment of unfit persons or persons not properly skilled in tasks assigned to them.

§ 3.5 Warranty

§ 3.5.1 The Contractor warrants to the Owner and Architect that materials and equipment furnished under the Contract will be of good quality and new unless the Contract Documents require or permit otherwise. The Contractor further warrants that the Work will conform to the requirements of the Contract Documents and will be free from defects, except for those inherent in the quality of the Work the Contract Documents require or permit. Work, materials, or equipment not conforming to these requirements may be considered defective. The Contractor's warranty excludes remedy for damage or defect caused by abuse, alterations to the Work not executed by the Contractor, improper or insufficient maintenance, improper operation, or normal wear and tear and normal usage. If required by the Architect, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment.

§ 3.5.2 All material, equipment, or other special warranties required by the Contract Documents shall be issued in the name of the Owner, or shall be transferable to the Owner, and shall commence in accordance with Section 9.8.4.

§ 3.6 Taxes

The Contractor shall pay sales, consumer, use and similar taxes for the Work provided by the Contractor that are legally enacted when bids are received or negotiations concluded, whether or not yet effective or merely scheduled to go into effect.

§ 3.7 Permits, Fees, Notices and Compliance with Laws

§ 3.7.1 Unless otherwise provided in the Contract Documents, the Contractor shall secure and pay for the building permit as well as for other permits, fees, licenses, and inspections by government agencies necessary for proper execution and completion of the Work that are customarily secured after execution of the Contract and legally required at the time bids are received or negotiations concluded.

§ 3.7.2 The Contractor shall comply with and give notices required by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities applicable to performance of the Work.

§ 3.7.3 If the Contractor performs Work knowing it to be contrary to applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, the Contractor shall assume appropriate responsibility for such Work and shall bear the costs attributable to correction.

§ 3.7.4 Concealed or Unknown Conditions

If the Contractor encounters conditions at the site that are (1) subsurface or otherwise concealed physical conditions that differ materially from those indicated in the Contract Documents or (2) unknown physical conditions of an unusual nature that differ materially from those ordinarily found to exist and generally recognized as inherent in construction activities of the character provided for in the Contract Documents, the Contractor shall promptly provide notice to the Owner and the Architect before conditions are disturbed and in no event later than 14 days after first observance of the conditions. The Architect will promptly investigate such conditions and, if the Architect determines that they differ materially and cause an increase or decrease in the Contractor's cost of, or time required for, performance of any part of the Work, will recommend that an equitable adjustment be made in the Contract Sum or Contract Time, or both. If the Architect determines that the conditions at the site are not materially different from those indicated in the Contract Documents and that no change in the terms of the Contract is justified, the Architect shall promptly notify the Owner and Contractor, stating the reasons. If either party disputes the Architect's determination or recommendation, that party may submit a Claim as provided in Article 15.

§ 3.7.5 If, in the course of the Work, the Contractor encounters human remains or recognizes the existence of burial markers, archaeological sites or wetlands not indicated in the Contract Documents, the Contractor shall immediately suspend any operations that would affect them and shall notify the Owner and Architect. Upon receipt of such notice, the Owner shall promptly take any action necessary to obtain governmental authorization required to resume the operations. The Contractor shall continue to suspend such operations until otherwise instructed by the Owner but shall continue with all other operations that do not affect those remains or features. Requests for adjustments in the Contract Sum and Contract Time arising from the existence of such remains or features may be made as provided in Article 15.

§ 3.8 Allowances

§ 3.8.1 The Contractor shall include in the Contract Sum all allowances stated in the Contract Documents. Items covered by allowances shall be supplied for such amounts and by such persons or entities as the Owner may direct, but the

Contractor shall not be required to employ persons or entities to whom the Contractor has reasonable objection.

§ 3.8.2 Unless otherwise provided in the Contract Documents,

- .1 allowances shall cover the cost to the Contractor of materials and equipment delivered at the site and all required taxes, less applicable trade discounts;
- .2 Contractor's costs for unloading and handling at the site, labor, installation costs, overhead, profit, and other expenses contemplated for stated allowance amounts shall be included in the Contract Sum but not in the allowances; and
- .3 whenever costs are more than or less than allowances, the Contract Sum shall be adjusted accordingly by Change Order. The amount of the Change Order shall reflect (1) the difference between actual costs and the allowances under Section 3.8.2.1 and (2) changes in Contractor's costs under Section 3.8.2.2.

§ 3.8.3 Materials and equipment under an allowance shall be selected by the Owner with reasonable promptness.

§ 3.9 Superintendent

§ 3.9.1 The Contractor shall employ a competent superintendent and necessary assistants who shall be in attendance at the Project site during performance of the Work. The superintendent shall represent the Contractor, and communications given to the superintendent shall be as binding as if given to the Contractor.

§ 3.9.2 The Contractor, as soon as practicable after award of the Contract, shall notify the Owner and Architect of the name and qualifications of a proposed superintendent. Within 14 days of receipt of the information, the Architect may notify the Contractor, stating whether the Owner or the Architect (1) has reasonable objection to the proposed superintendent or (2) requires additional time for review. Failure of the Architect to provide notice within the 14-day period shall constitute notice of no reasonable objection.

§ 3.9.3 The Contractor shall not employ a proposed superintendent to whom the Owner or Architect has made reasonable and timely objection. The Contractor shall not change the superintendent without the Owner's consent, which shall not unreasonably be withheld or delayed.

§ 3.10 Contractor's Construction and Submittal Schedules

§ 3.10.1 The Contractor, promptly after being awarded the Contract, shall submit for the Owner's and Architect's information a Contractor's construction schedule for the Work. The schedule shall contain detail appropriate for the Project, including (1) the date of commencement of the Work, interim schedule milestone dates, and the date of Substantial Completion; (2) an apportionment of the Work by construction activity; and (3) the time required for completion of each portion of the Work. The schedule shall provide for the orderly progression of the Work to completion and shall not exceed time limits current under the Contract Documents. The schedule shall be revised at appropriate intervals as required by the conditions of the Work and Project.

§ 3.10.2 The Contractor, promptly after being awarded the Contract and thereafter as necessary to maintain a current submittal schedule, shall submit a submittal schedule for the Architect's approval. The Architect's approval shall not be unreasonably delayed or withheld. The submittal schedule shall (1) be coordinated with the Contractor's construction schedule, and (2) allow the Architect reasonable time to review submittals. If the Contractor fails to submit a submittal schedule, or fails to provide submittals in accordance with the approved submittal schedule, the Contractor shall not be entitled to any increase in Contract Sum or extension of Contract Time based on the time required for review of submittals.

§ 3.10.3 The Contractor shall perform the Work in general accordance with the most recent schedules submitted to the Owner and Architect.

§ 3.11 Documents and Samples at the Site

The Contractor shall make available, at the Project site, the Contract Documents, including Change Orders, Construction Change Directives, and other Modifications, in good order and marked currently to indicate field changes and selections made during construction, and the approved Shop Drawings, Product Data, Samples, and similar required submittals. These shall be in electronic form or paper copy, available to the Architect and Owner, and delivered to the Architect for submittal to the Owner upon completion of the Work as a record of the Work as constructed.

§ 3.12 Shop Drawings, Product Data and Samples

§ 3.12.1 Shop Drawings are drawings, diagrams, schedules, and other data specially prepared for the Work by the Contractor or a Subcontractor, Sub-subcontractor, manufacturer, supplier, or distributor to illustrate some portion of the Work.

§ 3.12.2 Product Data are illustrations, standard schedules, performance charts, instructions, brochures, diagrams, and other information furnished by the Contractor to illustrate materials or equipment for some portion of the Work.

§ 3.12.3 Samples are physical examples that illustrate materials, equipment, or workmanship, and establish standards by which the Work will be judged.

§ 3.12.4 Shop Drawings, Product Data, Samples, and similar submittals are not Contract Documents. Their purpose is to demonstrate how the Contractor proposes to conform to the information given and the design concept expressed in the Contract Documents for those portions of the Work for which the Contract Documents require submittals. Review by the Architect is subject to the limitations of Section 4.2.7. Informational submittals upon which the Architect is not expected to take responsive action may be so identified in the Contract Documents. Submittals that are not required by the Contract Documents may be returned by the Architect without action.

§ 3.12.5 The Contractor shall review for compliance with the Contract Documents, approve, and submit to the Architect, Shop Drawings, Product Data, Samples, and similar submittals required by the Contract Documents, in accordance with the submittal schedule approved by the Architect or, in the absence of an approved submittal schedule, with reasonable promptness and in such sequence as to cause no delay in the Work or in the activities of the Owner or of Separate Contractors.

§ 3.12.6 By submitting Shop Drawings, Product Data, Samples, and similar submittals, the Contractor represents to the Owner and Architect that the Contractor has (1) reviewed and approved them, (2) determined and verified materials, field measurements and field construction criteria related thereto, or will do so, and (3) checked and coordinated the information contained within such submittals with the requirements of the Work and of the Contract Documents.

§ 3.12.7 The Contractor shall perform no portion of the Work for which the Contract Documents require submittal and review of Shop Drawings, Product Data, Samples, or similar submittals, until the respective submittal has been approved by the Architect.

§ 3.12.8 The Work shall be in accordance with approved submittals except that the Contractor shall not be relieved of responsibility for deviations from the requirements of the Contract Documents by the Architect's approval of Shop Drawings, Product Data, Samples, or similar submittals, unless the Contractor has specifically notified the Architect of such deviation at the time of submittal and (1) the Architect has given written approval to the specific deviation as a minor change in the Work, or (2) a Change Order or Construction Change Directive has been issued authorizing the deviation. The Contractor shall not be relieved of responsibility for errors or omissions in Shop Drawings, Product Data, Samples, or similar submittals, by the Architect's approval thereof.

§ 3.12.9 The Contractor shall direct specific attention, in writing or on resubmitted Shop Drawings, Product Data, Samples, or similar submittals, to revisions other than those requested by the Architect on previous submittals. In the absence of such notice, the Architect's approval of a resubmission shall not apply to such revisions.

§ 3.12.10 The Contractor shall not be required to provide professional services that constitute the practice of architecture or engineering unless such services are specifically required by the Contract Documents for a portion of the Work or unless the Contractor needs to provide such services in order to carry out the Contractor's responsibilities for construction means, methods, techniques, sequences, and procedures. The Contractor shall not be required to provide professional services in violation of applicable law.

§ 3.12.10.1 If professional design services or certifications by a design professional related to systems, materials, or equipment are specifically required of the Contractor by the Contract Documents, the Owner and the Architect will specify all performance and design criteria that such services must satisfy. The Contractor shall be entitled to rely upon the adequacy and accuracy of the performance and design criteria provided in the Contract Documents. The Contractor shall cause such services or certifications to be provided by an appropriately licensed design professional, whose

signature and seal shall appear on all drawings, calculations, specifications, certifications, Shop Drawings, and other submittals prepared by such professional. Shop Drawings, and other submittals related to the Work, designed or certified by such professional, if prepared by others, shall bear such professional's written approval when submitted to the Architect. The Owner and the Architect shall be entitled to rely upon the adequacy and accuracy of the services, certifications, and approvals performed or provided by such design professionals, provided the Owner and Architect have specified to the Contractor the performance and design criteria that such services must satisfy. Pursuant to this Section 3.12.10, the Architect will review and approve or take other appropriate action on submittals only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents.

§ 3.12.10.2 If the Contract Documents require the Contractor's design professional to certify that the Work has been performed in accordance with the design criteria, the Contractor shall furnish such certifications to the Architect at the time and in the form specified by the Architect.

§ 3.13 Use of Site

The Contractor shall confine operations at the site to areas permitted by applicable laws, statutes, ordinances, codes, rules and regulations, lawful orders of public authorities, and the Contract Documents and shall not unreasonably encumber the site with materials or equipment.

§ 3.14 Cutting and Patching

§ 3.14.1 The Contractor shall be responsible for cutting, fitting, or patching required to complete the Work or to make its parts fit together properly. All areas requiring cutting, fitting, or patching shall be restored to the condition existing prior to the cutting, fitting, or patching, unless otherwise required by the Contract Documents.

§ 3.14.2 The Contractor shall not damage or endanger a portion of the Work or fully or partially completed construction of the Owner or Separate Contractors by cutting, patching, or otherwise altering such construction, or by excavation. The Contractor shall not cut or otherwise alter construction by the Owner or a Separate Contractor except with written consent of the Owner and of the Separate Contractor. Consent shall not be unreasonably withheld. The Contractor shall not unreasonably withhold, from the Owner or a Separate Contractor, its consent to cutting or otherwise altering the Work.

§ 3.15 Cleaning Up

§ 3.15.1 The Contractor shall keep the premises and surrounding area free from accumulation of waste materials and rubbish caused by operations under the Contract. At completion of the Work, the Contractor shall remove waste materials, rubbish, the Contractor's tools, construction equipment, machinery, and surplus materials from and about the Project.

§ 3.15.2 If the Contractor fails to clean up as provided in the Contract Documents, the Owner may do so and the Owner shall be entitled to reimbursement from the Contractor.

§ 3.16 Access to Work

The Contractor shall provide the Owner and Architect with access to the Work in preparation and progress wherever located.

§ 3.17 Royalties, Patents and Copyrights

The Contractor shall pay all royalties and license fees. The Contractor shall defend suits or claims for infringement of copyrights and patent rights and shall hold the Owner and Architect harmless from loss on account thereof, but shall not be responsible for defense or loss when a particular design, process, or product of a particular manufacturer or manufacturers is required by the Contract Documents, or where the copyright violations are contained in Drawings, Specifications, or other documents prepared by the Owner or Architect. However, if an infringement of a copyright or patent is discovered by, or made known to, the Contractor, the Contractor shall be responsible for the loss unless the information is promptly furnished to the Architect.

§ 3.18 Indemnification

§ 3.18.1 To the fullest extent permitted by law, the Contractor shall indemnify and hold harmless the Owner, Architect, Architect's consultants, and agents and employees of any of them from and against claims, damages, losses, and

expenses, including but not limited to attorneys' fees, arising out of or resulting from performance of the Work, provided that such claim, damage, loss, or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself), but only to the extent caused by the negligent acts or omissions of the Contractor, a Subcontractor, anyone directly or indirectly employed by them, or anyone for whose acts they may be liable, regardless of whether or not such claim, damage, loss, or expense is caused in part by a party indemnified hereunder. Such obligation shall not be construed to negate, abridge, or reduce other rights or obligations of indemnity that would otherwise exist as to a party or person described in this Section 3.18.

§ 3.18.2 In claims against any person or entity indemnified under this Section 3.18 by an employee of the Contractor, a Subcontractor, anyone directly or indirectly employed by them, or anyone for whose acts they may be liable, the indemnification obligation under Section 3.18.1 shall not be limited by a limitation on amount or type of damages, compensation, or benefits payable by or for the Contractor or a Subcontractor under workers' compensation acts, disability benefit acts, or other employee benefit acts.

ARTICLE 4 ARCHITECT

§ 4.1 General

§ 4.1.1 The Architect is the person or entity retained by the Owner pursuant to Section 2.3.2 and identified as such in the Agreement.

§ 4.1.2 Duties, responsibilities, and limitations of authority of the Architect as set forth in the Contract Documents shall not be restricted, modified, or extended without written consent of the Owner, Contractor, and Architect. Consent shall not be unreasonably withheld.

§ 4.2 Administration of the Contract

§ 4.2.1 The Architect will provide administration of the Contract as described in the Contract Documents and will be an Owner's representative during construction until the date the Architect issues the final Certificate for Payment. The Architect will have authority to act on behalf of the Owner only to the extent provided in the Contract Documents.

§ 4.2.2 The Architect will visit the site at intervals appropriate to the stage of construction, or as otherwise agreed with the Owner, to become generally familiar with the progress and quality of the portion of the Work completed, and to determine in general if the Work observed is being performed in a manner indicating that the Work, when fully completed, will be in accordance with the Contract Documents. However, the Architect will not be required to make exhaustive or continuous on-site inspections to check the quality or quantity of the Work. The Architect will not have control over, charge of, or responsibility for the construction means, methods, techniques, sequences or procedures, or for the safety precautions and programs in connection with the Work, since these are solely the Contractor's rights and responsibilities under the Contract Documents.

§ 4.2.3 On the basis of the site visits, the Architect will keep the Owner reasonably informed about the progress and quality of the portion of the Work completed, and promptly report to the Owner (1) known deviations from the Contract Documents, (2) known deviations from the most recent construction schedule submitted by the Contractor, and (3) defects and deficiencies observed in the Work. The Architect will not be responsible for the Contractor's failure to perform the Work in accordance with the requirements of the Contract Documents. The Architect will not have control over or charge of, and will not be responsible for acts or omissions of, the Contractor, Subcontractors, or their agents or employees, or any other persons or entities performing portions of the Work.

§ 4.2.4 Communications

The Owner and Contractor shall include the Architect in all communications that relate to or affect the Architect's services or professional responsibilities. The Owner shall promptly notify the Architect of the substance of any direct communications between the Owner and the Contractor otherwise relating to the Project. Communications by and with the Architect's consultants shall be through the Architect. Communications by and with Subcontractors and suppliers shall be through the Contractor. Communications by and with Separate Contractors shall be through the Owner. The Contract Documents may specify other communication protocols.

§ 4.2.5 Based on the Architect's evaluations of the Contractor's Applications for Payment, the Architect will review and certify the amounts due the Contractor and will issue Certificates for Payment in such amounts.

§ 4.2.6 The Architect has authority to reject Work that does not conform to the Contract Documents. Whenever the Architect considers it necessary or advisable, the Architect will have authority to require inspection or testing of the Work in accordance with Sections 13.4.2 and 13.4.3, whether or not the Work is fabricated, installed or completed. However, neither this authority of the Architect nor a decision made in good faith either to exercise or not to exercise such authority shall give rise to a duty or responsibility of the Architect to the Contractor, Subcontractors, suppliers, their agents or employees, or other persons or entities performing portions of the Work.

§ 4.2.7 The Architect will review and approve, or take other appropriate action upon, the Contractor's submittals such as Shop Drawings, Product Data, and Samples, but only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. The Architect's action will be taken in accordance with the submittal schedule approved by the Architect or, in the absence of an approved submittal schedule, with reasonable promptness while allowing sufficient time in the Architect's professional judgment to permit adequate review. Review of such submittals is not conducted for the purpose of determining the accuracy and completeness of other details such as dimensions and quantities, or for substantiating instructions for installation or performance of equipment or systems, all of which remain the responsibility of the Contractor as required by the Contract Documents. The Architect's review of the Contractor's submittals shall not relieve the Contractor of the obligations under Sections 3.3, 3.5, and 3.12. The Architect's review shall not constitute approval of safety precautions or of any construction means, methods, techniques, sequences, or procedures. The Architect's approval of a specific item shall not indicate approval of an assembly of which the item is a component.

§ 4.2.8 The Architect will prepare Change Orders and Construction Change Directives, and may order minor changes in the Work as provided in Section 7.4. The Architect will investigate and make determinations and recommendations regarding concealed and unknown conditions as provided in Section 3.7.4.

§ 4.2.9 The Architect will conduct inspections to determine the date or dates of Substantial Completion and the date of final completion; issue Certificates of Substantial Completion pursuant to Section 9.8; receive and forward to the Owner, for the Owner's review and records, written warranties and related documents required by the Contract and assembled by the Contractor pursuant to Section 9.10; and issue a final Certificate for Payment pursuant to Section 9.10.

§ 4.2.10 If the Owner and Architect agree, the Architect will provide one or more Project representatives to assist in carrying out the Architect's responsibilities at the site. The Owner shall notify the Contractor of any change in the duties, responsibilities and limitations of authority of the Project representatives.

§ 4.2.11 The Architect will interpret and decide matters concerning performance under, and requirements of, the Contract Documents on written request of either the Owner or Contractor. The Architect's response to such requests will be made in writing within any time limits agreed upon or otherwise with reasonable promptness.

§ 4.2.12 Interpretations and decisions of the Architect will be consistent with the intent of, and reasonably inferable from, the Contract Documents and will be in writing or in the form of drawings. When making such interpretations and decisions, the Architect will endeavor to secure faithful performance by both Owner and Contractor, will not show partiality to either, and will not be liable for results of interpretations or decisions rendered in good faith.

§ 4.2.13 The Architect's decisions on matters relating to aesthetic effect will be final if consistent with the intent expressed in the Contract Documents.

§ 4.2.14 The Architect will review and respond to requests for information about the Contract Documents. The Architect's response to such requests will be made in writing within any time limits agreed upon or otherwise with reasonable promptness. If appropriate, the Architect will prepare and issue supplemental Drawings and Specifications in response to the requests for information.

ARTICLE 5 SUBCONTRACTORS

§ 5.1 Definitions

§ 5.1.1 A Subcontractor is a person or entity who has a direct contract with the Contractor to perform a portion of the Work at the site. The term "Subcontractor" is referred to throughout the Contract Documents as if singular in number and means a Subcontractor or an authorized representative of the Subcontractor. The term "Subcontractor" does not

include a Separate Contractor or the subcontractors of a Separate Contractor.

§ 5.1.2 A Sub-subcontractor is a person or entity who has a direct or indirect contract with a Subcontractor to perform a portion of the Work at the site. The term “Sub-subcontractor” is referred to throughout the Contract Documents as if singular in number and means a Sub-subcontractor or an authorized representative of the Sub-subcontractor.

§ 5.2 Award of Subcontracts and Other Contracts for Portions of the Work

§ 5.2.1 Unless otherwise stated in the Contract Documents, the Contractor, as soon as practicable after award of the Contract, shall notify the Owner and Architect of the persons or entities proposed for each principal portion of the Work, including those who are to furnish materials or equipment fabricated to a special design. Within 14 days of receipt of the information, the Architect may notify the Contractor whether the Owner or the Architect (1) has reasonable objection to any such proposed person or entity or (2) requires additional time for review. Failure of the Architect to provide notice within the 14-day period shall constitute notice of no reasonable objection.

§ 5.2.2 The Contractor shall not contract with a proposed person or entity to whom the Owner or Architect has made reasonable and timely objection. The Contractor shall not be required to contract with anyone to whom the Contractor has made reasonable objection.

§ 5.2.3 If the Owner or Architect has reasonable objection to a person or entity proposed by the Contractor, the Contractor shall propose another to whom the Owner or Architect has no reasonable objection. If the proposed but rejected Subcontractor was reasonably capable of performing the Work, the Contract Sum and Contract Time shall be increased or decreased by the difference, if any, occasioned by such change, and an appropriate Change Order shall be issued before commencement of the substitute Subcontractor’s Work. However, no increase in the Contract Sum or Contract Time shall be allowed for such change unless the Contractor has acted promptly and responsively in submitting names as required.

§ 5.2.4 The Contractor shall not substitute a Subcontractor, person, or entity for one previously selected if the Owner or Architect makes reasonable objection to such substitution.

§ 5.3 Subcontractual Relations

By appropriate written agreement, the Contractor shall require each Subcontractor, to the extent of the Work to be performed by the Subcontractor, to be bound to the Contractor by terms of the Contract Documents, and to assume toward the Contractor all the obligations and responsibilities, including the responsibility for safety of the Subcontractor’s Work that the Contractor, by these Contract Documents, assumes toward the Owner and Architect. Each subcontract agreement shall preserve and protect the rights of the Owner and Architect under the Contract Documents with respect to the Work to be performed by the Subcontractor so that subcontracting thereof will not prejudice such rights, and shall allow to the Subcontractor, unless specifically provided otherwise in the subcontract agreement, the benefit of all rights, remedies, and redress against the Contractor that the Contractor, by the Contract Documents, has against the Owner. Where appropriate, the Contractor shall require each Subcontractor to enter into similar agreements with Sub-subcontractors. The Contractor shall make available to each proposed Subcontractor, prior to the execution of the subcontract agreement, copies of the Contract Documents to which the Subcontractor will be bound, and, upon written request of the Subcontractor, identify to the Subcontractor terms and conditions of the proposed subcontract agreement that may be at variance with the Contract Documents. Subcontractors will similarly make copies of applicable portions of such documents available to their respective proposed Sub-subcontractors.

§ 5.4 Contingent Assignment of Subcontracts

§ 5.4.1 Each subcontract agreement for a portion of the Work is assigned by the Contractor to the Owner, provided that

- .1 assignment is effective only after termination of the Contract by the Owner for cause pursuant to Section 14.2 and only for those subcontract agreements that the Owner accepts by notifying the Subcontractor and Contractor; and
- .2 assignment is subject to the prior rights of the surety, if any, obligated under bond relating to the Contract.

When the Owner accepts the assignment of a subcontract agreement, the Owner assumes the Contractor’s rights and obligations under the subcontract.

§ 5.4.2 Upon such assignment, if the Work has been suspended for more than 30 days, the Subcontractor's compensation shall be equitably adjusted for increases in cost resulting from the suspension.

§ 5.4.3 Upon assignment to the Owner under this Section 5.4, the Owner may further assign the subcontract to a successor contractor or other entity. If the Owner assigns the subcontract to a successor contractor or other entity, the Owner shall nevertheless remain legally responsible for all of the successor contractor's obligations under the subcontract.

ARTICLE 6 CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS

§ 6.1 Owner's Right to Perform Construction and to Award Separate Contracts

§ 6.1.1 The term "Separate Contractor(s)" shall mean other contractors retained by the Owner under separate agreements. The Owner reserves the right to perform construction or operations related to the Project with the Owner's own forces, and with Separate Contractors retained under Conditions of the Contract substantially similar to those of this Contract, including those provisions of the Conditions of the Contract related to insurance and waiver of subrogation.

§ 6.1.2 When separate contracts are awarded for different portions of the Project or other construction or operations on the site, the term "Contractor" in the Contract Documents in each case shall mean the Contractor who executes each separate Owner-Contractor Agreement.

§ 6.1.3 The Owner shall provide for coordination of the activities of the Owner's own forces and of each Separate Contractor with the Work of the Contractor, who shall cooperate with them. The Contractor shall participate with any Separate Contractors and the Owner in reviewing their construction schedules. The Contractor shall make any revisions to its construction schedule deemed necessary after a joint review and mutual agreement. The construction schedules shall then constitute the schedules to be used by the Contractor, Separate Contractors, and the Owner until subsequently revised.

§ 6.1.4 Unless otherwise provided in the Contract Documents, when the Owner performs construction or operations related to the Project with the Owner's own forces or with Separate Contractors, the Owner or its Separate Contractors shall have the same obligations and rights that the Contractor has under the Conditions of the Contract, including, without excluding others, those stated in Article 3, this Article 6, and Articles 10, 11, and 12.

§ 6.2 Mutual Responsibility

§ 6.2.1 The Contractor shall afford the Owner and Separate Contractors reasonable opportunity for introduction and storage of their materials and equipment and performance of their activities, and shall connect and coordinate the Contractor's construction and operations with theirs as required by the Contract Documents.

§ 6.2.2 If part of the Contractor's Work depends for proper execution or results upon construction or operations by the Owner or a Separate Contractor, the Contractor shall, prior to proceeding with that portion of the Work, promptly notify the Architect of apparent discrepancies or defects in the construction or operations by the Owner or Separate Contractor that would render it unsuitable for proper execution and results of the Contractor's Work. Failure of the Contractor to notify the Architect of apparent discrepancies or defects prior to proceeding with the Work shall constitute an acknowledgment that the Owner's or Separate Contractor's completed or partially completed construction is fit and proper to receive the Contractor's Work. The Contractor shall not be responsible for discrepancies or defects in the construction or operations by the Owner or Separate Contractor that are not apparent.

§ 6.2.3 The Contractor shall reimburse the Owner for costs the Owner incurs that are payable to a Separate Contractor because of the Contractor's delays, improperly timed activities or defective construction. The Owner shall be responsible to the Contractor for costs the Contractor incurs because of a Separate Contractor's delays, improperly timed activities, damage to the Work or defective construction.

§ 6.2.4 The Contractor shall promptly remedy damage that the Contractor wrongfully causes to completed or partially completed construction or to property of the Owner or Separate Contractor as provided in Section 10.2.5.

§ 6.2.5 The Owner and each Separate Contractor shall have the same responsibilities for cutting and patching as are described for the Contractor in Section 3.14.

§ 6.3 Owner's Right to Clean Up

If a dispute arises among the Contractor, Separate Contractors, and the Owner as to the responsibility under their respective contracts for maintaining the premises and surrounding area free from waste materials and rubbish, the Owner may clean up and the Architect will allocate the cost among those responsible.

ARTICLE 7 CHANGES IN THE WORK

§ 7.1 General

§ 7.1.1 Changes in the Work may be accomplished after execution of the Contract, and without invalidating the Contract, by Change Order, Construction Change Directive or order for a minor change in the Work, subject to the limitations stated in this Article 7 and elsewhere in the Contract Documents.

§ 7.1.2 A Change Order shall be based upon agreement among the Owner, Contractor, and Architect. A Construction Change Directive requires agreement by the Owner and Architect and may or may not be agreed to by the Contractor. An order for a minor change in the Work may be issued by the Architect alone.

§ 7.1.3 Changes in the Work shall be performed under applicable provisions of the Contract Documents. The Contractor shall proceed promptly with changes in the Work, unless otherwise provided in the Change Order, Construction Change Directive, or order for a minor change in the Work.

§ 7.2 Change Orders

§ 7.2.1 A Change Order is a written instrument prepared by the Architect and signed by the Owner, Contractor, and Architect stating their agreement upon all of the following:

- .1 The change in the Work;
- .2 The amount of the adjustment, if any, in the Contract Sum; and
- .3 The extent of the adjustment, if any, in the Contract Time.

§ 7.3 Construction Change Directives

§ 7.3.1 A Construction Change Directive is a written order prepared by the Architect and signed by the Owner and Architect, directing a change in the Work prior to agreement on adjustment, if any, in the Contract Sum or Contract Time, or both. The Owner may by Construction Change Directive, without invalidating the Contract, order changes in the Work within the general scope of the Contract consisting of additions, deletions, or other revisions, the Contract Sum and Contract Time being adjusted accordingly.

§ 7.3.2 A Construction Change Directive shall be used in the absence of total agreement on the terms of a Change Order.

§ 7.3.3 If the Construction Change Directive provides for an adjustment to the Contract Sum, the adjustment shall be based on one of the following methods:

- .1 Mutual acceptance of a lump sum properly itemized and supported by sufficient substantiating data to permit evaluation;
- .2 Unit prices stated in the Contract Documents or subsequently agreed upon;
- .3 Cost to be determined in a manner agreed upon by the parties and a mutually acceptable fixed or percentage fee; or
- .4 As provided in Section 7.3.4.

§ 7.3.4 If the Contractor does not respond promptly or disagrees with the method for adjustment in the Contract Sum, the Architect shall determine the adjustment on the basis of reasonable expenditures and savings of those performing the Work attributable to the change, including, in case of an increase in the Contract Sum, an amount for overhead and profit as set forth in the Agreement, or if no such amount is set forth in the Agreement, a reasonable amount. In such case, and also under Section 7.3.3.3, the Contractor shall keep and present, in such form as the Architect may prescribe, an itemized accounting together with appropriate supporting data. Unless otherwise provided in the Contract Documents, costs for the purposes of this Section 7.3.4 shall be limited to the following:

- .1 Costs of labor, including applicable payroll taxes, fringe benefits required by agreement or custom, workers' compensation insurance, and other employee costs approved by the Architect;
- .2 Costs of materials, supplies, and equipment, including cost of transportation, whether incorporated or

- consumed;
- .3 Rental costs of machinery and equipment, exclusive of hand tools, whether rented from the Contractor or others;
- .4 Costs of premiums for all bonds and insurance, permit fees, and sales, use, or similar taxes, directly related to the change; and
- .5 Costs of supervision and field office personnel directly attributable to the change.

§ 7.3.5 If the Contractor disagrees with the adjustment in the Contract Time, the Contractor may make a Claim in accordance with applicable provisions of Article 15.

§ 7.3.6 Upon receipt of a Construction Change Directive, the Contractor shall promptly proceed with the change in the Work involved and advise the Architect of the Contractor's agreement or disagreement with the method, if any, provided in the Construction Change Directive for determining the proposed adjustment in the Contract Sum or Contract Time.

§ 7.3.7 A Construction Change Directive signed by the Contractor indicates the Contractor's agreement therewith, including adjustment in Contract Sum and Contract Time or the method for determining them. Such agreement shall be effective immediately and shall be recorded as a Change Order.

§ 7.3.8 The amount of credit to be allowed by the Contractor to the Owner for a deletion or change that results in a net decrease in the Contract Sum shall be actual net cost as confirmed by the Architect. When both additions and credits covering related Work or substitutions are involved in a change, the allowance for overhead and profit shall be figured on the basis of net increase, if any, with respect to that change.

§ 7.3.9 Pending final determination of the total cost of a Construction Change Directive to the Owner, the Contractor may request payment for Work completed under the Construction Change Directive in Applications for Payment. The Architect will make an interim determination for purposes of monthly certification for payment for those costs and certify for payment the amount that the Architect determines, in the Architect's professional judgment, to be reasonably justified. The Architect's interim determination of cost shall adjust the Contract Sum on the same basis as a Change Order, subject to the right of either party to disagree and assert a Claim in accordance with Article 15.

§ 7.3.10 When the Owner and Contractor agree with a determination made by the Architect concerning the adjustments in the Contract Sum and Contract Time, or otherwise reach agreement upon the adjustments, such agreement shall be effective immediately and the Architect will prepare a Change Order. Change Orders may be issued for all or any part of a Construction Change Directive.

§ 7.4 Minor Changes in the Work

The Architect may order minor changes in the Work that are consistent with the intent of the Contract Documents and do not involve an adjustment in the Contract Sum or an extension of the Contract Time. The Architect's order for minor changes shall be in writing. If the Contractor believes that the proposed minor change in the Work will affect the Contract Sum or Contract Time, the Contractor shall notify the Architect and shall not proceed to implement the change in the Work. If the Contractor performs the Work set forth in the Architect's order for a minor change without prior notice to the Architect that such change will affect the Contract Sum or Contract Time, the Contractor waives any adjustment to the Contract Sum or extension of the Contract Time.

ARTICLE 8 TIME

§ 8.1 Definitions

§ 8.1.1 Unless otherwise provided, Contract Time is the period of time, including authorized adjustments, allotted in the Contract Documents for Substantial Completion of the Work.

§ 8.1.2 The date of commencement of the Work is the date established in the Agreement.

§ 8.1.3 The date of Substantial Completion is the date certified by the Architect in accordance with Section 9.8.

§ 8.1.4 The term "day" as used in the Contract Documents shall mean calendar day unless otherwise specifically defined.

§ 8.2 Progress and Completion

§ 8.2.1 Time limits stated in the Contract Documents are of the essence of the Contract. By executing the Agreement, the Contractor confirms that the Contract Time is a reasonable period for performing the Work.

§ 8.2.2 The Contractor shall not knowingly, except by agreement or instruction of the Owner in writing, commence the Work prior to the effective date of insurance required to be furnished by the Contractor and Owner.

§ 8.2.3 The Contractor shall proceed expeditiously with adequate forces and shall achieve Substantial Completion within the Contract Time.

§ 8.3 Delays and Extensions of Time

§ 8.3.1 If the Contractor is delayed at any time in the commencement or progress of the Work by (1) an act or neglect of the Owner or Architect, of an employee of either, or of a Separate Contractor; (2) by changes ordered in the Work; (3) by labor disputes, fire, unusual delay in deliveries, unavoidable casualties, adverse weather conditions documented in accordance with Section 15.1.6.2, or other causes beyond the Contractor's control; (4) by delay authorized by the Owner pending mediation and binding dispute resolution; or (5) by other causes that the Contractor asserts, and the Architect determines, justify delay, then the Contract Time shall be extended for such reasonable time as the Architect may determine.

§ 8.3.2 Claims relating to time shall be made in accordance with applicable provisions of Article 15.

§ 8.3.3 This Section 8.3 does not preclude recovery of damages for delay by either party under other provisions of the Contract Documents.

ARTICLE 9 PAYMENTS AND COMPLETION

§ 9.1 Contract Sum

§ 9.1.1 The Contract Sum is stated in the Agreement and, including authorized adjustments, is the total amount payable by the Owner to the Contractor for performance of the Work under the Contract Documents.

§ 9.1.2 If unit prices are stated in the Contract Documents or subsequently agreed upon, and if quantities originally contemplated are materially changed so that application of such unit prices to the actual quantities causes substantial inequity to the Owner or Contractor, the applicable unit prices shall be equitably adjusted.

§ 9.2 Schedule of Values

Where the Contract is based on a stipulated sum or Guaranteed Maximum Price, the Contractor shall submit a schedule of values to the Architect before the first Application for Payment, allocating the entire Contract Sum to the various portions of the Work. The schedule of values shall be prepared in the form, and supported by the data to substantiate its accuracy, required by the Architect. This schedule, unless objected to by the Architect, shall be used as a basis for reviewing the Contractor's Applications for Payment. Any changes to the schedule of values shall be submitted to the Architect and supported by such data to substantiate its accuracy as the Architect may require, and unless objected to by the Architect, shall be used as a basis for reviewing the Contractor's subsequent Applications for Payment.

§ 9.3 Applications for Payment

§ 9.3.1 At least ten days before the date established for each progress payment, the Contractor shall submit to the Architect an itemized Application for Payment prepared in accordance with the schedule of values, if required under Section 9.2, for completed portions of the Work. The application shall be notarized, if required, and supported by all data substantiating the Contractor's right to payment that the Owner or Architect require, such as copies of requisitions, and releases and waivers of liens from Subcontractors and suppliers, and shall reflect retainage if provided for in the Contract Documents.

§ 9.3.1.1 As provided in Section 7.3.9, such applications may include requests for payment on account of changes in the Work that have been properly authorized by Construction Change Directives, or by interim determinations of the Architect, but not yet included in Change Orders.

§ 9.3.1.2 Applications for Payment shall not include requests for payment for portions of the Work for which the Contractor does not intend to pay a Subcontractor or supplier, unless such Work has been performed by others whom the Contractor intends to pay.

§ 9.3.2 Unless otherwise provided in the Contract Documents, payments shall be made on account of materials and equipment delivered and suitably stored at the site for subsequent incorporation in the Work. If approved in advance by the Owner, payment may similarly be made for materials and equipment suitably stored off the site at a location agreed upon in writing. Payment for materials and equipment stored on or off the site shall be conditioned upon compliance by the Contractor with procedures satisfactory to the Owner to establish the Owner's title to such materials and equipment or otherwise protect the Owner's interest, and shall include the costs of applicable insurance, storage, and transportation to the site, for such materials and equipment stored off the site.

§ 9.3.3 The Contractor warrants that title to all Work covered by an Application for Payment will pass to the Owner no later than the time of payment. The Contractor further warrants that upon submittal of an Application for Payment all Work for which Certificates for Payment have been previously issued and payments received from the Owner shall, to the best of the Contractor's knowledge, information, and belief, be free and clear of liens, claims, security interests, or encumbrances, in favor of the Contractor, Subcontractors, suppliers, or other persons or entities that provided labor, materials, and equipment relating to the Work.

§ 9.4 Certificates for Payment

§ 9.4.1 The Architect will, within seven days after receipt of the Contractor's Application for Payment, either (1) issue to the Owner a Certificate for Payment in the full amount of the Application for Payment, with a copy to the Contractor; or (2) issue to the Owner a Certificate for Payment for such amount as the Architect determines is properly due, and notify the Contractor and Owner of the Architect's reasons for withholding certification in part as provided in Section 9.5.1; or (3) withhold certification of the entire Application for Payment, and notify the Contractor and Owner of the Architect's reason for withholding certification in whole as provided in Section 9.5.1.

§ 9.4.2 The issuance of a Certificate for Payment will constitute a representation by the Architect to the Owner, based on the Architect's evaluation of the Work and the data in the Application for Payment, that, to the best of the Architect's knowledge, information, and belief, the Work has progressed to the point indicated, the quality of the Work is in accordance with the Contract Documents, and that the Contractor is entitled to payment in the amount certified. The foregoing representations are subject to an evaluation of the Work for conformance with the Contract Documents upon Substantial Completion, to results of subsequent tests and inspections, to correction of minor deviations from the Contract Documents prior to completion, and to specific qualifications expressed by the Architect. However, the issuance of a Certificate for Payment will not be a representation that the Architect has (1) made exhaustive or continuous on-site inspections to check the quality or quantity of the Work; (2) reviewed construction means, methods, techniques, sequences, or procedures; (3) reviewed copies of requisitions received from Subcontractors and suppliers and other data requested by the Owner to substantiate the Contractor's right to payment; or (4) made examination to ascertain how or for what purpose the Contractor has used money previously paid on account of the Contract Sum.

§ 9.5 Decisions to Withhold Certification

§ 9.5.1 The Architect may withhold a Certificate for Payment in whole or in part, to the extent reasonably necessary to protect the Owner, if in the Architect's opinion the representations to the Owner required by Section 9.4.2 cannot be made. If the Architect is unable to certify payment in the amount of the Application, the Architect will notify the Contractor and Owner as provided in Section 9.4.1. If the Contractor and Architect cannot agree on a revised amount, the Architect will promptly issue a Certificate for Payment for the amount for which the Architect is able to make such representations to the Owner. The Architect may also withhold a Certificate for Payment or, because of subsequently discovered evidence, may nullify the whole or a part of a Certificate for Payment previously issued, to such extent as may be necessary in the Architect's opinion to protect the Owner from loss for which the Contractor is responsible, including loss resulting from acts and omissions described in Section 3.3.2, because of

- .1 defective Work not remedied;
- .2 third party claims filed or reasonable evidence indicating probable filing of such claims, unless security acceptable to the Owner is provided by the Contractor;
- .3 failure of the Contractor to make payments properly to Subcontractors or suppliers for labor, materials or equipment;
- .4 reasonable evidence that the Work cannot be completed for the unpaid balance of the Contract Sum;

- .5 damage to the Owner or a Separate Contractor;
- .6 reasonable evidence that the Work will not be completed within the Contract Time, and that the unpaid balance would not be adequate to cover actual or liquidated damages for the anticipated delay; or
- .7 repeated failure to carry out the Work in accordance with the Contract Documents.

§ 9.5.2 When either party disputes the Architect's decision regarding a Certificate for Payment under Section 9.5.1, in whole or in part, that party may submit a Claim in accordance with Article 15.

§ 9.5.3 When the reasons for withholding certification are removed, certification will be made for amounts previously withheld.

§ 9.5.4 If the Architect withholds certification for payment under Section 9.5.1.3, the Owner may, at its sole option, issue joint checks to the Contractor and to any Subcontractor or supplier to whom the Contractor failed to make payment for Work properly performed or material or equipment suitably delivered. If the Owner makes payments by joint check, the Owner shall notify the Architect and the Contractor shall reflect such payment on its next Application for Payment.

§ 9.6 Progress Payments

§ 9.6.1 After the Architect has issued a Certificate for Payment, the Owner shall make payment in the manner and within the time provided in the Contract Documents, and shall so notify the Architect.

§ 9.6.2 The Contractor shall pay each Subcontractor, no later than seven days after receipt of payment from the Owner, the amount to which the Subcontractor is entitled, reflecting percentages actually retained from payments to the Contractor on account of the Subcontractor's portion of the Work. The Contractor shall, by appropriate agreement with each Subcontractor, require each Subcontractor to make payments to Sub-subcontractors in a similar manner.

§ 9.6.3 The Architect will, on request, furnish to a Subcontractor, if practicable, information regarding percentages of completion or amounts applied for by the Contractor and action taken thereon by the Architect and Owner on account of portions of the Work done by such Subcontractor.

§ 9.6.4 The Owner has the right to request written evidence from the Contractor that the Contractor has properly paid Subcontractors and suppliers amounts paid by the Owner to the Contractor for subcontracted Work. If the Contractor fails to furnish such evidence within seven days, the Owner shall have the right to contact Subcontractors and suppliers to ascertain whether they have been properly paid. Neither the Owner nor Architect shall have an obligation to pay, or to see to the payment of money to, a Subcontractor or supplier, except as may otherwise be required by law.

§ 9.6.5 The Contractor's payments to suppliers shall be treated in a manner similar to that provided in Sections 9.6.2, 9.6.3 and 9.6.4.

§ 9.6.6 A Certificate for Payment, a progress payment, or partial or entire use or occupancy of the Project by the Owner shall not constitute acceptance of Work not in accordance with the Contract Documents.

§ 9.6.7 Unless the Contractor provides the Owner with a payment bond in the full penal sum of the Contract Sum, payments received by the Contractor for Work properly performed by Subcontractors or provided by suppliers shall be held by the Contractor for those Subcontractors or suppliers who performed Work or furnished materials, or both, under contract with the Contractor for which payment was made by the Owner. Nothing contained herein shall require money to be placed in a separate account and not commingled with money of the Contractor, create any fiduciary liability or tort liability on the part of the Contractor for breach of trust, or entitle any person or entity to an award of punitive damages against the Contractor for breach of the requirements of this provision.

§ 9.6.8 Provided the Owner has fulfilled its payment obligations under the Contract Documents, the Contractor shall defend and indemnify the Owner from all loss, liability, damage or expense, including reasonable attorney's fees and litigation expenses, arising out of any lien claim or other claim for payment by any Subcontractor or supplier of any tier. Upon receipt of notice of a lien claim or other claim for payment, the Owner shall notify the Contractor. If approved by the applicable court, when required, the Contractor may substitute a surety bond for the property against which the lien or other claim for payment has been asserted.

§ 9.7 Failure of Payment

If the Architect does not issue a Certificate for Payment, through no fault of the Contractor, within seven days after receipt of the Contractor's Application for Payment, or if the Owner does not pay the Contractor within seven days after the date established in the Contract Documents, the amount certified by the Architect or awarded by binding dispute resolution, then the Contractor may, upon seven additional days' notice to the Owner and Architect, stop the Work until payment of the amount owing has been received. The Contract Time shall be extended appropriately and the Contract Sum shall be increased by the amount of the Contractor's reasonable costs of shutdown, delay and start-up, plus interest as provided for in the Contract Documents.

§ 9.8 Substantial Completion

§ 9.8.1 Substantial Completion is the stage in the progress of the Work when the Work or designated portion thereof is sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work for its intended use.

§ 9.8.2 When the Contractor considers that the Work, or a portion thereof which the Owner agrees to accept separately, is substantially complete, the Contractor shall prepare and submit to the Architect a comprehensive list of items to be completed or corrected prior to final payment. Failure to include an item on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents.

§ 9.8.3 Upon receipt of the Contractor's list, the Architect will make an inspection to determine whether the Work or designated portion thereof is substantially complete. If the Architect's inspection discloses any item, whether or not included on the Contractor's list, which is not sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work or designated portion thereof for its intended use, the Contractor shall, before issuance of the Certificate of Substantial Completion, complete or correct such item upon notification by the Architect. In such case, the Contractor shall then submit a request for another inspection by the Architect to determine Substantial Completion.

§ 9.8.4 When the Work or designated portion thereof is substantially complete, the Architect will prepare a Certificate of Substantial Completion that shall establish the date of Substantial Completion; establish responsibilities of the Owner and Contractor for security, maintenance, heat, utilities, damage to the Work and insurance; and fix the time within which the Contractor shall finish all items on the list accompanying the Certificate. Warranties required by the Contract Documents shall commence on the date of Substantial Completion of the Work or designated portion thereof unless otherwise provided in the Certificate of Substantial Completion.

§ 9.8.5 The Certificate of Substantial Completion shall be submitted to the Owner and Contractor for their written acceptance of responsibilities assigned to them in the Certificate. Upon such acceptance, and consent of surety if any, the Owner shall make payment of retainage applying to the Work or designated portion thereof. Such payment shall be adjusted for Work that is incomplete or not in accordance with the requirements of the Contract Documents.

§ 9.9 Partial Occupancy or Use

§ 9.9.1 The Owner may occupy or use any completed or partially completed portion of the Work at any stage when such portion is designated by separate agreement with the Contractor, provided such occupancy or use is consented to by the insurer and authorized by public authorities having jurisdiction over the Project. Such partial occupancy or use may commence whether or not the portion is substantially complete, provided the Owner and Contractor have accepted in writing the responsibilities assigned to each of them for payments, retainage, if any, security, maintenance, heat, utilities, damage to the Work and insurance, and have agreed in writing concerning the period for correction of the Work and commencement of warranties required by the Contract Documents. When the Contractor considers a portion substantially complete, the Contractor shall prepare and submit a list to the Architect as provided under Section 9.8.2. Consent of the Contractor to partial occupancy or use shall not be unreasonably withheld. The stage of the progress of the Work shall be determined by written agreement between the Owner and Contractor or, if no agreement is reached, by decision of the Architect.

§ 9.9.2 Immediately prior to such partial occupancy or use, the Owner, Contractor, and Architect shall jointly inspect the area to be occupied or portion of the Work to be used in order to determine and record the condition of the Work.

§ 9.9.3 Unless otherwise agreed upon, partial occupancy or use of a portion or portions of the Work shall not constitute acceptance of Work not complying with the requirements of the Contract Documents.

§ 9.10 Final Completion and Final Payment

§ 9.10.1 Upon receipt of the Contractor's notice that the Work is ready for final inspection and acceptance and upon receipt of a final Application for Payment, the Architect will promptly make such inspection. When the Architect finds the Work acceptable under the Contract Documents and the Contract fully performed, the Architect will promptly issue a final Certificate for Payment stating that to the best of the Architect's knowledge, information and belief, and on the basis of the Architect's on-site visits and inspections, the Work has been completed in accordance with the Contract Documents and that the entire balance found to be due the Contractor and noted in the final Certificate is due and payable. The Architect's final Certificate for Payment will constitute a further representation that conditions listed in Section 9.10.2 as precedent to the Contractor's being entitled to final payment have been fulfilled.

§ 9.10.2 Neither final payment nor any remaining retained percentage shall become due until the Contractor submits to the Architect (1) an affidavit that payrolls, bills for materials and equipment, and other indebtedness connected with the Work for which the Owner or the Owner's property might be responsible or encumbered (less amounts withheld by Owner) have been paid or otherwise satisfied, (2) a certificate evidencing that insurance required by the Contract Documents to remain in force after final payment is currently in effect, (3) a written statement that the Contractor knows of no reason that the insurance will not be renewable to cover the period required by the Contract Documents, (4) consent of surety, if any, to final payment, (5) documentation of any special warranties, such as manufacturers' warranties or specific Subcontractor warranties, and (6) if required by the Owner, other data establishing payment or satisfaction of obligations, such as receipts and releases and waivers of liens, claims, security interests, or encumbrances arising out of the Contract, to the extent and in such form as may be designated by the Owner. If a Subcontractor refuses to furnish a release or waiver required by the Owner, the Contractor may furnish a bond satisfactory to the Owner to indemnify the Owner against such lien, claim, security interest, or encumbrance. If a lien, claim, security interest, or encumbrance remains unsatisfied after payments are made, the Contractor shall refund to the Owner all money that the Owner may be compelled to pay in discharging the lien, claim, security interest, or encumbrance, including all costs and reasonable attorneys' fees.

§ 9.10.3 If, after Substantial Completion of the Work, final completion thereof is materially delayed through no fault of the Contractor or by issuance of Change Orders affecting final completion, and the Architect so confirms, the Owner shall, upon application by the Contractor and certification by the Architect, and without terminating the Contract, make payment of the balance due for that portion of the Work fully completed, corrected, and accepted. If the remaining balance for Work not fully completed or corrected is less than retainage stipulated in the Contract Documents, and if bonds have been furnished, the written consent of the surety to payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by the Contractor to the Architect prior to certification of such payment. Such payment shall be made under terms and conditions governing final payment, except that it shall not constitute a waiver of Claims.

§ 9.10.4 The making of final payment shall constitute a waiver of Claims by the Owner except those arising from

- .1 liens, Claims, security interests, or encumbrances arising out of the Contract and unsettled;
- .2 failure of the Work to comply with the requirements of the Contract Documents;
- .3 terms of special warranties required by the Contract Documents; or
- .4 audits performed by the Owner, if permitted by the Contract Documents, after final payment.

§ 9.10.5 Acceptance of final payment by the Contractor, a Subcontractor, or a supplier, shall constitute a waiver of claims by that payee except those previously made in writing and identified by that payee as unsettled at the time of final Application for Payment.

ARTICLE 10 PROTECTION OF PERSONS AND PROPERTY

§ 10.1 Safety Precautions and Programs

The Contractor shall be responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with the performance of the Contract.

§ 10.2 Safety of Persons and Property

§ 10.2.1 The Contractor shall take reasonable precautions for safety of, and shall provide reasonable protection to

prevent damage, injury, or loss to

- .1 employees on the Work and other persons who may be affected thereby;
- .2 the Work and materials and equipment to be incorporated therein, whether in storage on or off the site, under care, custody, or control of the Contractor, a Subcontractor, or a Sub-subcontractor; and
- .3 other property at the site or adjacent thereto, such as trees, shrubs, lawns, walks, pavements, roadways, structures, and utilities not designated for removal, relocation, or replacement in the course of construction.

§ 10.2.2 The Contractor shall comply with, and give notices required by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities, bearing on safety of persons or property or their protection from damage, injury, or loss.

§ 10.2.3 The Contractor shall implement, erect, and maintain, as required by existing conditions and performance of the Contract, reasonable safeguards for safety and protection, including posting danger signs and other warnings against hazards; promulgating safety regulations; and notifying the owners and users of adjacent sites and utilities of the safeguards.

§ 10.2.4 When use or storage of explosives or other hazardous materials or equipment, or unusual methods are necessary for execution of the Work, the Contractor shall exercise utmost care and carry on such activities under supervision of properly qualified personnel.

§ 10.2.5 The Contractor shall promptly remedy damage and loss (other than damage or loss insured under property insurance required by the Contract Documents) to property referred to in Sections 10.2.1.2 and 10.2.1.3 caused in whole or in part by the Contractor, a Subcontractor, a Sub-subcontractor, or anyone directly or indirectly employed by any of them, or by anyone for whose acts they may be liable and for which the Contractor is responsible under Sections 10.2.1.2 and 10.2.1.3. The Contractor may make a Claim for the cost to remedy the damage or loss to the extent such damage or loss is attributable to acts or omissions of the Owner or Architect or anyone directly or indirectly employed by either of them, or by anyone for whose acts either of them may be liable, and not attributable to the fault or negligence of the Contractor. The foregoing obligations of the Contractor are in addition to the Contractor's obligations under Section 3.18.

§ 10.2.6 The Contractor shall designate a responsible member of the Contractor's organization at the site whose duty shall be the prevention of accidents. This person shall be the Contractor's superintendent unless otherwise designated by the Contractor in writing to the Owner and Architect.

§ 10.2.7 The Contractor shall not permit any part of the construction or site to be loaded so as to cause damage or create an unsafe condition.

§ 10.2.8 Injury or Damage to Person or Property

If either party suffers injury or damage to person or property because of an act or omission of the other party, or of others for whose acts such party is legally responsible, notice of the injury or damage, whether or not insured, shall be given to the other party within a reasonable time not exceeding 21 days after discovery. The notice shall provide sufficient detail to enable the other party to investigate the matter.

§ 10.3 Hazardous Materials and Substances

§ 10.3.1 The Contractor is responsible for compliance with any requirements included in the Contract Documents regarding hazardous materials or substances. If the Contractor encounters a hazardous material or substance not addressed in the Contract Documents and if reasonable precautions will be inadequate to prevent foreseeable bodily injury or death to persons resulting from a material or substance, including but not limited to asbestos or polychlorinated biphenyl (PCB), encountered on the site by the Contractor, the Contractor shall, upon recognizing the condition, immediately stop Work in the affected area and notify the Owner and Architect of the condition.

§ 10.3.2 Upon receipt of the Contractor's notice, the Owner shall obtain the services of a licensed laboratory to verify the presence or absence of the material or substance reported by the Contractor and, in the event such material or substance is found to be present, to cause it to be rendered harmless. Unless otherwise required by the Contract Documents, the Owner shall furnish in writing to the Contractor and Architect the names and qualifications of persons or entities who

are to perform tests verifying the presence or absence of the material or substance or who are to perform the task of removal or safe containment of the material or substance. The Contractor and the Architect will promptly reply to the Owner in writing stating whether or not either has reasonable objection to the persons or entities proposed by the Owner. If either the Contractor or Architect has an objection to a person or entity proposed by the Owner, the Owner shall propose another to whom the Contractor and the Architect have no reasonable objection. When the material or substance has been rendered harmless, Work in the affected area shall resume upon written agreement of the Owner and Contractor. By Change Order, the Contract Time shall be extended appropriately and the Contract Sum shall be increased by the amount of the Contractor's reasonable additional costs of shutdown, delay, and start-up.

§ 10.3.3 To the fullest extent permitted by law, the Owner shall indemnify and hold harmless the Contractor, Subcontractors, Architect, Architect's consultants, and agents and employees of any of them from and against claims, damages, losses, and expenses, including but not limited to attorneys' fees, arising out of or resulting from performance of the Work in the affected area if in fact the material or substance presents the risk of bodily injury or death as described in Section 10.3.1 and has not been rendered harmless, provided that such claim, damage, loss, or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself), except to the extent that such damage, loss, or expense is due to the fault or negligence of the party seeking indemnity.

§ 10.3.4 The Owner shall not be responsible under this Section 10.3 for hazardous materials or substances the Contractor brings to the site unless such materials or substances are required by the Contract Documents. The Owner shall be responsible for hazardous materials or substances required by the Contract Documents, except to the extent of the Contractor's fault or negligence in the use and handling of such materials or substances.

§ 10.3.5 The Contractor shall reimburse the Owner for the cost and expense the Owner incurs (1) for remediation of hazardous materials or substances the Contractor brings to the site and negligently handles, or (2) where the Contractor fails to perform its obligations under Section 10.3.1, except to the extent that the cost and expense are due to the Owner's fault or negligence.

§ 10.3.6 If, without negligence on the part of the Contractor, the Contractor is held liable by a government agency for the cost of remediation of a hazardous material or substance solely by reason of performing Work as required by the Contract Documents, the Owner shall reimburse the Contractor for all cost and expense thereby incurred.

§ 10.4 Emergencies

In an emergency affecting safety of persons or property, the Contractor shall act, at the Contractor's discretion, to prevent threatened damage, injury, or loss. Additional compensation or extension of time claimed by the Contractor on account of an emergency shall be determined as provided in Article 15 and Article 7.

ARTICLE 11 INSURANCE AND BONDS

§ 11.1 Contractor's Insurance and Bonds

§ 11.1.1 The Contractor shall purchase and maintain insurance of the types and limits of liability, containing the endorsements, and subject to the terms and conditions, as described in the Agreement or elsewhere in the Contract Documents. The Contractor shall purchase and maintain the required insurance from an insurance company or insurance companies lawfully authorized to issue insurance in the jurisdiction where the Project is located. The Owner, Architect, and Architect's consultants shall be named as additional insureds under the Contractor's commercial general liability policy or as otherwise described in the Contract Documents.

§ 11.1.2 The Contractor shall provide surety bonds of the types, for such penal sums, and subject to such terms and conditions as required by the Contract Documents. The Contractor shall purchase and maintain the required bonds from a company or companies lawfully authorized to issue surety bonds in the jurisdiction where the Project is located.

§ 11.1.3 Upon the request of any person or entity appearing to be a potential beneficiary of bonds covering payment of obligations arising under the Contract, the Contractor shall promptly furnish a copy of the bonds or shall authorize a copy to be furnished.

§ 11.1.4 Notice of Cancellation or Expiration of Contractor's Required Insurance. Within three (3) business days of the date the Contractor becomes aware of an impending or actual cancellation or expiration of any insurance required by the

Contract Documents, the Contractor shall provide notice to the Owner of such impending or actual cancellation or expiration. Upon receipt of notice from the Contractor, the Owner shall, unless the lapse in coverage arises from an act or omission of the Owner, have the right to stop the Work until the lapse in coverage has been cured by the procurement of replacement coverage by the Contractor. The furnishing of notice by the Contractor shall not relieve the Contractor of any contractual obligation to provide any required coverage.

§ 11.2 Owner's Insurance

§ 11.2.1 The Owner shall purchase and maintain insurance of the types and limits of liability, containing the endorsements, and subject to the terms and conditions, as described in the Agreement or elsewhere in the Contract Documents. The Owner shall purchase and maintain the required insurance from an insurance company or insurance companies lawfully authorized to issue insurance in the jurisdiction where the Project is located.

§ 11.2.2 Failure to Purchase Required Property Insurance. If the Owner fails to purchase and maintain the required property insurance, with all of the coverages and in the amounts described in the Agreement or elsewhere in the Contract Documents, the Owner shall inform the Contractor in writing prior to commencement of the Work. Upon receipt of notice from the Owner, the Contractor may delay commencement of the Work and may obtain insurance that will protect the interests of the Contractor, Subcontractors, and Sub-Subcontractors in the Work. When the failure to provide coverage has been cured or resolved, the Contract Sum and Contract Time shall be equitably adjusted. In the event the Owner fails to procure coverage, the Owner waives all rights against the Contractor, Subcontractors, and Sub-subcontractors to the extent the loss to the Owner would have been covered by the insurance to have been procured by the Owner. The cost of the insurance shall be charged to the Owner by a Change Order. If the Owner does not provide written notice, and the Contractor is damaged by the failure or neglect of the Owner to purchase or maintain the required insurance, the Owner shall reimburse the Contractor for all reasonable costs and damages attributable thereto.

§ 11.2.3 Notice of Cancellation or Expiration of Owner's Required Property Insurance. Within three (3) business days of the date the Owner becomes aware of an impending or actual cancellation or expiration of any property insurance required by the Contract Documents, the Owner shall provide notice to the Contractor of such impending or actual cancellation or expiration. Unless the lapse in coverage arises from an act or omission of the Contractor: (1) the Contractor, upon receipt of notice from the Owner, shall have the right to stop the Work until the lapse in coverage has been cured by the procurement of replacement coverage by either the Owner or the Contractor; (2) the Contract Time and Contract Sum shall be equitably adjusted; and (3) the Owner waives all rights against the Contractor, Subcontractors, and Sub-subcontractors to the extent any loss to the Owner would have been covered by the insurance had it not expired or been cancelled. If the Contractor purchases replacement coverage, the cost of the insurance shall be charged to the Owner by an appropriate Change Order. The furnishing of notice by the Owner shall not relieve the Owner of any contractual obligation to provide required insurance.

§ 11.3 Waivers of Subrogation

§ 11.3.1 The Owner and Contractor waive all rights against (1) each other and any of their subcontractors, sub-subcontractors, agents, and employees, each of the other; (2) the Architect and Architect's consultants; and (3) Separate Contractors, if any, and any of their subcontractors, sub-subcontractors, agents, and employees, for damages caused by fire, or other causes of loss, to the extent those losses are covered by property insurance required by the Agreement or other property insurance applicable to the Project, except such rights as they have to proceeds of such insurance. The Owner or Contractor, as appropriate, shall require similar written waivers in favor of the individuals and entities identified above from the Architect, Architect's consultants, Separate Contractors, subcontractors, and sub-subcontractors. The policies of insurance purchased and maintained by each person or entity agreeing to waive claims pursuant to this section 11.3.1 shall not prohibit this waiver of subrogation. This waiver of subrogation shall be effective as to a person or entity (1) even though that person or entity would otherwise have a duty of indemnification, contractual or otherwise, (2) even though that person or entity did not pay the insurance premium directly or indirectly, or (3) whether or not the person or entity had an insurable interest in the damaged property.

§ 11.3.2 If during the Project construction period the Owner insures properties, real or personal or both, at or adjacent to the site by property insurance under policies separate from those insuring the Project, or if after final payment property insurance is to be provided on the completed Project through a policy or policies other than those insuring the Project during the construction period, to the extent permissible by such policies, the Owner waives all rights in accordance with the terms of Section 11.3.1 for damages caused by fire or other causes of loss covered by this separate property insurance.

§ 11.4 Loss of Use, Business Interruption, and Delay in Completion Insurance

The Owner, at the Owner's option, may purchase and maintain insurance that will protect the Owner against loss of use of the Owner's property, or the inability to conduct normal operations, due to fire or other causes of loss. The Owner waives all rights of action against the Contractor and Architect for loss of use of the Owner's property, due to fire or other hazards however caused.

§11.5 Adjustment and Settlement of Insured Loss

§ 11.5.1 A loss insured under the property insurance required by the Agreement shall be adjusted by the Owner as fiduciary and made payable to the Owner as fiduciary for the insureds, as their interests may appear, subject to requirements of any applicable mortgagee clause and of Section 11.5.2. The Owner shall pay the Architect and Contractor their just shares of insurance proceeds received by the Owner, and by appropriate agreements the Architect and Contractor shall make payments to their consultants and Subcontractors in similar manner.

§ 11.5.2 Prior to settlement of an insured loss, the Owner shall notify the Contractor of the terms of the proposed settlement as well as the proposed allocation of the insurance proceeds. The Contractor shall have 14 days from receipt of notice to object to the proposed settlement or allocation of the proceeds. If the Contractor does not object, the Owner shall settle the loss and the Contractor shall be bound by the settlement and allocation. Upon receipt, the Owner shall deposit the insurance proceeds in a separate account and make the appropriate distributions. Thereafter, if no other agreement is made or the Owner does not terminate the Contract for convenience, the Owner and Contractor shall execute a Change Order for reconstruction of the damaged or destroyed Work in the amount allocated for that purpose. If the Contractor timely objects to either the terms of the proposed settlement or the allocation of the proceeds, the Owner may proceed to settle the insured loss, and any dispute between the Owner and Contractor arising out of the settlement or allocation of the proceeds shall be resolved pursuant to Article 15. Pending resolution of any dispute, the Owner may issue a Construction Change Directive for the reconstruction of the damaged or destroyed Work.

ARTICLE 12 UNCOVERING AND CORRECTION OF WORK

§ 12.1 Uncovering of Work

§ 12.1.1 If a portion of the Work is covered contrary to the Architect's request or to requirements specifically expressed in the Contract Documents, it must, if requested in writing by the Architect, be uncovered for the Architect's examination and be replaced at the Contractor's expense without change in the Contract Time.

§ 12.1.2 If a portion of the Work has been covered that the Architect has not specifically requested to examine prior to its being covered, the Architect may request to see such Work and it shall be uncovered by the Contractor. If such Work is in accordance with the Contract Documents, the Contractor shall be entitled to an equitable adjustment to the Contract Sum and Contract Time as may be appropriate. If such Work is not in accordance with the Contract Documents, the costs of uncovering the Work, and the cost of correction, shall be at the Contractor's expense.

§ 12.2 Correction of Work

§ 12.2.1 Before Substantial Completion

The Contractor shall promptly correct Work rejected by the Architect or failing to conform to the requirements of the Contract Documents, discovered before Substantial Completion and whether or not fabricated, installed or completed. Costs of correcting such rejected Work, including additional testing and inspections, the cost of uncovering and replacement, and compensation for the Architect's services and expenses made necessary thereby, shall be at the Contractor's expense.

§ 12.2.2 After Substantial Completion

§ 12.2.2.1 In addition to the Contractor's obligations under Section 3.5, if, within one year after the date of Substantial Completion of the Work or designated portion thereof or after the date for commencement of warranties established under Section 9.9.1, or by terms of any applicable special warranty required by the Contract Documents, any of the Work is found to be not in accordance with the requirements of the Contract Documents, the Contractor shall correct it promptly after receipt of notice from the Owner to do so, unless the Owner has previously given the Contractor a written acceptance of such condition. The Owner shall give such notice promptly after discovery of the condition. During the one-year period for correction of Work, if the Owner fails to notify the Contractor and give the Contractor an opportunity to make the correction, the Owner waives the rights to require correction by the Contractor and to make a claim for breach of warranty. If the Contractor fails to correct nonconforming Work within a reasonable time during that period after receipt of notice from the Owner or Architect, the Owner may correct it in accordance with Section 2.5.

§ 12.2.2.2 The one-year period for correction of Work shall be extended with respect to portions of Work first performed after Substantial Completion by the period of time between Substantial Completion and the actual completion of that portion of the Work.

§ 12.2.2.3 The one-year period for correction of Work shall not be extended by corrective Work performed by the Contractor pursuant to this Section 12.2.

§ 12.2.3 The Contractor shall remove from the site portions of the Work that are not in accordance with the requirements of the Contract Documents and are neither corrected by the Contractor nor accepted by the Owner.

§ 12.2.4 The Contractor shall bear the cost of correcting destroyed or damaged construction of the Owner or Separate Contractors, whether completed or partially completed, caused by the Contractor's correction or removal of Work that is not in accordance with the requirements of the Contract Documents.

§ 12.2.5 Nothing contained in this Section 12.2 shall be construed to establish a period of limitation with respect to other obligations the Contractor has under the Contract Documents. Establishment of the one-year period for correction of Work as described in Section 12.2.2 relates only to the specific obligation of the Contractor to correct the Work, and has no relationship to the time within which the obligation to comply with the Contract Documents may be sought to be enforced, nor to the time within which proceedings may be commenced to establish the Contractor's liability with respect to the Contractor's obligations other than specifically to correct the Work.

§ 12.3 Acceptance of Nonconforming Work

If the Owner prefers to accept Work that is not in accordance with the requirements of the Contract Documents, the Owner may do so instead of requiring its removal and correction, in which case the Contract Sum will be reduced as appropriate and equitable. Such adjustment shall be effected whether or not final payment has been made.

ARTICLE 13 MISCELLANEOUS PROVISIONS

§ 13.1 Governing Law

The Contract shall be governed by the law of the place where the Project is located, excluding that jurisdiction's choice of law rules. If the parties have selected arbitration as the method of binding dispute resolution, the Federal Arbitration Act shall govern Section 15.4.

§ 13.2 Successors and Assigns

§ 13.2.1 The Owner and Contractor respectively bind themselves, their partners, successors, assigns, and legal representatives to covenants, agreements, and obligations contained in the Contract Documents. Except as provided in Section 13.2.2, neither party to the Contract shall assign the Contract as a whole without written consent of the other. If either party attempts to make an assignment without such consent, that party shall nevertheless remain legally responsible for all obligations under the Contract.

§ 13.2.2 The Owner may, without consent of the Contractor, assign the Contract to a lender providing construction financing for the Project, if the lender assumes the Owner's rights and obligations under the Contract Documents. The Contractor shall execute all consents reasonably required to facilitate the assignment.

§ 13.3 Rights and Remedies

§ 13.3.1 Duties and obligations imposed by the Contract Documents and rights and remedies available thereunder shall be in addition to and not a limitation of duties, obligations, rights, and remedies otherwise imposed or available by law.

§ 13.3.2 No action or failure to act by the Owner, Architect, or Contractor shall constitute a waiver of a right or duty afforded them under the Contract, nor shall such action or failure to act constitute approval of or acquiescence in a breach thereunder, except as may be specifically agreed upon in writing.

§ 13.4 Tests and Inspections

§ 13.4.1 Tests, inspections, and approvals of portions of the Work shall be made as required by the Contract Documents and by applicable laws, statutes, ordinances, codes, rules, and regulations or lawful orders of public authorities. Unless

otherwise provided, the Contractor shall make arrangements for such tests, inspections, and approvals with an independent testing laboratory or entity acceptable to the Owner, or with the appropriate public authority, and shall bear all related costs of tests, inspections, and approvals. The Contractor shall give the Architect timely notice of when and where tests and inspections are to be made so that the Architect may be present for such procedures. The Owner shall bear costs of tests, inspections, or approvals that do not become requirements until after bids are received or negotiations concluded. The Owner shall directly arrange and pay for tests, inspections, or approvals where building codes or applicable laws or regulations so require.

§ 13.4.2 If the Architect, Owner, or public authorities having jurisdiction determine that portions of the Work require additional testing, inspection, or approval not included under Section 13.4.1, the Architect will, upon written authorization from the Owner, instruct the Contractor to make arrangements for such additional testing, inspection, or approval, by an entity acceptable to the Owner, and the Contractor shall give timely notice to the Architect of when and where tests and inspections are to be made so that the Architect may be present for such procedures. Such costs, except as provided in Section 13.4.3, shall be at the Owner's expense.

§ 13.4.3 If procedures for testing, inspection, or approval under Sections 13.4.1 and 13.4.2 reveal failure of the portions of the Work to comply with requirements established by the Contract Documents, all costs made necessary by such failure, including those of repeated procedures and compensation for the Architect's services and expenses, shall be at the Contractor's expense.

§ 13.4.4 Required certificates of testing, inspection, or approval shall, unless otherwise required by the Contract Documents, be secured by the Contractor and promptly delivered to the Architect.

§ 13.4.5 If the Architect is to observe tests, inspections, or approvals required by the Contract Documents, the Architect will do so promptly and, where practicable, at the normal place of testing.

§ 13.4.6 Tests or inspections conducted pursuant to the Contract Documents shall be made promptly to avoid unreasonable delay in the Work.

§ 13.5 Interest

Payments due and unpaid under the Contract Documents shall bear interest from the date payment is due at the rate the parties agree upon in writing or, in the absence thereof, at the legal rate prevailing from time to time at the place where the Project is located.

ARTICLE 14 TERMINATION OR SUSPENSION OF THE CONTRACT

§ 14.1 Termination by the Contractor

§ 14.1.1 The Contractor may terminate the Contract if the Work is stopped for a period of 30 consecutive days through no act or fault of the Contractor, a Subcontractor, a Sub-subcontractor, their agents or employees, or any other persons or entities performing portions of the Work, for any of the following reasons:

- .1 Issuance of an order of a court or other public authority having jurisdiction that requires all Work to be stopped;
- .2 An act of government, such as a declaration of national emergency, that requires all Work to be stopped;
- .3 Because the Architect has not issued a Certificate for Payment and has not notified the Contractor of the reason for withholding certification as provided in Section 9.4.1, or because the Owner has not made payment on a Certificate for Payment within the time stated in the Contract Documents; or
- .4 The Owner has failed to furnish to the Contractor reasonable evidence as required by Section 2.2.

§ 14.1.2 The Contractor may terminate the Contract if, through no act or fault of the Contractor, a Subcontractor, a Sub-subcontractor, their agents or employees, or any other persons or entities performing portions of the Work, repeated suspensions, delays, or interruptions of the entire Work by the Owner as described in Section 14.3, constitute in the aggregate more than 100 percent of the total number of days scheduled for completion, or 120 days in any 365-day period, whichever is less.

§ 14.1.3 If one of the reasons described in Section 14.1.1 or 14.1.2 exists, the Contractor may, upon seven days' notice to the Owner and Architect, terminate the Contract and recover from the Owner payment for Work executed, as well as reasonable overhead and profit on Work not executed, and costs incurred by reason of such termination.

§ 14.1.4 If the Work is stopped for a period of 60 consecutive days through no act or fault of the Contractor, a Subcontractor, a Sub-subcontractor, or their agents or employees or any other persons or entities performing portions of the Work because the Owner has repeatedly failed to fulfill the Owner's obligations under the Contract Documents with respect to matters important to the progress of the Work, the Contractor may, upon seven additional days' notice to the Owner and the Architect, terminate the Contract and recover from the Owner as provided in Section 14.1.3.

§ 14.2 Termination by the Owner for Cause

§ 14.2.1 The Owner may terminate the Contract if the Contractor

- .1 repeatedly refuses or fails to supply enough properly skilled workers or proper materials;
- .2 fails to make payment to Subcontractors or suppliers in accordance with the respective agreements between the Contractor and the Subcontractors or suppliers;
- .3 repeatedly disregards applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of a public authority; or
- .4 otherwise is guilty of substantial breach of a provision of the Contract Documents.

§ 14.2.2 When any of the reasons described in Section 14.2.1 exist, and upon certification by the Architect that sufficient cause exists to justify such action, the Owner may, without prejudice to any other rights or remedies of the Owner and after giving the Contractor and the Contractor's surety, if any, seven days' notice, terminate employment of the Contractor and may, subject to any prior rights of the surety:

- .1 Exclude the Contractor from the site and take possession of all materials, equipment, tools, and construction equipment and machinery thereon owned by the Contractor;
- .2 Accept assignment of subcontracts pursuant to Section 5.4; and
- .3 Finish the Work by whatever reasonable method the Owner may deem expedient. Upon written request of the Contractor, the Owner shall furnish to the Contractor a detailed accounting of the costs incurred by the Owner in finishing the Work.

§ 14.2.3 When the Owner terminates the Contract for one of the reasons stated in Section 14.2.1, the Contractor shall not be entitled to receive further payment until the Work is finished.

§ 14.2.4 If the unpaid balance of the Contract Sum exceeds costs of finishing the Work, including compensation for the Architect's services and expenses made necessary thereby, and other damages incurred by the Owner and not expressly waived, such excess shall be paid to the Contractor. If such costs and damages exceed the unpaid balance, the Contractor shall pay the difference to the Owner. The amount to be paid to the Contractor or Owner, as the case may be, shall be certified by the Initial Decision Maker, upon application, and this obligation for payment shall survive termination of the Contract.

§ 14.3 Suspension by the Owner for Convenience

§ 14.3.1 The Owner may, without cause, order the Contractor in writing to suspend, delay or interrupt the Work, in whole or in part for such period of time as the Owner may determine.

§ 14.3.2 The Contract Sum and Contract Time shall be adjusted for increases in the cost and time caused by suspension, delay, or interruption under Section 14.3.1. Adjustment of the Contract Sum shall include profit. No adjustment shall be made to the extent

- .1 that performance is, was, or would have been, so suspended, delayed, or interrupted, by another cause for which the Contractor is responsible; or
- .2 that an equitable adjustment is made or denied under another provision of the Contract.

§ 14.4 Termination by the Owner for Convenience

§ 14.4.1 The Owner may, at any time, terminate the Contract for the Owner's convenience and without cause.

§ 14.4.2 Upon receipt of notice from the Owner of such termination for the Owner's convenience, the Contractor shall

- .1 cease operations as directed by the Owner in the notice;
- .2 take actions necessary, or that the Owner may direct, for the protection and preservation of the Work; and
- .3 except for Work directed to be performed prior to the effective date of termination stated in the notice,

terminate all existing subcontracts and purchase orders and enter into no further subcontracts and purchase orders.

§ 14.4.3 In case of such termination for the Owner's convenience, the Owner shall pay the Contractor for Work properly executed; costs incurred by reason of the termination, including costs attributable to termination of Subcontracts; and the termination fee, if any, set forth in the Agreement.

ARTICLE 15 CLAIMS AND DISPUTES

§ 15.1 Claims

§ 15.1.1 Definition

A Claim is a demand or assertion by one of the parties seeking, as a matter of right, payment of money, a change in the Contract Time, or other relief with respect to the terms of the Contract. The term "Claim" also includes other disputes and matters in question between the Owner and Contractor arising out of or relating to the Contract. The responsibility to substantiate Claims shall rest with the party making the Claim. This Section 15.1.1 does not require the Owner to file a Claim in order to impose liquidated damages in accordance with the Contract Documents.

§ 15.1.2 Time Limits on Claims

The Owner and Contractor shall commence all Claims and causes of action against the other and arising out of or related to the Contract, whether in contract, tort, breach of warranty or otherwise, in accordance with the requirements of the binding dispute resolution method selected in the Agreement and within the period specified by applicable law, but in any case not more than 10 years after the date of Substantial Completion of the Work. The Owner and Contractor waive all Claims and causes of action not commenced in accordance with this Section 15.1.2.

§ 15.1.3 Notice of Claims

§ 15.1.3.1 Claims by either the Owner or Contractor, where the condition giving rise to the Claim is first discovered prior to expiration of the period for correction of the Work set forth in Section 12.2.2, shall be initiated by notice to the other party and to the Initial Decision Maker with a copy sent to the Architect, if the Architect is not serving as the Initial Decision Maker. Claims by either party under this Section 15.1.3.1 shall be initiated within 21 days after occurrence of the event giving rise to such Claim or within 21 days after the claimant first recognizes the condition giving rise to the Claim, whichever is later.

§ 15.1.3.2 Claims by either the Owner or Contractor, where the condition giving rise to the Claim is first discovered after expiration of the period for correction of the Work set forth in Section 12.2.2, shall be initiated by notice to the other party. In such event, no decision by the Initial Decision Maker is required.

§ 15.1.4 Continuing Contract Performance

§ 15.1.4.1 Pending final resolution of a Claim, except as otherwise agreed in writing or as provided in Section 9.7 and Article 14, the Contractor shall proceed diligently with performance of the Contract and the Owner shall continue to make payments in accordance with the Contract Documents.

§ 15.1.4.2 The Contract Sum and Contract Time shall be adjusted in accordance with the Initial Decision Maker's decision, subject to the right of either party to proceed in accordance with this Article 15. The Architect will issue Certificates for Payment in accordance with the decision of the Initial Decision Maker.

§ 15.1.5 Claims for Additional Cost

If the Contractor wishes to make a Claim for an increase in the Contract Sum, notice as provided in Section 15.1.3 shall be given before proceeding to execute the portion of the Work that is the subject of the Claim. Prior notice is not required for Claims relating to an emergency endangering life or property arising under Section 10.4.

§ 15.1.6 Claims for Additional Time

§ 15.1.6.1 If the Contractor wishes to make a Claim for an increase in the Contract Time, notice as provided in Section 15.1.3 shall be given. The Contractor's Claim shall include an estimate of cost and of probable effect of delay on progress of the Work. In the case of a continuing delay, only one Claim is necessary.

§ 15.1.6.2 If adverse weather conditions are the basis for a Claim for additional time, such Claim shall be documented by data substantiating that weather conditions were abnormal for the period of time, could not have been reasonably

anticipated, and had an adverse effect on the scheduled construction.

§ 15.1.7 Waiver of Claims for Consequential Damages

The Contractor and Owner waive Claims against each other for consequential damages arising out of or relating to this Contract. This mutual waiver includes

- .1 damages incurred by the Owner for rental expenses, for losses of use, income, profit, financing, business and reputation, and for loss of management or employee productivity or of the services of such persons; and
- .2 damages incurred by the Contractor for principal office expenses including the compensation of personnel stationed there, for losses of financing, business and reputation, and for loss of profit, except anticipated profit arising directly from the Work.

This mutual waiver is applicable, without limitation, to all consequential damages due to either party's termination in accordance with Article 14. Nothing contained in this Section 15.1.7 shall be deemed to preclude assessment of liquidated damages, when applicable, in accordance with the requirements of the Contract Documents.

§ 15.2 Initial Decision

§ 15.2.1 Claims, excluding those where the condition giving rise to the Claim is first discovered after expiration of the period for correction of the Work set forth in Section 12.2.2 or arising under Sections 10.3, 10.4, and 11.5, shall be referred to the Initial Decision Maker for initial decision. The Architect will serve as the Initial Decision Maker, unless otherwise indicated in the Agreement. Except for those Claims excluded by this Section 15.2.1, an initial decision shall be required as a condition precedent to mediation of any Claim. If an initial decision has not been rendered within 30 days after the Claim has been referred to the Initial Decision Maker, the party asserting the Claim may demand mediation and binding dispute resolution without a decision having been rendered. Unless the Initial Decision Maker and all affected parties agree, the Initial Decision Maker will not decide disputes between the Contractor and persons or entities other than the Owner.

§ 15.2.2 The Initial Decision Maker will review Claims and within ten days of the receipt of a Claim take one or more of the following actions: (1) request additional supporting data from the claimant or a response with supporting data from the other party, (2) reject the Claim in whole or in part, (3) approve the Claim, (4) suggest a compromise, or (5) advise the parties that the Initial Decision Maker is unable to resolve the Claim if the Initial Decision Maker lacks sufficient information to evaluate the merits of the Claim or if the Initial Decision Maker concludes that, in the Initial Decision Maker's sole discretion, it would be inappropriate for the Initial Decision Maker to resolve the Claim.

§ 15.2.3 In evaluating Claims, the Initial Decision Maker may, but shall not be obligated to, consult with or seek information from either party or from persons with special knowledge or expertise who may assist the Initial Decision Maker in rendering a decision. The Initial Decision Maker may request the Owner to authorize retention of such persons at the Owner's expense.

§ 15.2.4 If the Initial Decision Maker requests a party to provide a response to a Claim or to furnish additional supporting data, such party shall respond, within ten days after receipt of the request, and shall either (1) provide a response on the requested supporting data, (2) advise the Initial Decision Maker when the response or supporting data will be furnished, or (3) advise the Initial Decision Maker that no supporting data will be furnished. Upon receipt of the response or supporting data, if any, the Initial Decision Maker will either reject or approve the Claim in whole or in part.

§ 15.2.5 The Initial Decision Maker will render an initial decision approving or rejecting the Claim, or indicating that the Initial Decision Maker is unable to resolve the Claim. This initial decision shall (1) be in writing; (2) state the reasons therefor; and (3) notify the parties and the Architect, if the Architect is not serving as the Initial Decision Maker, of any change in the Contract Sum or Contract Time or both. The initial decision shall be final and binding on the parties but subject to mediation and, if the parties fail to resolve their dispute through mediation, to binding dispute resolution.

§ 15.2.6 Either party may file for mediation of an initial decision at any time, subject to the terms of Section 15.2.6.1.

§ 15.2.6.1 Either party may, within 30 days from the date of receipt of an initial decision, demand in writing that the other party file for mediation. If such a demand is made and the party receiving the demand fails to file for mediation

within 30 days after receipt thereof, then both parties waive their rights to mediate or pursue binding dispute resolution proceedings with respect to the initial decision.

§ 15.2.7 In the event of a Claim against the Contractor, the Owner may, but is not obligated to, notify the surety, if any, of the nature and amount of the Claim. If the Claim relates to a possibility of a Contractor's default, the Owner may, but is not obligated to, notify the surety and request the surety's assistance in resolving the controversy.

§ 15.2.8 If a Claim relates to or is the subject of a mechanic's lien, the party asserting such Claim may proceed in accordance with applicable law to comply with the lien notice or filing deadlines.

§ 15.3 Mediation

§ 15.3.1 Claims, disputes, or other matters in controversy arising out of or related to the Contract, except those waived as provided for in Sections 9.10.4, 9.10.5, and 15.1.7, shall be subject to mediation as a condition precedent to binding dispute resolution.

§ 15.3.2 The parties shall endeavor to resolve their Claims by mediation which, unless the parties mutually agree otherwise, shall be administered by the American Arbitration Association in accordance with its Construction Industry Mediation Procedures in effect on the date of the Agreement. A request for mediation shall be made in writing, delivered to the other party to the Contract, and filed with the person or entity administering the mediation. The request may be made concurrently with the filing of binding dispute resolution proceedings but, in such event, mediation shall proceed in advance of binding dispute resolution proceedings, which shall be stayed pending mediation for a period of 60 days from the date of filing, unless stayed for a longer period by agreement of the parties or court order. If an arbitration is stayed pursuant to this Section 15.3.2, the parties may nonetheless proceed to the selection of the arbitrator(s) and agree upon a schedule for later proceedings.

§ 15.3.3 Either party may, within 30 days from the date that mediation has been concluded without resolution of the dispute or 60 days after mediation has been demanded without resolution of the dispute, demand in writing that the other party file for binding dispute resolution. If such a demand is made and the party receiving the demand fails to file for binding dispute resolution within 60 days after receipt thereof, then both parties waive their rights to binding dispute resolution proceedings with respect to the initial decision.

§ 15.3.4 The parties shall share the mediator's fee and any filing fees equally. The mediation shall be held in the place where the Project is located, unless another location is mutually agreed upon. Agreements reached in mediation shall be enforceable as settlement agreements in any court having jurisdiction thereof.

§ 15.4 Arbitration

§ 15.4.1 If the parties have selected arbitration as the method for binding dispute resolution in the Agreement, any Claim subject to, but not resolved by, mediation shall be subject to arbitration which, unless the parties mutually agree otherwise, shall be administered by the American Arbitration Association in accordance with its Construction Industry Arbitration Rules in effect on the date of the Agreement. The Arbitration shall be conducted in the place where the Project is located, unless another location is mutually agreed upon. A demand for arbitration shall be made in writing, delivered to the other party to the Contract, and filed with the person or entity administering the arbitration. The party filing a notice of demand for arbitration must assert in the demand all Claims then known to that party on which arbitration is permitted to be demanded.

§ 15.4.1.1 A demand for arbitration shall be made no earlier than concurrently with the filing of a request for mediation, but in no event shall it be made after the date when the institution of legal or equitable proceedings based on the Claim would be barred by the applicable statute of limitations. For statute of limitations purposes, receipt of a written demand for arbitration by the person or entity administering the arbitration shall constitute the institution of legal or equitable proceedings based on the Claim.

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

§ 15.4.3 The foregoing agreement to arbitrate and other agreements to arbitrate with an additional person or entity duly consented to by parties to the Agreement, shall be specifically enforceable under applicable law in any court having

jurisdiction thereof.

§ 15.4.4 Consolidation or Joinder

§ 15.4.4.1 Subject to the rules of the American Arbitration Association or other applicable arbitration rules, either party may consolidate an arbitration conducted under this Agreement with any other arbitration to which it is a party provided that (1) the arbitration agreement governing the other arbitration permits consolidation, (2) the arbitrations to be consolidated substantially involve common questions of law or fact, and (3) the arbitrations employ materially similar procedural rules and methods for selecting arbitrator(s).

§ 15.4.4.2 Subject to the rules of the American Arbitration Association or other applicable arbitration rules, either party may include by joinder persons or entities substantially involved in a common question of law or fact whose presence is required if complete relief is to be accorded in arbitration, provided that the party sought to be joined consents in writing to such joinder. Consent to arbitration involving an additional person or entity shall not constitute consent to arbitration of any claim, dispute or other matter in question not described in the written consent.

§ 15.4.4.3 The Owner and Contractor grant to any person or entity made a party to an arbitration conducted under this Section 15.4, whether by joinder or consolidation, the same rights of joinder and consolidation as those of the Owner and Contractor under this Agreement.

These Supplementary Conditions to AIA Document A201-2017 are attached to and shall constitute part of the Contract Documents for the Agreement between Owner and Contractor for the CCAC Boyce Campus, Biology Lab Renovation located at CCAC Boyce Campus, 595 Beatty Road, Monroeville, Pennsylvania. The terms and conditions set forth herein modify, supersede and, where applicable, supplant the corresponding numbered provisions of the AIA Document A201-2017, General Conditions of the Contract for Construction (“General Conditions”). Unless expressly provided otherwise, all terms used herein shall have the same meaning and definitions as provided in the Agreement and the General Conditions.

ARTICLE 1

Add after the third sentence of Section 1.1.2:

Such Modifications must be in writing to have any effect. Such requirement shall not be waived by way of oral agreement.

Add new Sections 1.1.9 and 1.1.10:

§1.1.9 Knowledge. The terms “knowledge,” “recognize” and “discover,” their respective derivatives and similar terms in the Contract Documents, as used in reference to the Contractor, shall be interpreted to mean that which the Contractor knows (or should know), recognizes (or should recognize) and discovers (or should discover) in exercising the care, skill, and diligence required by the Contract Documents and Section 3.5 below. Analogously, the expression “reasonably inferable” and similar terms in the Contract Documents shall be interpreted to mean reasonably inferable by a contractor familiar with the Project and exercising the care skill and diligence required of the Contractor by the Contract Documents and Section 3.5 below.

§1.1.10 Persistently. The phrase “persistently fails” and other similar expressions, as used in reference to the Contractor, shall be interpreted to mean any combination of acts and omissions, which causes the Owner or the Architect to reasonably conclude that the Contractor will not complete the Work within the Contract Time, for the Contract Sum or in substantial compliance with the requirements of the Contract Documents.

Add new Section 1.2.4:

§1.2.4 If there is a conflict or ambiguity among the Contract Documents: (1) the more stringent requirement relating to performance of the Work shall control, as determined by the Owner, and (2) the Supplementary Conditions shall control over the standard form printed terms.

Add after first sentence of Section 1.5.1:

Owner is a co-owner of and shall be deemed to have an irrevocable license to utilize such Instruments of Service, such that Owner shall be provided suitable copies thereof and shall be entitled to retain, use, consult, rely upon, and/or modify such drawings for any reasonable purpose relating to this specific Project and/or subsequent improvements.

Add new Section 1.9:

§1.9 The Contractor warrants and represents that the Contractor shall not knowingly or negligently communicate or disclose at any time to any person or entity any information in connection with the Work or the Project, except: (1) with prior written consent of the Owner, (2) information that was in the public domain prior to the date of this Agreement, (3) information which becomes part of the public domain by publication or otherwise not due to any unauthorized act or omission of the Contractor, or (4) as may be required to perform the Work or by any applicable law.

ARTICLE 2**Delete Section 2.1.2 in its entirety and replace with the following:**

§2.1.2 To the extent allowed by law, neither Contractor nor any Subcontractor, Supplier or Sub-Subcontractor shall have the right to file or otherwise assert any mechanics, materialmen's or other lien against the Owner's property for any labor, services, material or equipment furnished or provided in the performance of the Work. Contractor hereby expressly waives its right to any such liens. As an express condition precedent to payment of any amounts deemed due and owing for Work performed under this Agreement, Contractor shall provide a conditional lien waiver (1) certifying that such payment will be used to pay for all Work and materials for which the payment application was submitted, and (2) waiving any and all mechanics' lien rights for all Work for which payment is to be issued. Contractor shall also provide Partial Lien waivers from each subcontractor and/or materialman providing Work or materials for which the payment application was submitted.

Notwithstanding the above, in the event any lien is filed against the Project, or any portion thereof, by or through any Subcontractor, Supplier or Sub-Subcontractor, Contractor agrees to immediately remove any such lien, by bond or otherwise, at its own expense. In the event any lien is not so removed by Contractor, Owner may remove the same at the expense of Contractor, including all legal fees incident thereto.

If at any time during the course of the Project there is reasonable evidence of any lien or claim which, if established, is chargeable to Contractor, Owner shall have the right to retain out of any payment due Contractor an amount sufficient to completely indemnify Owner against such lien or claim, including the expense of discharging or otherwise disposing of such lien, and all attorney's fees incurred in connection therewith.

Delete Section 2.2.1.**Delete Section 2.2.2.****Delete Section 2.2.3.****Delete Section 2.2.4.**

Delete second sentence of Section 2.3.4

Delete the following from Section 2.5 reading “Such action by the Owner and amounts charged to the Contractor are both subject to prior approval of the Architect and the Architect may” and add “Owner may,” before “pursuant to Section 9.5.1, withhold or nullify a Certificate for Payment in whole or in part...”

Add new Section 2.6:

§2.6 Extent of Owner Rights

§2.6.1 In no event shall the Owner have control over, charge of, or any responsibility for construction means, methods, techniques, sequences or procedures or for safety precautions and programs in connection with the Work, notwithstanding any of the rights and authority granted the Owner in the Contract Documents.

ARTICLE 3**Add new Section 3.2.1.1:**

§3.2.1.1 The Contractor and each Subcontractor shall evaluate and satisfy themselves as to the conditions and limitations under which the Work is to be performed, including, without limitation (1) the location, condition, layout and nature of the Project site and surrounding areas, (2) generally prevailing climatic conditions, (3) anticipated labor supply and costs, (4) availability and cost of materials, tools and equipment and (5) other similar issues. The Owner assumes no responsibility or liability for the physical condition or safety of the Project site or any improvements located on the Project site.

Add the following to Section 3.2.2:

§3.2.2.1 The exactness of grades, elevations, dimensions, or locations given on any Drawing issued by the Architect, is not guaranteed by the Architect or the Owner.

§3.2.2.2 The Contractor shall, therefore, satisfy itself as to the accuracy of all grades, elevations, dimensions and locations. In all cases of interconnection of its Work with existing or other work, it shall verify at the site all dimensions relating to such existing or other work. Any errors due to the Contractor's failure to so verify all such grades, elevations, locations or dimensions shall be promptly rectified by the Contractor without any additional cost to the Owner.

Delete Section 3.2.4 in its entirety and replace with the following:

§3.2.4 Except as to any reported errors, inconsistencies or omissions, and to concealed or unknown conditions defined in Section 3.7.4, by executing the Agreement, the Contractor represents the following:

.1 The Contract Documents are sufficiently complete and detailed for the Contractor to (1) perform the Work required to produce the results intended by the Contract Documents and (2) comply with all the requirements of the Contract Documents.

.2 The Work required by the Contract Documents, including, without limitation, all construction details, construction means, methods, procedures and techniques necessary to perform the Work, use of materials, selection of equipment and requirements of product manufacturers are consistent with: (1) good and sound practices within the construction industry; (2) generally prevailing and accepted industry standards applicable to Work; (3) requirements of any warranties applicable to the Work; and (4) all laws, ordinances, regulations, rules and orders which bear upon the Contractor's performance of the Work.

Delete Section 3.4.1 in its entirety and replace with the following:

§3.4.1 Unless provided in the Contract Documents, the Contractor shall provide and pay for labor (excluding premium for Workers' Compensation and General Liability insurance in the event such insurance is provided by the Owner in accordance with the insurance provisions hereinafter), materials, equipment, tools, construction equipment and machinery, water, heat, utilities, transportation, and other facilities and services necessary for proper execution and completion of the Work, whether temporary or permanent and whether or not incorporated or to be incorporated in the Work.

Add the following to end of Section 3.4.3:

The Contractor shall only employ labor on the Project or in connection with the Work capable of working harmoniously with all trades, crafts and other individuals associated with the Project. The Contractor shall also use its best efforts to minimize the likelihood of any strike, work stoppage or other labor disturbance. Contractor shall comply with any and all Labor Stabilization Agreements applicable to the Project included in the Contract Documents.

The word "may" in the third sentence of Section 3.5.1 is deleted and replaced by "shall."

Delete "improper or insufficient maintenance" from the fourth sentence of Section 3.5.1.

Add the following to the end of Section 3.5.1:

Contractor further warrants that it (i) possesses adequate skill, training, expertise, knowledge and experience to perform the Work in a competent and professional manner and in accordance with the Contract Documents; (ii) has sufficient personnel and equipment available to perform the Work within the milestones, timelines and time frames specified in the Contract Documents; (iii) will perform the Work in a good and workmanlike manner and in conformance with the requirements, specifications and instructions set forth in the Contract Documents; (iv) will perform the Work in a manner that will not infringe upon, violate or misappropriate the patent, copyright, trade secret, intellectual property or other protected rights or interests of any third party; and (v) will maintain insurance as required by Section 11 hereof and the Contract Documents.

Add new Section 3.5.3:

§3.5.3 The Contractor agrees to assign and/or provide to the Owner at the time of final completion of the Work, any and all manufacturer's warranties relating to materials and labor used in the Work and further agrees to perform the Work in such manner so as to preserve any and all such manufacturer's warranties.

Delete Section 3.7.1 and replace with the following:

§3.7.1 With the exception of the building permit, which shall be secured by Owner, the Contractor shall secure, pay for, and, as soon as practicable, furnish the Owner and Architect with copies or certificates of all permits and fees, licenses and inspections necessary for the proper execution and completion of the Work. All such costs and fees and any connection charges, assessments or inspection fees as may be imposed by any municipal agency or utility company, excepting those agreed in writing to be covered by the Developer, if applicable, are included in the Contract Sum and shall be the Contractor's responsibility.

Add new Section 3.7.2.1:

§3.7.2.1 The Contractor shall procure and obtain all bonds required of the Owner or the Contractor by the municipality in which the Project is located or by any other public or private body with jurisdiction over the Project. In connection with such bonds, the Contractor shall prepare all applications, supply all necessary back-up material and furnish the surety with any required personal undertakings. The Contractor shall also obtain and pay all charges for all approvals for street closings, parking meter removal and other similar matters as may be necessary or appropriate from time to time for the performance of the work.

Delete "knowing it to be" in first sentence of Section 3.7.3**Delete "14" in the fifth line of Section 3.7.4 and replace with "7".****Add the following after the second sentence in Section 3.10.1:**

If required by the Contract Documents, Contractor shall schedule and coordinate the work of the other Multiple Prime Contractors, and the Contractor's construction schedule shall also include a detailed project schedule of basic operations for the Multiple Prime Contractors.

Add the following at the end of Section 3.10.1:

The Contractor shall cooperate with the Architect and Owner in scheduling and performing the Contractor's Work to avoid conflict with, and as to cause no delay in, the work or activities of other Multiple Prime Contractors or the construction or operations of the Owner's own forces.

Add the following to the end of Section 3.10.1:

In connection with each monthly Application for Payment, Contractor shall submit an

updated schedule and accompanying progress report, in a format approved by Owner and Architect, which provides:

- (1) Percentages of completion for each major portion of the Work;
- (2) An identification of any project delays and resulting schedule deviation or slippage relating to the Work or any portion thereof;
- (3) Contractor's plan to mitigate or recapture the time lost by any such project delay; and
- (4) A description of any anticipated problems or action items or responses requested or Owner and/or Architect pertaining to the Work over the next thirty (30) days.

Change Section 3.13 to 3.13.1.

Add the following new sections to Section 3.13:

§3.13.2 Only materials and equipment which are to be used directly in the Work shall be brought to and stored on the Project site by the Contractor. After equipment is no longer required for the Work, it shall be promptly removed from the Project site. Protection of construction materials and equipment stored at the Project site from weather, theft, damage and all other adversity is solely the responsibility of the Contractor.

§3.13.3 The Contractor and any entity for whom the Contractor is responsible shall not erect any sign on the Project site without the prior written consent of the Owner, which may be withheld in the sole discretion of the Owner.

§3.13.4 Contractor shall ensure that the Work, at all times, is performed in a manner that affords reasonable access, both vehicular and pedestrian, to the site of the Work and all adjacent areas. The Work shall be performed, to the fullest extent reasonably possible, in such a manner that public areas adjacent to the site of the Work shall be free from all debris, building materials and equipment likely to cause hazardous conditions. Without limitation of any other provision of the Contract Documents, Contractor shall use its best efforts to minimize any interference with the occupancy or beneficial use of (1) any areas and buildings adjacent to or part of the site of the Work or (2) the Building in the event of partial occupancy, as more specifically described in Paragraph 9.9.

§3.13.5 Without prior approval of the Owner, the Contractor shall not permit any workers to use any existing facilities at the Project site, including, without limitation, lavatories, toilets, entrances and parking areas other than those designated by the Owner. Without limitation of any other provision of the Contract Documents, the Contractor shall use its best efforts to comply with all rules and regulations promulgated by the Owner in connection with the use and occupancy of the Project site and the Building, as amended from time to time. The Contractor shall immediately notify the Owner in writing if during the performance of the Work, the Contractor finds compliance with any portion of such rules and regulations to be impracticable,

setting forth the problems of such compliance and suggesting alternatives through which the same results intended by such portions of the rules and regulations can be achieved. The Owner may, in the Owner's sole discretion, adopt such suggestions, develop new alternatives or require compliance with the existing requirements of the rules and regulations. The Contractor shall also comply with all insurance requirements and collective bargaining agreements applicable to use and occupancy of the Project site and the Building.

Delete Sections 3.18.1 and 3.18.2 in their entirety and replace with the following:

§3.18.1 To the fullest extent permitted by law, Contractor shall defend (at Owner's request and through counsel reasonably acceptable to Owner), indemnify, and hold harmless Owner, its affiliates, and their respective directors, officers, employees, agents, lenders, and representatives from and against any and all claims, demands, damages, losses, liabilities, costs, and expenses (including reasonable attorneys' fees) arising out of or resulting from: (a) the acts or omissions, recklessness, or willful misconduct of Contractor or its subconsultants; (b) breach of this Agreement by Contractor; (c) violation of law by Contractor or its subconsultants; or (d) actual or alleged infringement or misappropriation of intellectual property rights by the work product or materials furnished by Contractor or its subconsultants. Contractor shall defend, indemnify and hold Owner harmless as set forth herein regardless of whether or not such claim, damage, loss or expense is caused in part by a party indemnified hereunder.

§3.18.2 In any and all claims against the Owner or other indemnified parties described in the preceding paragraph by any employee of Contractor or any sub-consultant, anyone directly or indirectly employed by them or anyone for whose acts any of them may be liable, the indemnification obligation 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 sub-consultant under workers' or workmen's compensation acts, disability benefit acts, or other employee benefit acts. Contractor's indemnity obligations herein shall not be limited by any statutorily provided immunity under any applicable Workers' Compensation or other statute.

§3.18.3 The Contractor and each Subcontractor, of whatever tier, hereby certifies to Owner that it complies with all employment related laws and regulations governing employment or collective bargaining agreements, if any. Nothing in this Agreement shall be construed as divesting any Contractor or Subcontractor of its sole and exclusive right to control the means, manner or method of performance of the Work of any Contractor or their employees. Nothing in this Agreement shall be construed in a manner that would be violative of the legal or contractual rights of any employee. The Contractor, and each Subcontractor, regardless of tier, shall defend, hold harmless and indemnify the Owner against and from any and all claims, demands, suits, actions, costs and expenses including reasonable attorneys' fees, growing out of any claims by an employee or independent contractor of any Contractor or Subcontractor of any tier alleging the violation of any of the individuals' employment rights, whether legal, constitutional or contractual in nature. This provision shall be accorded the broadest meaning permitted by law, and Contractor hereby expressly waives any statutorily provided immunity under the Pennsylvania Workers' Compensation statutes that would serve to limit its indemnification obligations hereunder.

ARTICLE 4

Delete “Contractor, and Architect. Consent shall not be unreasonably withheld.” from the end of Section 4.1.2.

Delete the second sentence of Section 4.2.12.

ARTICLE 5

Delete Section 5.2.1 in its entirety and replace with the following:

§5.2.1 Unless otherwise stated in the Contract Documents or the bidding requirements, the Contractor, as soon as practical after award of the Contract, shall furnish in writing to the Owner through Architect the name of persons or entities (including those who are to furnish materials or equipment fabricated to a special design) proposed for each principal portion of the Work. The Architect will promptly reply to a Contractor in writing stating whether or not the Owner or the Architect, after due investigation, has reasonable objection to any such proposed person or entity. Failure of the Owner or Architect to reply promptly shall constitute notice of no reasonable objection.

Add to the end of Section 5.4.1:

, provided Owner shall not be obligated to satisfy obligations of the Contractor accruing prior to the date of the assignment. Such right of assignment and/or assumption shall be expressly provided for in each subcontract or other agreement entered by the Contractor for the Project. Such rights are solely intended for Owner’s protection and benefit. Owner is under no obligation to exercise such rights or enforce such protections. Owner shall not be deemed to have waived any obligation on the part of Contractor by choosing not to exercise such rights. Nothing in this Agreement is intended to confer third party beneficiary status upon any subcontractor or other entity.

ARTICLE 6

Delete Section 6.1.4.

Delete the second sentence in Section 6.2.3.

ARTICLE 7

Add to the end of Section 7.1.3:

Except as permitted in Section 7.3, a change in the Contract Sum or the Contract Time shall be accomplished only by Change Order. Accordingly, no course of conduct or dealings between the parties, nor express or implied acceptance of alterations or additions to the Work, and

no claim that the Owner has been unjustly enriched by any alteration or addition to the Work, whether or not there is, in fact, any unjust enrichment to the Work, shall be the basis of any claim to any increase in any amounts due under the Contract Documents or a change in any time period provided for the Contract Documents.

Add to the end of Section 7.2:

Agreement on any Change Order shall constitute a final settlement of all matters relating to the change in the Work which is the subject of the Change Order, including, but not limited to, all direct and indirect costs associated with such change and any and all adjustments to the Contract Sum and the construction schedule. In the event a Change Order increases the Contract Sum, Contractor shall include the Work covered by such Change Orders in Applications for Payment as if such Work were originally part of the Contract Documents.

Add to the end of Section 7.3.4:

No allowance will be made for loss of anticipated profit or fee on any portion of the Work not performed by reason of a change in the Work.

Add the following new Section 7.3.11:

§7.3.11 To the extent applicable, each Construction Change Order shall reflect the proper credit of the Owner providing insurance as set forth in Article 11 of this Contract.

ARTICLE 8

Delete Section 8.2.2 in its entirety and replace with the following:

§8.2.2 The Contractor shall not knowingly, except by agreement or instruction of the Owner in writing, prematurely commence operations on the site or elsewhere prior to the effective date of insurance required by Article 11 of these General Conditions. The date of commencement of the Work shall not be changed by the effective date of such insurance. Unless the date of commencement is established by the Contract Documents or a Notice to Proceed given by the Owner, the Contractor shall notify the Owner in writing not less than Five (5) Days or other agreed period before commencing the Work to permit the timely filing of mortgages, mechanic's liens and other security interests.

Delete Section 8.3.1 in its entirety and replace with the following:

§8.3.1 If the Contractor is delayed at any time in the commencement or progress of the Work by an act or neglect of Owner, Architect, any of the other Multiple Prime Contractors or an employee of any of them, or by changes ordered in the Work, or by labor disputes, fire, unavoidable casualties or other causes beyond the Contractor's reasonable control; or by delay authorized by the Owner pending mediation and arbitration, or by other causes that the Architect determines may justify delay, then the Contract Time shall be extended by Change Order.

Notwithstanding the foregoing, an extension of the Contract Time will only be granted to the extent that the delay will prevent the Contractor from achieving Substantial Completion within the Contract Time. Further, an extension of the Contract Time will not be granted to the extent that the delay results from or is attributable to a cause(s) for which Contractor is otherwise not entitled to an extension of the Contract Time under the Contract Documents. The Contractor further acknowledges and agrees that adjustments in the Contract Time will be permitted for a delay only to the extent such delay (1) is not caused, or could not have been anticipated, by the Contractor, (2) could not be limited or avoided by the Contractor's timely notice to the Owner of the delay and (3) is of a duration not less than one (1) day. However, as a condition precedent to Contractor's right to seek adjustment in the Contract Time, within twenty (20) days after the occurrence of any delay, Contractor shall furnish the Architect with detailed information and substantiation concerning the cause of the delay, the exact duration of the delay, the specific activities thereby affected and the measures taken by Contractor to prevent or mitigate the delay. Failure to submit such information within the time required shall result in the automatic denial of any request for extension of time.

Delete Section 8.3.3 in its entirety and replace with the following:

§8.3.3 Notwithstanding anything to the contrary in the Contract Documents, an extension in the Contract Time, to the extent permitted under Section 8.3.1, shall be the sole remedy of the Contractor for any (1) delay in the commencement, prosecution or completion of the Work, (2) hindrance or obstruction in the performance of the Work, (3) loss of productivity, or (4) other similar claims (collectively referred to in this Section 8.3.3 as Delays), whether or not such Delays are foreseeable. In no event shall the Contractor be entitled to any additional compensation or recovery of any damages in connection with Delays, including, without limitation, consequential damages, lost opportunity costs, impact damages or other similar remuneration. The Owner's exercise of any of its rights or remedies under the Contract Documents (including, without limitation, ordering changes in the Work, or directing suspension, rescheduling or correction of the Work), regardless of the extent or frequency of the Owner's exercise of such rights or remedies, shall not be construed as active interference with the Contractor's performance of the Work.

Add the following new Section 8.3.4:

§8.3.4 If the Contractor submits a progress report indicating, or otherwise expresses an intention to achieve, completion of the Work prior to any completion date required by the Contract Documents or expiration of the Contract Time, no liability of the Owner to the Contractor for any failure of the Contractor to so complete the Work shall be created or implied.

Add the following new Section 8.3.5:

§8.3.5 Notwithstanding anything in this Section 8.3 or the Contract Documents to the contrary, no adjustment in the Contract Time or Contract Sum shall be permitted in connection with a concealed or unknown condition which does not differ materially from those conditions

disclosed or which reasonably should have been disclosed by the Contractor's (1) prior inspections, tests, reviews and preconstruction services for the Project, including without limitation any pre-bid site inspection; or (2) inspections, tests, reviews, and preconstruction services which the Contractor had the opportunity to make or should have performed in connection with the Project.

Add the following new Section 8.3.6:

§8.3.6 In the event that the Contractor, either directly or through the actions of its subcontractors or their respective agents, servants, or employees, causes damage or injury to the property or work of any other Multiple Prime Contractors or contractors, or otherwise causes a delay in any such party's work that causes such party to suffer additional expense or damage, then the parties involved in such dispute shall resolve the dispute or claim through agreement directly between them or by referring the claim or dispute to the American Arbitration Association. Such Arbitration shall be administered in accordance with its Construction Industry Arbitration Rules in effect on the date of the Agreement. Notice of the demand for arbitration shall be filed in writing with the other prime Contractor(s), and a copy shall be filed with the Architect and the Owner. The demand for arbitration shall be made within a reasonable time after the claim, dispute or other matter in question has arisen.

It is agreed by all parties that disputes or actions between contractors concerning the additional expense or damage described above shall not delay completion of the Work, which shall be continued by the parties, subject to the rights herein provided. It is agreed by the parties to the Contract (the Owner as promisee and the Contractor as promisor) that the intent of this clause is to benefit the other Multiple Prime Contractors on the project or related projects and to serve as an indication of the mutual intent of the Owner and the Contractor that this clause raise such other Multiple Prime Contractors to the status of third party beneficiaries only as to the terms and conditions of sections entitled Subcontractors and Disputes with the Owner. The Contractor agrees that these sections are provided as a benefit to the Contractor and that they specifically exclude claims against the Owner for delay or other damages. Owner shall not be named a party or joined in any arbitration to which this section applies.

The Contractor agrees that all claims, disputes and other matters in question between Multiple Prime Contractors, which arise out of, or are related to this Agreement or the breach thereof shall be finally settled by arbitration, unless the parties mutually agree otherwise. This agreement to arbitrate shall be in consideration of the fact that all Multiple Prime Contractors agree to this same arbitration provision as provided in each separate prime contract and that arbitration of all claims disputes and other matters in question shall be held within a reasonable time after the claim, dispute or other matter in question has arisen.

ARTICLE 9

Delete Section 9.1.1 in its entirety and replace with the following:

§9.1.1 The Contract Sum as stated in the Agreement and, including authorized adjustments, is the total amount payable by the Owner to the Contractor for performance of the

Work under the Contract Documents. In the event and to the extent that the Owner provides insurance in accordance with Article 11 of this Contract, the Contract Sum shall exclude the Contractors' and Subcontractors' related costs for the insurance being provided in accordance with Article 11.

Add the following to section 9.5.1 of the agreement:

§9.5.1.8 Failure to comply with Project Safety Requirements as set forth in the Project Safety and Health Management Plan.

Delete "repeated" from Section 9.5.1.7.

Delete the first sentence in Section 9.6.7 and replace with the following:

Payments received by the Contractor for Work properly performed by Subcontractors and suppliers shall be held by the Contractor for those Subcontractors and suppliers who performed Work or furnished materials, or both, under contract with the Contractor for which payment was made by the Owner.

Add the following to the end of Section 9.8.1:

; provided, however, that as a condition precedent to Substantial Completion, the Owner has received all certificates of occupancy and any other permits, approvals, licenses, and other documents from any governmental authority having jurisdiction thereof necessary for the beneficial occupancy of the Project and/or has been reasonably assured they will be provided within a reasonable time not to exceed thirty (30) days.

Add the following to the end of Section 9.10.1:

All warranties and guarantees required under or pursuant to the Contract Documents shall be assembled and delivered by the Contractor to the Owner and Architect as part of the final Application for Payment. The final Certificate for Payment will not be issued by the Owner's Representative until all warranties and guarantees have been received and accepted by the Owner.

Delete Section 9.10.2 in its entirety and replace with the following:

§9.10.2 Neither final payment nor any remaining retained percentage shall become due until the Contractor submits to the Architect (i) an affidavit that payrolls, bills for materials and equipment, and other indebtedness connected with the Work or which the Owner and Owner's property might be responsible or encumbered (less amounts withheld by Owner) have been paid or otherwise satisfied, (ii) consent of surety, if any, to final payment and (iii) if required by Owner, other data establishing payment or satisfaction of obligations, such as receipts, releases and waivers of liens, claims, security interests or encumbrances arising out of the Contract, to the extent and in such form as may be designated by the Owner. If a Contractor refuses to furnish a release or waiver required by the Owner, the Contractor may furnish a bond satisfactory to the Owner to indemnify the Owner against such lien. If such lien remains unsatisfied after payments are made,

the Contractor shall refund to the Owner all money that the Owner may be compelled to pay in discharging such lien, including all costs and reasonable attorneys' fees.

Add the following new Section 9.10.6:

§9.10.6 Owner shall not release/make final payment to the Contractor, nor shall the Contractor release/make final payment to any Subcontractor unless required payroll audits have been successfully completed as required by Section 11.1.9 of this Contract and the Contractor/Subcontractor is in compliance with the payroll reporting requirements included in the Project Insurance Manual.

ARTICLE 10

Delete Sections 10.2.1 through 10.2.8 in their entirety and replace with the following:

§10.2.1 The Contractor agrees to and shall comply with all of the terms, conditions and requirements set forth in the Project Safety and Health Management Plan for the Project ("the Plan") contained in the Owner's Invitation to Bid and which is incorporated herein by reference. Contractor further agrees to require each of its Subcontractors and sub-Subcontractors to comply with the Plan.

§§10.2.2 – 10.2.8 Omitted.

ARTICLE 11

Sections 11.1 through 11.5 are deleted in their entirety and replaced with the following:

§11.1 Insurance Provided by Owner

§11.1.1 Except as otherwise provided in this Contract, Owner shall, at its sole cost and expense, secure and hereafter maintain insurance of the type and in the limits set forth below. To the extent that the Contractor, Subcontractor, or the property of such persons or entities, are covered by such insurance, (i) the Contractor shall comply and shall require its Subcontractors to comply with the terms set forth in this Section 11.1; and (ii) the Contractor shall exclude, and shall require its Subcontractors to exclude, the cost and expense of maintaining duplicative insurance coverage in the Cost of Work.

§11.1.2 Except as otherwise specified in this Contract, Owner shall purchase and continuously maintain, until Substantial Completion or termination of this Contract, Builders Risk/Installation insurance, with limits no less than the Total Project Value. Policy shall include Hard and Soft Costs.

§11.1.2.1 Owner and contractor waive all rights against (i) Each other and the subcontractors, agents and employees of each other and (ii) Subcontractors, agents and employees, for damages caused by fire or other peril to the extent covered by the Builders Risk insurance obtained.

§11.1.2.2 Builders Risk Insurance shall include as Additional Insured, the Owner,

Contractor and Subcontractor of all tiers performing Work at the Project Site.

§11.1.3 Each Contractor and Subcontractor shall be responsible to pay the Builder's Risk policy deductible. If the claim, however, is caused by CCAC or another Contractor/Subcontractor, the negligent party will be held responsible for the deductible payment. If the negligent party is not CCAC or another Contractor/Subcontractor, each Contractor and Subcontractor shall be responsible to pay the Builder's Risk policy deductible. Payment towards the Builder's Risk deductible will be shared in proportion to direct loss.

§11.1.4 Loss, if any, under this Builder's Risk insurance shall be adjusted with Owner, Lenders, and/or Trustees, with the cooperation of Contractor and Subcontractors. Insurance proceed checks shall be made payable to the Owner or its Lenders or Trustees. Amounts shall be disbursed, when and if appropriate, to the Contractor or Subcontractors through the Change Order procedures described in this Contract.

§11.2 Contractor and Subcontractor Provided Insurance

§11.2.1 The Contractor shall provide the following insurances as well as those on Exhibit B in the Invitation to Bid and, upon request, supply proof of the following insurances to the Owner or its designee.:

§11.2.1.1 Automobile Liability insurance covering all owned, non-owned, and hired vehicles used by Contractor and Subcontractors for all operations both on and off the Project Site, with a minimum limit of One Million Dollars (\$1,000,000) Combined Single Limit Per Accident for Bodily Injury and Property Damage.

§11.2.1.2 Professional Liability insurance if Contractor (or applicable Subcontractors) will perform or retain others to perform professional services in connection with the Work, including engineering, architectural, medical, testing, environmental assessment or remediation, or design-build services, with a minimum limit of Two Million Dollars (\$2,000,000) Per Wrongful Act, Error, or Omission, and a minimum Two Million Dollars (\$2,000,000) Annual Aggregate Limit.

§11.2.1.3 Asbestos and/or Lead Abatement. Asbestos and/or Lead Abatement Liability Insurance with limits of Ten Million Dollars (\$10,000,000) Each Occurrence and Ten Million Dollars (\$10,000,000) Aggregate when Work includes asbestos and/or lead abatement activities.

§11.2.1.4 Commercial General Liability. The Commercial General Liability Coverage shall not be provided under a "Claims-Made" or "Modified Occurrence" policy without the prior, expressed written consent of Owner. Such insurance: (i) shall include by its terms or appropriate endorsements Bodily Injury, Property Damage, Personal Injury, Blanket Contractual, Independent Contractors, Products and Completed Operations coverages for 5 years; (ii) shall include Products Liability coverage for any products manufactured, assembled, or otherwise worked upon away from the Project Site; and (iii) shall include coverage for "x" (explosion), "c" (collapse), and "u" (underground) exposures. Such insurance shall have the following minimum limits:

For the Contractor:

\$1,000,000 Each Occurrence;
\$1,000,000 General Aggregate per Project; and
\$1,000,000 Products/Completed Operations Aggregate (5 Years)

For all Subcontractors:

\$1,000,000 Each Occurrence;
\$1,000,000 General Aggregate per Project; and
\$1,000,000 Products/Completed Operations Aggregate (5 Years)

§11.2.1.5 Worker's Compensation insurance providing statutory benefit limits under applicable state law and minimum limits under Coverage Part B (Employer's Liability) of Five Hundred Thousand Dollars (\$100,000) for Each Accident for Bodily Injury by Accident, Five Hundred Thousand Dollars (\$100,000) Each Employee for Bodily Injury by Disease, and Five Hundred Thousand Dollars (\$500,000) Policy Limit for Bodily Injury by Disease.

§11.2.1.6 Umbrella Liability insurance with limits of Five Million Dollars (\$5,000,000) Per Occurrence and Five Million Dollars (\$5,000,000) Aggregate. The Products/Completed Operations Aggregate of Five Million Dollars (\$5,000,000), including a 10 Year Completed Operations Extension.

§11.2.1.7 The Owner, the Architect, and its Consultants shall be named as Additional Insureds on all insurance policies except for Workers' Compensation and Professional Liability. Coverage afforded to the Owner, the Architect and its Consultants, as Additional Insureds under said policies shall be primary to any insurance carried by Owner, the Architect or its Consultants.

§ 11.2.1.8 The Contractor shall not subcontract any portion of the Contract unless the Subcontractor has presented satisfactory evidence of insurance required under Section 11.2.1.

§11.3 General Provisions Relating to Insurance

§11.3.1 All insurance required by this Contract shall be from insurance companies authorized to transact that class of insurance in the Commonwealth of Pennsylvania and having a minimum rating of (or equivalent to) A- VIII by A.M. Best & Company. When required, certificates must be personally and manually signed by the authorized representative of the insurance company shown on the certificate with proof that he/she is an authorized representative thereof and provided to the Owner's representative as evidence of insurance required in accordance with Section 11.2 herein. In addition, certified, true and exact copies of all insurance policies required by this Contract shall be provided by Contractors and Subcontractors within a reasonable period of time upon written request.

§11.3.2 All of the insurance provided by the Contractor, Subcontractors and Owner under the terms of this Contract shall provide primary coverage with respect to the Work, unless noted otherwise herein. Any other insurance maintained by Owner, Contractor, or Subcontractor shall be in excess of this insurance and shall not contribute to it.

§11.3.3 The issuing insurers will provide thirty (30) Days written notice to the

Owner and Contractor of any cancellation, intent not to renew, or reduction in the policies' coverage except in the application of the Aggregate Limit Provisions.

§11.3.4 The insurance coverages and limits required under this Contract are designed to meet the minimum requirements of the Owner. They are not designed as a recommended insurance program for the Contractor or its Subcontractor; and meeting these minimum requirements does not relieve such persons or entities of their obligations under any other Section of this Contract. The Contractor shall not be prevented from acquiring, at its own expense, any other additional insurance coverages it deems necessary for the protection of its Work under the Contract.

§11.3.5 The amounts and types of insurance required by the Contract shall conform to the minimum requirements set forth in this Article 11, utilizing Insurance Services Office (ISO) policies and endorsements where applicable.

§11.3.6 All of the insurance required by this Article 11 shall be issued as required by law and shall be endorsed, where necessary, to comply with the minimum requirements contained herein.

§11.3.7 Owner may elect at any time during the term of this Contract to require Contractor to procure and maintain other or additional insurance. Notice of such election shall be given at least Sixty (60) Days prior to the effective date of the required modifications. Any additional costs incurred by the Contractor or Subcontractors in securing said other or additional insurance shall be reimbursed by the Owner as part of the Cost of the Work, and the Contract Price shall be revised by Change Order to be increased by the amount of such additional cost.

§11.3.8 Owner and Contractor waive all rights against (i) each other and the Subcontractors, agents and employees of each other and (ii) Subcontractors, agents and employees, for damages caused by fire or other peril to the extent covered by the Builder's Risk insurance obtained pursuant to Section 11.1.2 hereof, Commercial General Liability insurance obtained pursuant to Section §11.2.1.4 hereof, or Umbrella Liability insurance obtained pursuant to Section §11.2.1.6 hereof; except such rights as each may have to proceeds of such insurance held by any party to this Agreement or by any Subcontractor. The insurance policies obtained by Owner pursuant to this Article 11 shall include a waiver of subrogation in favor of the Contractor and Subcontractors and the insurance policies obtained by Contractor or Subcontractors pursuant to this Article 11 shall include a waiver of subrogation in favor of the Owner. Without limiting the generality of the foregoing, it is specifically agreed that there is and shall be no waiver of subrogation by Owner or Owner's other Property and Casualty insurer(s) for claims, damages, or losses of whatever nature or type that are insured by any insurance obtained either by Owner, the Contractor, or any Subcontractor of any tier pursuant to any of the provisions of this Agreement. In all events, any insurance obtained by the Owner, Contractor or any Subcontractor of any tier pursuant to this Agreement shall be primary and the policies possessed by Owner, Contractor or any Subcontractor of any tier for purposes of fulfilling the insurance obligations under this Agreement shall be written as primary.

Renumber Section 11.1.2 as 11.4.1 and 11.1.3 as 11.4.2

ARTICLE 12

Add at the end of Section 12.2.1:

If prior to the date of Substantial Completion, the Contractor, a Subcontractor or anyone for whom either is responsible uses or damages any portion of the Work, including, without limitation, mechanical, electrical, plumbing and other building systems, machinery, equipment or other mechanical device, the Contractor shall cause such item to be restored to “like new” condition at no expense to the Owner.

Delete the second and third to last sentences of Section 12.2.2.1.**Delete the word “not” from the first line of Section 12.2.2.3.****ARTICLE 13****Delete Section 13.1 and replace with the following:**

§13.1 The Contract shall be governed by the substantive law of the Commonwealth of Pennsylvania, without regard to its choice of law provisions.

ARTICLE 14**Replace “30” in the first sentence of Section 14.1.1 with “90”.**

Add the following to the end of Section 14.1.1 – Upon such termination, the Contractor shall recover as its sole remedy payment in accordance with the schedule of values for scheduled Work completed in compliance with the Contract Documents. Under no circumstances shall the Contractor be entitled to and Contractor expressly waives entitlement to any overhead, profit, or fee for services not performed.

Add “an undisputed” before the word “payment” in line 2 of Section 14.1.1.3.**Delete Section 14.1.1.4.****Delete Section 14.1.2 and indicate “Section 14.1.2 - Not Used”****Delete the reference to Section 14.1.2 in Section 14.1.3.**

Delete “and recover from the Owner payment for Work executed, as well as reasonable overhead and profit on Work no executed, and costs incurred by reasons of such termination” from the end of Section 14.1.3.

Delete Section 14.1.4.**Delete the word “repeatedly” from Section 14.2.1.1.****Delete the word “repeatedly” from Section 14.2.1.3.**

Add the following to Section 14.2.1:

§14.2.1.5 substantially breaches any warranty made by the Contractor under or pursuant to the Contract Documents.

§14.2.1.6 fails to furnish the Owner with assurances satisfactory to the Owner evidencing the Contractor's ability to complete the Work in compliance with all the requirements of the Contract Documents; or

§14.2.1.7 fails after commencement of the Work to proceed continuously with the construction and completion of the Work for more than ten (10) days, except as permitted under the Contract Documents.

Delete “, and upon certification by the Architect that sufficient cause exists to justify such action” from Section 14.2.2.

Delete the word “detailed” from Section 14.2.2.3.

Add the following to the end of Section 14.3.1: “Contractor shall promptly resume the Work upon Owner’s written direction. The contract time shall be reasonably adjusted for increases in the time to complete the Work caused by suspension, delay, or interruption.”

Delete Section 14.3.2.

Delete Sections 14.4, 14.4.1, 14.4.2 and 14.4.3 in their entirety and replace with the following:

§14.4 Owner’s Termination for Convenience

§14.4.1 The Owner may, at any time, terminate the Contract in whole or in part for the Owner’s convenience and without cause. Termination by the Owner under this Paragraph shall be by a notice of termination delivered to the Contractor specifying the extent of termination and the effective date.

§14.4.2 Upon receipt of a notice of termination for convenience, the Contractor shall immediately, in accordance with instructions from the Owner, proceed with performance of the following duties regardless of delay in determining or adjusting amounts due under this Paragraph:

- .1 cease operation as specified in the notice;
- .2 place no further orders and enter into no further subcontracts for materials, labor, services or facilities except as necessary to complete continued portions of the Contract;
- .3 terminate all subcontracts and orders to the extent they relate to the Work terminated;
- .4 proceed to complete the performance of Work not terminated; and

.5 take actions that may be necessary, or that the Owner may direct, for the protection and preservation of the terminated Work.

§14.4.3 Upon such termination, the Contractor shall recover as its sole remedy payment in accordance with the schedule of values for scheduled Work completed in compliance with the Contract Documents. Under no circumstances shall the Contractor be entitled to and Contractor expressly waives entitlement to any overhead, profit, or fee for services not performed.

As an express condition precedent to any payment obligation on the part of Owner, Contractor shall present Owner with a detailed itemized listing of any and all amounts due and owing from and/or paid by Contractor to any person or entity in connection with this Project. Such detailed itemization shall attach all backup for such obligations and proof of payment (if such amount was actually paid). Failure to provide a complete and accurate itemization and backup shall be considered a material breach of this Agreement and shall entitle Owner to withhold payment in amounts necessary to adequately protect Owner's interests and to seek any remedy available by law.

Owner expressly reserves the right to issue payment for any unpaid item required to be set forth in the detailed itemization provided for above by way of a joint check made out to both Contractor and the person or entity owed such amounts. The amount of such joint check shall be deducted from any direct payment to the Contractor. Issuance of a joint check shall not shift the ultimate responsibility for such payment from the Contractor to the Owner.

Such rights and protections are solely intended for Owner's protection and benefit. Owner is under no obligation to exercise such rights or enforce such protections. Owner shall not be deemed to have waived any obligation on the part of Contractor by choosing not to exercise such rights or enforcing such protections. Nothing in this Agreement is intended to confer third party beneficiary status upon any subcontractor or other entity.

§14.4.4 The Owner shall be credited for (1) payments previously made to the Contractor for the terminated portion of the Work, (2) claims which the Owner has against the Contractor under the contract and (3) the value of the materials, supplies, equipment or other items that are to be disposed of by the Contractor that are part of the Contract Sum.

ARTICLE 15

Delete Section 15.1.2 in its entirety and replace with the following:

§15.1.2 Causes of action between the parties to this Agreement pertaining to acts or failures to act shall be deemed to have accrued and the applicable statutes of limitations shall commence to run either on the date of Substantial Completion (for acts or failures to act occurring prior to Substantial Completion of which the Owner was aware as a result of notice by the Architect) or upon the Owner's discovery of damages to the Owner or the Project resulting in any part from the act or failure to act by the Contractor, whichever is later.

Delete Section 15.1.7 in its entirety and replace with the following:

§ 15.1.7 In no event shall Owner, its employees or agents be liable for any special, incidental, indirect or consequential damages (or equivalents thereof no matter how claimed, computed or characterized) arising out of or in connection with this Contract or Owner's performance or breach thereof, regardless of whether any such liability shall be claimed in contract, warranty, equity, tort (including negligence, gross negligence and strict tort liability) or otherwise. Consequential damages excluded hereunder include, but are not limited to, damages incurred by Contractor for principal office expenses including the compensation of personnel retained there, for losses of financing, business and reputation, and for loss of profit except anticipated profit directly resulting from the Work and included in the Contract price.

Add the following after “subject to mediation” in Section 15.2.5: “(at Owner’s sole and absolute discretion)”

Add the following to the end of Section 15.2.5:

If mediation or arbitration is not demanded and filed for within 90 days of the Initial Decision Maker’s initial decision approving or rejecting the claim, the initial decision will be final, binding, non-reviewable, and non-appealable.

Delete Sections 15.2.6 and 15.2.6.1

Delete Sections 15.3 and 15.4 in their entirety and replace with the following:

§ 15.3 Mediation

§ 15.3.1 At the Owner’s sole and absolute discretion, the Owner may elect that claims, disputes and other matters in question between Owner and Contractor first attempt to be resolved by mediation which, unless the parties mutually agree otherwise, shall be administered by the American Arbitration Association in accordance with its Construction Industry Mediation Procedures in effect on the date of the Agreement. Owner’s request for mediation shall be made in writing, delivered to the Contractor, and filed with the person or entity administering the mediation. The request may be made concurrently with the filing of a complaint or other appropriate demand for binding dispute resolution but, in such event, mediation shall proceed in advance of binding dispute resolution proceedings, which shall be stayed pending mediation for a period of 60 days from the date of filing, unless stayed for a longer period by agreement of the parties or court order. If an arbitration proceeding is stayed pursuant to this section, the parties may nonetheless proceed to the selection of the arbitrator(s) and agree upon a schedule for later proceedings.

§ 15.3.2 The parties shall share the mediator’s fee and any filing fees equally. The mediation shall be held in Pittsburgh, Pennsylvania, unless another location is mutually agreed upon. Agreements reached in mediation shall be enforceable as settlement agreements in any court having jurisdiction thereof.

§ 15.4 Arbitration

§ 15.4.1 Any claim, dispute or other matter in question arising out of or related to this Agreement subject to, but not resolved by, mediation shall be subject to arbitration which,

unless the parties mutually agree otherwise, shall be administered by the American Arbitration Association in accordance with its Construction Industry Arbitration Rules in effect on the date of this Agreement. A demand for arbitration shall be made in writing, delivered to the other party to this Agreement, and filed with the person or entity administering the arbitration. Any such arbitration shall be held in Pittsburgh, Pennsylvania. The discovery process shall be limited by the following: 1. Where the dispute is less than \$50,000, there shall be no discovery other than exchange of documents. 2. Where the dispute is over \$50,000 but less than \$250,000, discovery shall consist of no more than two (2) deposition(s) per party of seven (7) hours or less and an exchange of documents. 3. For disputes in excess of \$250,000, discovery shall be limited to the number and length of depositions as determined by the arbitrator(s) and an exchange of documents. All objections are reserved for the arbitration hearing except for objections based on privilege and proprietary or confidential information. Notwithstanding anything herein to the contrary, however, for disputes between the parties involving one or more claims that, in the aggregate, exceed \$250,000, Owner reserves the option to elect to litigate any controversies or claims in the appropriate state or federal court located in Allegheny County, Pennsylvania, which venue shall be the exclusive forum for any and all such litigation. Contractor agrees to the jurisdiction of such courts located in Allegheny County, Pennsylvania over it and expressly waives any such challenge to jurisdiction or venue.

§ 15.4.1.1 A demand for arbitration shall be made no earlier than concurrently with the filing of a request for mediation, but in no event shall it be made after the date when the institution of legal or equitable proceedings based on the claim, dispute or other matter in question would be barred by the applicable statute of limitations. For statute of limitations purposes, receipt of a written demand for arbitration by the person or entity administering the arbitration shall constitute the institution of legal or equitable proceedings based on the claim, dispute or other matter in question.

§ 15.4.2 The foregoing agreement to arbitrate and other agreements to arbitrate with an additional person or entity duly consented to by parties to this Agreement shall be specifically enforceable in accordance with applicable law in any court having jurisdiction thereof.

§ 15.4.3 The award rendered by the arbitrator(s) shall be final, and judgment may be entered upon it in accordance with applicable law in any court having jurisdiction thereof.

§ 15.4.4 Consolidation or Joinder

§ 15.4.4.1 Either party, at its sole discretion, may consolidate an arbitration conducted under this Agreement with any other arbitration to which it is a party provided that (1) the arbitration agreement governing the other arbitration permits consolidation, (2) the arbitrations to be consolidated substantially involve common questions of law or fact, and (3) the arbitrations employ materially similar procedural rules and methods for selecting arbitrator(s). Notwithstanding the foregoing, no proceeding in which the Owner is a party shall be consolidated with any proceeding brought pursuant to Section 8.3.6 herein.

§ 15.4.4.2 Either party, at its sole discretion, may include by joinder persons or entities substantially involved in a common question of law or fact whose presence is required if complete relief is to be accorded in arbitration, provided that the party sought to be joined consents in writing to such joinder. Consent to arbitration involving an additional person or entity shall not constitute consent to arbitration of any claim, dispute or other matter in question not described in the written

consent. Notwithstanding the foregoing, the Owner shall not be joined as party to any proceeding brought pursuant to Section 8.3.6 herein.

COMMUNITY COLLEGE OF ALLEGHENY COUNTY

GENERAL CONDITIONS

FOR

CONSTRUCTION AND RENOVATION CONTRACTS

1. PERMITS

It is the responsibility of the contractor to obtain all permits and/or licenses required by Federal, State, County, City, or other local Municipalities or Authorities for work done or services performed under this contract.

2. ROLE OF CONTRACTOR

In the performance of the work hereunder, the contractor shall act as an independent contractor, and all of his agents, employees, and subcontractors shall be subject solely to the control, supervision, and authority of the contractor.

3. EMPLOYEES OF THE CONTRACTOR

It is understood that the contractor in signing the contract will employ only competent and first-class workmen and mechanics; that no workmen shall be regarded as competent and first-class except those who are duly skilled in their respective branches of labor.

4. BONDS

The College will accept only bonds written by surety companies authorized to do business in the Commonwealth of Pennsylvania and the County of Allegheny and included on the United States Treasury Department Annual List of Surety Companies published July first of each year. Limits for those companies appearing on the United States Treasury Department's list cannot be exceeded. This list is available for inspection in the Purchasing Department, Community College of Allegheny County, Administration Building, 800 Allegheny Avenue, Pittsburgh, Pennsylvania 15233. It is also available from the Surety Bond Branch, Financial Management Services, Department of the Treasury, Washington, D.C. 20226. Phone: 1.202.634.2214.

5. EQUAL OPPORTUNITY

Contractor and all subcontractors shall not discriminate against any employee or applicant for employment because of race, color, creed, national origin, or sex. Contractor and all subcontractors shall also comply with all applicable Federal, State, and local Fair Employment Practice Acts, or similar Acts, Rules, and Regulations and whether or not applicable will comply with the Federal Civil Rights Act of 1964. The Terms and Provisions of Executive Order 11246 and any Executive Order modifying or superseding same, are incorporated herein with respect to any work subject thereto.

The contractor and all subcontractors shall, in all solicitations or advertisements for employees placed by them or their behalf state all qualified applicants will receive consideration for employment without regard to race, religion, color, sex, or national origin.

6. MINORITY & DISADVANTAGED PARTICIPATION GOALS

The College's goal is to obtain 20% MBE/WBE/DBE (13% Minority-owned Business enterprise/7% Woman-owned Business Enterprise/Disadvantaged Business Enterprise) participation in the work. This is to be based on the dollar value of employment, subcontracts, supplies, goods, and services as a percentage of the total contract amount. The bidder/contractor must demonstrate to the College prior to award of the contract, and periodically thereafter throughout the term of the contract, their compliance and continued ability to comply with these goals.

The contractor shall submit with their bid (on Return Form 4.0) a completed Minority & Disadvantaged Contractor Commitment Plan that will contain the details of how they plan to comply with this goal should they be awarded the contract.

If the plan is not submitted in the bid or is not acceptable, the College may deem the bid non-responsive and may award the work to the next lowest responsive bidder with an acceptable plan. Thus, it behooves all bidders to formulate their M/W/DBE plan before submitting a bid.

Finding Certified M/W/DBE's - All subcontractors and suppliers of goods and services used to comply with this goal must be **certified** minority or disadvantaged firms. They may be certified by any recognized and reputable organization such as the following: African American Chamber of Commerce, Allegheny County, Port Authority of Allegheny County, City of Pittsburgh, Pittsburgh Regional Minority Purchasing Council, Commonwealth of Pennsylvania, United States Federal Government.

If the firm is not certified and desires to be certified, it is suggested that they contact one of the following organizations. These organizations may also be used as references for sourcing M/W/DBE firms.

Allegheny County
M/W/DBE Department
County Office Building Rm 204
542 Forbes Avenue
Pittsburgh, Pennsylvania 15219
412.350.4309

EMSDC

Pittsburgh, Pennsylvania
412.391.4423

Diversity Business Resource Center
700 River Avenue Suite 231
Pittsburgh, PA 15212
412.322.3272

African American Chamber of Commerce
Koppers Building
436 Seventh Avenue, Suite 2220
Pittsburgh, PA 15219
412.391.0610

A list of PA certified M/W/DBE firms can be found on the Internet at <http://www.paucp.com>.

The College expects all firms to demonstrate a good faith effort to include M/W/DBE's when bidding on College contracts. A good faith effort as defined by the Code of Federal Regulations (49CFR26) means *"efforts to achieve a DBE goal or other requirement of this part which, by their scope, intensity, and appropriateness to the objective, can reasonably be expected to fulfill the program requirement"*.

If you are not successful in securing M/W/DBE participation after a good faith effort is made, provide the following in your waiver request:

- A detailed account of your efforts;
- Your normal business practice and/or inventory profile; and
- An active diversity plan/policy

Reporting During and After Project Completion - The contractor shall submit with their monthly application for payment a written M/W/DBE Contractor Report demonstrating their compliance with the goal. The report shall state the dollar amount spent on labor, materials, services, and subcontracts and shall list firm names and vendor names. At the completion of the project, with final application for payment, the contractor shall submit a recap of their compliance which shall state the dollar amount spent on labor, materials, subcontracts, and services as a percentage of the total contract amount. Projects with shorter timeframes shall require a one-time only report at the completion of the project. Reports are to be accompanied by back-up documentation evidencing the business relationship with the M/W/DBE for the particular project (e.g.: copies of invoices, purchase orders, or evidence of payments).

Failure to Comply With M/W/DBE Goals – If the contractor fails to make a good faith effort (as determined by the College) to comply with the College's 20% M/W/DBE goal or fails to meet their M/W/DBE commitment or to submit documentation as required by the College, the College may consider such non-compliance or breach of contract and any one or more of the following may occur:

- Rejection of the bid
- Forfeiture of bid guaranty
- Termination of the contract
- The imposing of sanctions as deemed appropriate by the College
- Contractor being barred from bidding on College contracts for up to three (3) years
- Or such other remedy as the College deems appropriate

7. FINANCIAL INTEREST

All bidders for construction must be established firms competent to perform the required scope of work. All bidders must satisfy the Community College of Allegheny County that they have the requisite organization, capital, plant, stock, ability, and experience to satisfactorily execute and contract in accordance with the provisions of the contract in which they are interested.

If the contractor's base bid is \$25,000.00 or more, the American Institute of Architects form, "Contractors Qualification Statement" form A305 - 1986 (or latest revision) may be requested by CCAC. This form is available from the American Institute of Architects, 1735 New York Avenue N.W., Washington, D.C. 20006. If requested by CCAC, a completed form A305 is to be submitted within 48 business hours and may be faxed to 412.237.3195.

8. EMPLOYMENT OF INDEPENDENT SUBCONTRACTORS

If you are a contractor to the College and the value of the base contract is \$25,000.00 or more, you must secure approval of all proposed subcontractors from the College prior to beginning work. Information on your proposed subcontractors is to be submitted on the form entitled Proposed Subcontractors.

Each proposed subcontractor to be employed must be an independent contractor "in fact" and must meet the following criteria:

- a. The subcontractor must have a Federal identification number.
- b. The subcontractor must perform these same services for others.
- c. The subcontractor must have an established place of business.
- d. The subcontractor must use their own tools and equipment.
- e. The subcontractor must pay all taxes and other items required by law to be paid by an employer with respect to compensation paid to their employees.
- f. The subcontractor must provide and maintain all insurance required by law and the College.

If the proposed subcontractor does not meet all of these criteria, they will not be approved.

9. VERBAL AUTHORIZATIONS

No verbal agreement or understanding with any officer, agent, or employee of the College either before or after the execution of the contract shall alter, amend, modify, or rescind any of the terms or provisions contained in any of the contract documents. This provision shall not limit or affect the right to make changes or variations in the work. Any changes must be authorized in writing.

10. APPLICABLE LAW, ACTS, AND ORDINANCES

The contractor(s) shall agree to abide by and be bound by all applicable provisions and regulations of all laws, acts, and ordinances relating to and regulating the hours and conditions of employment.

11. PENNSYLVANIA PREVAILING WAGE ACT

The Pennsylvania Prevailing Wage Act shall be incorporated into and made part of all College construction related contract(s) having an estimated value of \$25,000.00 or more.

It is the responsibility of the contractor to ensure that they have included the appropriate Pennsylvania prevailing wage rates in their proposal to the College. Failure to do this will not be a reason for the contractor to withdraw their bid or fail to perform the contract or to request additional payments from the College.

In accordance with the Prevailing Wage Determination Act, the contractor(s) shall:

- a. Pay no less than the wage rates including contributions for employee benefits as determined in the decision of the Secretary of Labor and Industry and shall comply with the conditions of the Pennsylvania Prevailing Wage Act approved August 15, 1961 (Act No. 442) as amended August 9, 1963 and/or subsequent amendments thereof (Act No. 342) and the regulations issued pursuant thereto.
- b. Apply all applicable provisions of the Acts and Laws to all work performed on the contract by the contractor(s) and subcontractor(s).
- c. Insert in each of his subcontracts all of the stipulations contained in these required provisions and such other stipulations as may be required.
- d. Assure that no workmen be employed on the public work except in accordance with the classifications set forth in the decisions of the Secretary. In the event that additional or different classifications are necessary, the procedure set forth in Section 7 of the above referenced Regulations shall be followed.
- e. Assure that all workmen employed or working on this contract shall be paid unconditionally regardless of whether any contractual relationship exists or the nature of any contractual relationship which may be alleged to exist between any contractor, subcontractor, and workmen not less than once a week without deduction or debate on any account either directly or indirectly except authorized deductions, the full amounts due at the time of payment computed at the rates applicable to the time worked on the appropriate classification. Nothing in this contract, the Act or these Regulations, prohibits the payment of more than the general prevailing minimum wage rates as determined by the Secretary to any workmen on public work.
- f. Each subcontractor shall post for the entire period of construction the wage determination decisions of the Secretary including the effective date of any charges thereof in a prominent and easily accessible place or places at the site of the work and at such place or places used by them to pay workmen their wages. The posted notice of wage rates must contain the following information:
 1. Name of project.
 2. Name of public body for which it is being constructed.
 3. The crafts and classifications of workmen listed in the Secretary's general prevailing minimum wage rate determination for the particular project.

4. The general prevailing minimum wage rates determined for each craft and classification and the effective date of any changes.
 5. A statement advising workmen that if they have been paid less than the general prevailing minimum wage rate for their job classification or that the contractor and/or subcontractor are not complying with the Act or these Regulations in any manner whatsoever they may file a protest with the Secretary of Labor and Industry. Any Workmen paid less than the rate specified in the contract shall have a civil right of action for the difference between the wage paid and the wages stipulated in the contract, which right of action must be exercised within six months from the occurrence of the event creating such right.
- g. All subcontractors shall keep an accurate record showing the name, craft, and/or classification, number of hours worked per day, and the actual hourly rate of wage paid (including employee benefits) to each workman employed by him in connection with the public work and such record must include any deductions from each workman. The record shall be preserved for two years from the date of payment and shall be open at all reasonable hours to the inspection of the public body awarding the contract and to the Secretary or his duly authorized representative.
 - h. Assure that apprentices shall be limited to such numbers as shall be in accordance with a bonafide apprenticeship program registered with and approved by the Pennsylvania Apprenticeship and Training Council and only apprentices whose training and employment are in full compliance with the provisions of the Apprenticeship and Training Act approved July 14, 1961 (Act No. 304) and the Rules and Regulations issued pursuant thereto shall be employed on the public work project. Any workman using the tools of a craft who does not qualify as an apprentice within the provisions of this subsection shall be paid at the rate predetermined for journeymen in that particular craft and/or classification.
 - i. Pay wages without any deductions except authorized deductions. Employers not parties to a contract requiring contributions for employee benefits which the Secretary has determined to be included in the general prevailing minimum wage rate shall pay the monetary equivalent thereof directly to the workmen.
 - j. Be advised that payment of compensation to workmen for work performed on public work on a lump sum basis, or a piece work system, or a price certain for the completion of a certain amount of work, or the production of a certain result shall be deemed a violation of the Act and these Regulations regardless of the average hourly earnings resulting therefrom.
 - k. Each subcontractor shall file a statement each week and a final statement at the conclusion of the work on the contract with the contracting agency under oath and in form satisfactory to the Secretary certifying that all workmen have been paid wages in strict conformity with the provisions of the contract as prescribed by Section 3 of these Regulations; or, if any wages remain unpaid, to set forth the amount of wages due and owing to each workman respectively. The College shall require the contractor and all subcontractors to file weekly wage certifications utilizing form WH-347. (Reference: Section 10(a) of Act and Section 10 of Regulations). Prior to making final payment the College will require final wage certifications from all contractors and subcontractors.

12. PAYMENT TO CONTRACTORS

The College maintains the right to withhold a percentage of monies requested by contractors for work done under this contract in accordance with the American Institute of Architects Application for Payment form G-702 as indicated in Section 01152--Applications for Payment of the technical specifications.

13. INSURANCE REQUIREMENT

A properly executed certificate of insurance must be submitted with the signed Contract Articles of Agreement. The certificate of insurance must show that the contractor and subcontractors comply with the College's insurance requirements. The certificate of insurance must state that in the event any coverage shown is to be cancelled the College will be given a thirty day advance notice of the cancellation.

14. MINORITY BIDDERS

The Community College of Allegheny County hereby notifies all bidders that it will affirmatively ensure that minority business enterprises will be afforded full opportunity to submit bids in response to this invitation and will not be discriminated against on the grounds of race, color, or national origin in consideration for an award.

15. MODIFICATION AND WITHDRAWAL OF BIDS

- a. Bids may be modified or withdrawn by an appropriate document duly executed (in the manner that a Bid must be executed) and delivered to the place where Bids are to be submitted at any time prior to the opening of Bids.
- b. Bidders may withdraw their bid within two (2) business days of the bid opening only within accordance of Commonwealth of Pennsylvania public bidding law.

16. TAXES

CCAC is a governmental entity and is generally exempt from sales and use tax with respect to purchases of building machinery and equipment. A tax exemption certificate will be provided upon request. It is the bidder's responsibility to pay any/all applicable taxes on non-exempt equipment, supplies and services in accordance with applicable law.

17. PENNSYLVANIA STEEL PRODUCTS PROCUREMENT ACT

Contractor acknowledges that CCAC is a public agency subject to the requirements of the Pennsylvania Steel Products Procurement Act, 73 P.S. Section 1881 et. seq (the "SPPA"). Contractor therefore represents and warrants that any and all steel products purchased, used or supplied by it in the performance of the Contract will be melted and manufactured in the United States, and that its performance hereunder will otherwise comply with requirements of the SPPA at all times. Contractor further agrees to provide CCAC with documentation and/or certification of its compliance with the foregoing requirements, as required under the SPPA, and acknowledges that it shall not be entitled to receive payment hereunder until such documentation and/or certification has been provided.

18. MARKUPS ON CHANGE ORDERS

Markups on change order requests shall not exceed 15%. This would apply to overhead and profit, labor, materials, equipment, etc.

Project Labor Agreement

February 15, 2011

ARTICLE I

INTENT AND DURATION

Section 1. Intent and Duration. This Project Labor Agreement (the "Agreement") is entered into between the Community College of Allegheny County ("CCAC"); [Name of Contractor] as [Trade] Contractor and the Pittsburgh Regional Building and Construction Trades Council of Pittsburgh, AFL-CIO ("BCTC"); and the Signatory Unions (the "Unions") and applies exclusively to the construction work within the scope of this Agreement to be performed on the CCAC's BID PROPOSAL. (the "Project"). The purpose of this Agreement is to promote efficiency in the construction of the Project and to provide for the peaceful settlement of any and all labor disputes and grievances without strikes or lockouts, thereby promoting the public interest in assuring the timely and economical completion of the Project

Upon execution of this Agreement by all parties, all construction work covered by this Agreement on the Project shall be contracted exclusively to Contractors who agree to execute and be bound by the terms of this Agreement. The Unions agree that other Contractors may execute the Agreement for purposes of performing such work. The Prime Contractors shall monitor compliance with this Agreement by all contractors, who through their execution of a Letter of Assent hereto, together with their subcontractors, shall become bound hereto. For purposes of this Agreement, the term "Contractor" shall be deemed to include all Prime construction contractors and subcontractors of whatever tier engaged in on-site construction work on the Project.

The Prime Contractors, the Unions and all signatory Contractors agree to abide by the terms and conditions contained in the Agreement. This Agreement represents the complete understanding of all parties, and no Contractor is or will be required to sign any other agreement with a signatory union as a condition of performing work coming within the scope of this Agreement. No practice, understanding or agreement between a Contractor and a Union which is not specifically set forth in this Agreement will be binding on any other party unless endorsed in writing by the Prime Contractor.

Section 2. Limitation of Agreement to Project The Unions agree that this Agreement will be made available to, and will fully apply to, any successful bidder for work on the Project, without regard to whether that successful bidder performs work at other sites on either a union or a non-union basis, and without regard to whether employees of such bidder are or are not members of any union. The Unions further agree that this Agreement applies only to this Project, and that by signing the Letter of Assent hereto, a Contractor, not previously in signed agreement with the Unions, does not recognize the Unions as the bargaining representative of any of its employees at any other project, site or location. It is the intent of this Agreement that Contractors who sign it will create a relationship with the Unions governed by the provisions of Section 8(f) of the Labor Management Relations Act, 29 U.S.C. §158(f).

ARTICLE II

PURPOSE

Section 1. Purpose. The parties signatory to this Agreement accordingly pledge their complete good faith and trust to work towards an absolutely on-time completion of the Project. The signatory parties further pledge to demonstrate nationally that Western Pennsylvania enjoys a mature labor relations climate and continues to be the number one location in the United States to live and work.

Section 2. Time is of the Essence. The parties to this Agreement understand and agree that time is of the essence for this Project. The parties understand and agree that the CCAC and the Prime Contractors have a critical need for timely completion of the Project, as the Project must be completed prior to (SEE SPECIFICATIONS). Timely completion of the Project without interruption or delay is therefore vital. The parties understand and agree that timely construction of the Project will require substantial numbers of employees from construction and supporting crafts possessing skills and qualifications that are essential to its completion; the Unions pledge that they have members who are competent, skilled, and qualified to perform the required construction work. The parties also understand that on-budget completion of the Project is most critical; it is therefore essential that construction work on the Project be done in an efficient, economical manner with optimum productivity and no delays. In recognition of those special needs of the Project, Unions signatory hereto and their members agree not to initiate, authorize, sanction, participate in or condone, or permit their members to engage in, any strike, sympathy strike, jurisdictional strike, recognition strike, slowdown, sabotage, work to rule, sickout, sit down, picketing of any type (including informational picketing), hand billing, boycott, interruption of work or any disruptive activity that interferes with or interrupts in any way work on the Project. Contractors agree not to engage in any lockouts.

ARTICLE III

BENEFITS OF THE AGREEMENT

Section 1. Benefits of the Agreement. This Agreement is intended to foster the achievement of a timely and on-budget completion of the Project by, among other things:

- (a) avoiding the costly delays of potential strikes, sympathy strikes, jurisdictional strikes, slowdowns, walkouts, picketing, handbilling and any other disruptions or interference with work, and promoting labor harmony and peace for the duration of the Project;
- (b) standardizing terms and conditions governing the employment of labor on the Project;
- (c) permitting a wide flexibility in work scheduling, shift hours, and starting times;
- (d) achieving negotiated adjustments as to work rules and staffing requirements from those which otherwise might obtain;
- (e) providing comprehensive and standardized mechanisms for the settlement of work disputes;
- (f) ensuring a reliable source of skilled and experienced labor; and
- (g) furthering public policy objectives, to the extent lawful, as to improved employment opportunities for the Minority Business Enterprises, Women Business Enterprises.

ARTICLE IV

SCOPE OF THE AGREEMENT

Section 1. The Work. This Agreement is specifically defined and limited to onsite construction work required to construct the Project.

Section 2. Exclusions from Scope. Items specifically excluded from the scope of this Agreement, even if performed in connection with the Project, include the following:

- (a) Work of non-manual employees, including but not limited to, superintendents, supervisors, staff engineers, inspectors, quality control and quality assurance personnel, timekeepers, mail carriers, clerks, office workers including messengers, guards, safety personnel, emergency medical and first aid technicians, and other professional, engineering, administrative, supervisory and management employees.
- (b) Equipment and machinery owned or controlled and operated by CCAC.
- (c) All off-site manufacture, fabrication or handling of materials, equipment or machinery (except at dedicated lay-down or storage areas), and all deliveries of any type to and from the Project site.
- (d) All employees of CCAC; the Prime Contractors, the design team or any other consultant when such employees do not perform manual labor coming within the scope of this Agreement.
- (e) Any work performed on or near or leading to or onto the site of work on the Project and undertaken by state, county, city or other governmental bodies, or their contractors; or by public utilities or their contractors.
- (f) Off-site maintenance of leased equipment and on-site supervision of all such maintenance work.
- (g) Work by employees of a manufacturer or vendor necessary to maintain such manufacturer's or vendor's warranty or guarantee, unless such work has historically and customarily been performed by members of a signatory union, or work performed by supervisors or technicians employed by the manufacturer or vendor to oversee the testing of equipment once installed to insure that the equipment is fully operational.
- (h) Laboratory work for specialty testing or inspections not ordinarily done by the signatory local unions.
- (i) All work done by employees of CCAC, or of any State agency, authority or entity or employees of any municipality or other public employer.
- (j) All employees and entities engaged in ancillary Project work performed by electric utilities, gas utilities and telephone companies.
- (k) It is further agreed that, where there is a conflict, the terms and conditions of this Project Agreement shall supersede and override terms and conditions of any and all other national, area, or local collective bargaining agreements, except for all work performed under the NTL Articles of Agreement. The National Stack/Chimney Agreement, and the National Cooling Tower Agreement, all instrument calibration work and loop

checking shall be performed under the terms of the UA/IBEW Joint National Agreement for Instrument and Control Systems Technicians, and the National Agreement of the International Union of Elevator Constructors, with the exception of Article 8 (Work Stoppages and Lockouts); Article 10 (Grievance & Arbitration Procedure); and Article 11 (Jurisdictional Disputes) of this Project Agreement, which shall apply to such work. (see attached model PLA-Article II, Section 1)

The Unions agree that there shall be no interference with, or disruption of work, of those contractors, employers and employees exempted from coverage of this Agreement by subparagraph (a) through (k) above.

Section 3. Contract Award and Consent to Agreement.

- (a) The Prime Contractors, and/or Contractors, as appropriate have the absolute right to award contracts or subcontracts on the Project notwithstanding the existence or nonexistence of any Agreements between such contractor and any Union party provided only that such Contractor is willing, ready and able to execute and comply with this Agreement or a Letter of Assent thereto, should such Contractor be awarded work covered by this Agreement.
- (b) All subcontractors of a Contractor, of whatever tier, who have been awarded contracts of work covered by this Agreement on or after the effective date of this Agreement shall also be required to accept to be bound by the terms and conditions of this Agreement, and shall evidence their acceptance by the execution of this Agreement or a Letter of Assent thereto, prior to the commencement of work. A copy of this Agreement or Letter of Assent executed by each Contractor shall be available for review by the Unions.

Section 4. Stand-Alone Agreement. This Agreement is a stand alone agreement. While this Agreement expressly does not incorporate any local area collective bargaining agreements, such local area collective bargaining agreements may be referenced for the limited purposes as hereinafter set forth in this Agreement. However, to the extent, if any, that any provisions of this Agreement conflict with any provision of a local area collective bargaining agreement, the provisions of this Agreement shall control.

Section 5. Craft Jurisdiction. This Agreement shall recognize the traditional craft jurisdictions of the signatory unions. Any and all jurisdictional disputes shall be settled in accordance with Article VIII below. While this Agreement is a stand-alone Agreement and expressly does not incorporate any local area collective bargaining agreements, the Agreement will utilize the local area collective bargaining agreements of signatory locals as a reference to define the signatory local unions' craft jurisdiction.

Section 6. Subcontracting. CCAC agrees that neither it nor any of its contractors or subcontractors will subcontract any work covered by this Agreement to be done on the Project except to a person, firm or corporation who is or agrees to become party to this Agreement. Any contractor or subcontractor working on the Project shall, as a condition to working on said Project, become a

signatory to and perform all work under the terms of this Agreement. Contractors who are signatory to local collective bargaining agreements shall be bound by the terms of their respective local collective bargaining agreements on subcontracting to the extent such terms are consistent with Article IV, Section 2 of this Agreement. Disputes concerning compliance with such local subcontracting provisions for this project shall be subject to all of the dispute resolution provisions of this Agreement.

Section 7. Liability. It is understood that the liability of the Contractor and the liability of the separate Unions under this Agreement shall be several and not joint. The Unions agree that this Agreement does not have the effect of creating any joint employer status between or among CCAC and/or any Contractor and CCAC shall not assume any liabilities of the Contractors.

Section 8. Abatement of Agreement. As areas of covered work on the Project are accepted by CCAC, this Agreement shall have no further force or effect on such areas except where the Contractor is directed by CCAC to engage in repairs or punch list modifications.

ARTICLE V

LABOR/MANAGEMENT COOPERATION JOINT ADMINISTRATIVE COMMITTEE

Section 1. The parties to this Agreement shall establish a Project Joint Administrative Committee ("Committee"). This Committee will be a three-person committee comprised of one member each from the Prime Contractor, from CCAC, and from the signatory Unions, with an alternate signatory Union member available to replace the regular volunteer when a problem or grievance concerns the regular member's Union. The members of the Project Joint Administrative Committee shall be appointed by their respective principals at a time to be determined after the time the Prime Contracts are awarded. Each member of the Committee shall designate an alternate who shall serve in the absence of the member for any purpose contemplated by this Agreement.

Section 2. The Committee shall meet at least quarterly or more often if special circumstances warrant, to discuss the administration of the Agreement, the progress of the Project, labor/management problems that may arise, and any other relevant matters. Any need for interpretation which might arise from the application of the terms and conditions of the Agreement shall be referred directly to the Committee for resolution.

ARTICLE VI

UNION RECOGNITION AND EMPLOYMENT

Section 1. Pre-Hire Recognition. Each Contractor recognizes the Unions as the sole and exclusive bargaining representative of all craft employees within their respective jurisdictions working on the Project under the Agreement. It is contemplated that such recognition under this Agreement is pursuant to the provisions of Section 8(f) of the Labor Management Relations Act, 29 U.S.C. §158(f) unless the signatory Contractor and Unions have another, preexisting legal relationship.

Section 2. Contractor's Right of Selection. Each Contractor shall have the right to determine the competency of all employees, the number of employees required and shall have the sole responsibility for selecting employees to be laid off.

Section 3. Union Referral. For Local Unions having a job referral system, each Contractor agrees to comply with such system, and the referral system shall be used exclusively by such Contractor, except as modified by this Article. Such job referral system will be operated in a non-discriminatory manner and in full compliance with Federal, State, and Local laws and regulations requiring equal employment opportunities and non-discrimination, and referrals shall not be affected in any way by the rules, regulations, by-laws, constitutional provisions or any other aspects or obligations of union membership, policies or requirements. The Union shall indemnify and hold each Contractor harmless with respect to any claim arising out of how the Union operates and administers its referral system. All hiring procedures, including related practices affecting apprenticeship and training, will be operated so as to facilitate the ability of the contractors to meet any and all equal employment opportunity/affirmative action obligations. The Contractor may reject any referral for any reason and request another, different referral.

Section 4. Lack of Job Referral System. In the event that a signatory Local Union does not have a job referral system as set forth in Section 3 above, the Contractor shall give the Union forty-eight (48) hours to refer applicants. The Contractor may reject any referral for any reason and request another, different referral. The Contractor shall notify the Union of employees hired from any source other than referral by the Union.

Section 5. Unavailability of Union Referrals. In the event that Local Unions are unable to fill any requisitions for qualified employees within forty-eight (48) hours after such requisition is made by the Contractor (Saturdays, Sundays, and Holidays excepted), the Contractor may employ applicants from any other available source. The Contractor shall inform the Union of the name and social security number of any applicants hired from other sources and refer the applicant to the Local Union for dispatch to the Project.

Section 6. No Cross-Referrals. The Local Unions shall not knowingly refer an employee currently employed by any Contractor working under this Agreement to any other Contractor, nor shall any Union engage in any activity which encourages workforce turnover or absenteeism.

Section 7. Union Best Efforts. The Local Unions will exert their utmost efforts to recruit sufficient numbers of skilled craft workers to fulfill the manpower requirements of each Contractor, including calls to local unions in other geographical areas when its referral lists have been exhausted.

Section 8. Non-Discrimination. No employee covered by this Agreement shall be required to join any Union or pay any agency fees or dues as a condition of being employed, or remaining employed, on the Project. Where, however, there is in effect and in the possession of the Contractor a voluntary written dues deduction authorization executed by the employee on a standard form furnished by the Union, the Contractor agrees to deduct union dues from the pay of the employee and to remit the dues to the Union at the same time that trust fund contributions are required to be remitted to the administrators of the appropriate trust funds on behalf of that employee.

Section 9. Core Employees. To provide opportunities to participate on the Project to minority and women owned business enterprises as well as other enterprises which do not have a relationship with the Unions signatory to this Agreement and to ensure that such enterprises will have an opportunity to employ their "core" employees on this Project, the parties agree that any such enterprise has the right to select core employees whom it will employ on site, in accordance with the formula below and who:

- (a) possess any license required by the state or federal law for the Project work to be performed;
- (b) have worked a total of at least 1,200 hours per year in the construction craft during each of the prior 3 years, including participating in a state certified apprenticeship program;
- (c) were on the Contractor's active payroll for at least 60 out of the 180 calendar days prior to the contract award;
- (d) have the ability to perform safely the basic functions of the applicable trade.

The first employee and the third employee, or up to ten (10) percent of all employees, whichever is greater, hired by each contractor may be core employees. After such core employees have been hired by any contractor, all the employees shall thereafter be hiring hall referrals by the appropriate signatory unions in accordance with the provisions of the applicable local collective bargaining agreements.

Section 10. Craft and General Forepersons. The selection of craft foreman and/or general foreman and the number foreman required shall be the exclusive right and responsibility of each contractor.

ARTICLE VII

DISPUTES AND GRIEVANCES

Section 1. This Agreement is intended to provide close cooperation between management and labor. Each of the Unions will assign a representative to this Project for the purpose of completing the construction of the Project economically, efficiently, continuously, and without interruptions, delays, or work stoppages.

Section 2. The Contractors, Unions and the employees, collectively and individually, realize the importance to all parties to maintain continuous and uninterrupted performance of the work of the Project, and agree to resolve disputes in accordance with the grievance-arbitration provisions set forth in this Article.

Section 3. Any question or dispute arising out of and during the term of this Project Agreement (other than trade jurisdictional disputes) shall be considered a grievance and subject to resolution under the following procedures:

Step 1. (a) When any employee subject to the provisions of this Agreement feels he or she is aggrieved by a violation of this Agreement, he or she, through his or her local union business representative or job steward, shall, within five (5) working days after the occurrence of the

violation, give notice to the work-site representative of the involved Contractor stating the provision(s) alleged to have been violated. The business representative of the local union or the job steward and the work-site representative of the involved Contractor and the Prime Contractor shall meet and endeavor to adjust the matter within three (3) working days after timely notice has been given.

The representative of the Contractor shall keep the meeting minutes and shall respond to the Union representative in writing (copying the Prime Contractor) at the conclusion of the meeting but not later than twenty-four (24) hours thereafter. If they fail to resolve the matter within the prescribed period, the grieving party may, within forty-eight (48) hours thereafter, pursue Step 2 of the Grievance Procedure, provided the grievance is reduced to writing, setting forth the relevant information concerning the alleged grievance, including a short description thereof, the date on which the grievance occurred, and the provision(s) of the Agreement alleged to have been violated.

(b) Should the Local Union(s) or the Prime Contractor or any Contractor have a dispute with the other party and, if after conferring, a settlement is not reached within three (3) working days, the dispute may be reduced to writing and proceed to Step 2 in the same manner as outlined herein for the adjustment of an employee complaint.

Step 2. The International Union Representative and the involved Contractor shall meet within seven (7) working days of the referral of a dispute to this second step to arrive at a satisfactory settlement thereof. Meeting minutes shall be kept by the Contractor. If the parties fail to reach an agreement, the dispute may be appealed in writing in accordance with the provisions of Step 3 within seven (7) calendar days thereafter.

Step 3. (a) If the grievance has been submitted but not adjusted under Step 2, either party may request in writing, within seven (7) calendar days thereafter, that the grievance be submitted to an Arbitrator mutually agreed upon by them. The Contractor and the involved Union shall attempt mutually to select an arbitrator, but if they are unable to do so, they shall request the American Arbitration Association to provide them with a list of arbitrators from which the Arbitrator shall be selected. The rules of the American Arbitration Association shall govern the conduct of the arbitration hearing. The decision of the Arbitrator shall be final and binding on all parties. The fee and expenses of such Arbitration shall be borne equally by the Contractor and the involved Local Union(s).

(b) Failure of the grieving party to adhere to the time limits established herein shall render the grievance null and void. The time limits established herein may be extended only by written consent of the parties involved at the particular step where the extension is agreed upon. The Arbitrator shall have the authority to make decisions only on issues presented to him or her, and he or she shall not have authority to change, amend, add to or detract from any of the provisions of this Agreement.

Section 4. The Prime Contractor and Owner shall be notified of all actions at Steps 2 and 3 and shall, upon their request, be permitted to participate in all proceedings at these steps.

ARTICLE VIII

JURISDICTIONAL DISPUTES

Section 1. The assignment of work will be solely the responsibility of the Contractor performing the work involved; and such work assignments will be in accordance with the Plan for the Settlement of Jurisdictional Disputes in the Construction Industry (the "Plan") or any successor Plan.

Section 2. All jurisdictional disputes on this Project, between or among Building and Construction Trades Unions and employers shall be settled and adjusted according to the present Plan established by the Building and Construction Trades Department or any other plan or method of procedure that may be adopted in the future by the Building and Construction Trades Department. Decisions rendered shall be final binding and conclusive on the Contractors and Unions parties to this Agreement.

Section 3. All jurisdictional disputes shall be resolved without the occurrence of any strike, work stoppage, or slow-down of any nature, and the Contractor's assignment shall be adhered to until the dispute is resolved. Individuals violating this section shall be subject to immediate discharge.

Section 4. Each Contractor will conduct a pre-job conference with the appropriate Building and Construction Trades Council prior to commencing work. The Prime Contractor and the Owner will be advised in advance of all such conferences and may participate if they wish.

ARTICLE IX.

MANAGEMENT'S RIGHTS

Section 1. Exclusive Authority – Workforce. The Prime Contractors retain the full and exclusive authority for the management of their operations and workforces. The Prime Contractors retain the right to plan, direct, and control the workforce, including the hiring, promotion, demotion, transfer, layoff, suspension, discipline or discharge for just cause of employees; the determination of crew make-up, crew size and manning levels; the selection of foremen, the assignment and scheduling of work; the promulgation of work rules; and the requirement of overtime work, the determination of when it will be worked and the number and identity of employees engaged in such work. No rules, customs, or practices which limit or restrict productivity, efficiency of the individual and/or joint working efforts of employees shall be permitted or observed. The Prime Contractors may utilize any methods or techniques of construction and operation.

Section 2. Materials, Design, Machinery, Equipment. There shall be no limitation or restriction by a signatory Union upon a Contractor's choice of materials or design, nor, regardless of source or location, upon the full use and utilization of equipment, machinery packaging, pre-cast, pre-fabricated, pre-finish, or pre-assembled materials, tools or other labor saving devices. The on-site installation or application of all items shall be performed by the craft having jurisdiction of such work;

provided, however, that installation of specialty items may be performed by employees employed under this Agreement who may be directed by other personnel in a supervisory role, in circumstances requiring special knowledge of the particular items.

Section 3. Specialty Work. It is recognized by the Contractors, the Unions, and their members that the performance of certain work on the Project shall consist of the installation of certain materials, equipment, or supplies manufactured outside this local vicinity which must, for warranty purposes, be installed by the manufacturer and/or designated specialty contractors and that such installation work is not customarily performed by the members of such unions. The Unions and their members agree that they shall make no claims for such work; provided, however, that the Prime Contractors and/or the Joint Administrative Committee shall provide them with the necessary information establishing the nature of such specialty work.

Section 4. New Technology, Equipment. The use of new technology, equipment, machinery, tools and/or labor saving devices and methods of performing work may be initiated by any Contractor from time to time during the Project. The Union agrees that it will not in any way restrict the implementation of such new devices or work methods.

Section 5. Disputes. If there is any disagreement between any Contractor and the Union concerning the manner or implementation of such device or method of work, the implementation shall proceed as directed by the Contractor, and the Union shall have the right to grieve and/or arbitrate the dispute as set forth in Article VII of this Agreement.

ARTICLE X.

WORK STOPPAGES

Section 1. No Strikes or Work Disruptions. There shall be no strike, sympathy strike, jurisdictional strike, recognitional strike, slowdown, sabotage, work to rule, sickout, sitdown, picketing of any type (including informational picketing), handbilling, boycott, interruption of work or any disruptive activity that interferes with or interrupts in any way work on the Project. The Unions signatory hereto, and each of their members, agree not to initiate, authorize, sanction, participate in, condone, or permit their members to engage in any such activity. Failure of any Union or employee covered by this Agreement to cross any picket line established by any Union, signatory or non-signatory to the Agreement, or by any other organization or individual at or in proximity to the Project construction site, is a violation of this Article. The signatory Union shall be responsible for any action of its members, which violates this section, and its members shall be subject to discipline up to and including discharge for violation of the provisions of this article.

Section 2. Union Responsibilities. The Union shall not sanction, aid or abet, encourage or condone any conduct or activity in violation of this Article, and shall undertake all means to prevent or to terminate any such conduct immediately. No employee shall engage in activities which violate this Article, and the Union shall pursue all disciplinary action permitted by its Constitution and By-laws against any employee who engages in any activity which violates this Article.

Section 3. Violation. If any Contractor and/or CCAC contends that any Union or its member(s) has violated this Article, it will notify in writing the International President(s) of the Union(s) involved, advising him of the fact, with copies of such notice to the Local Union(s) involved, and the BCTC. The International President or Presidents will immediately instruct, order and use the best efforts of his office, including discipline procedures under its Constitution and By-laws, to cause the Local Union(s) or its members to cease any violation of this Article.

Section 4. Expedited Arbitration. Should CCAC, Prime Contractor or any Contractor believe that there has been any violation of this Article, it may institute this expedited arbitration procedure (in addition to any action at law or in equity, or any other contractual procedure available to it). The parties to this Agreement have agreed that the Labor Arbitration Rules of the American Arbitration Association shall apply, including the Rules governing Expedited Arbitration. The Arbitrator shall hold a hearing within twenty-four (24) hours of verbal or written notice of a claimed violation of this Article and shall complete the hearing in one session. The sole issue at the hearing shall be whether or not a violation of this article has occurred. The Arbitrator shall have no authority to consider any matter in justification, explanation, or mitigation of such violation. The arbitral award shall be issued in writing within three (3) hours after the close of the hearing and may be issued without opinion. If any party desires an opinion, the arbitrator shall issue one within fifteen (15) days, but its issuance shall not delay compliance with, or enforcement of, the award.

ARTICLE XI

WAGE AND BENEFITS

Section 1. Classification – Wages. All employees covered by this Agreement shall be classified in accordance with work performed and paid the prevailing wage and benefit rates for these classifications. The Prime Contractors, upon request, shall provide the Unions with substantiation that prevailing wages and benefits are being paid by Contractors on the Project.

Section 2. Payment of Benefits/Contribution. Each Contractor will also pay all required contributions in the amounts required by Section 1 of this Article to the established employee benefit funds that accrue to the direct benefit of the employees (such as pension and annuity, health and welfare, vacation, apprenticeship, training funds). With respect to contributions required in this Section to Employer-Union jointly trusted funds, the Contractor adopts and agrees to be bound by the written terms of the legally established trust agreement specifying the detailed basis on which payments are to be made into, and benefits paid out of, such Trust Funds. The Contractor authorizes the parties to such Trust Funds to appoint Trustees and successor Trustees to administer the Trust Funds and hereby ratifies and accepts the Trustees and successor Trustees to administer the Trust Funds and hereby ratifies and accepts the Trustees so appointed as if made by Contractor. This section does not apply to core employees unless any core employee voluntarily elects to join and become a member of any local union signatory to this Agreement, in which event this Section shall immediately apply with respect to any such core employee.

ARTICLE XII

LOCAL UNION NEGOTIATIONS DURING THE PENDENCY OF THE AGREEMENT

Section 1. All parties to this Agreement understand and acknowledge that some crafts who will be working on the Project are covered by local collective bargaining agreements that will expire prior to the projected completion of the project. All contracting parties understand and agree that irrespective of whether such local collective bargaining agreement negotiations are successful or unsuccessful, there shall be no strike, sympathy strike, jurisdictional strike, recognition strike slowdown, sabotage, work to rule, sickout, sitdown, picketing of any type (including informational picketing), handbidding, boycott, interruption of work or any disruptive activity that interferes with or interrupts in any way work on the Project by any Union involved in such local negotiations, or by any of its members, nor shall there be any lockout on the Project affecting such union or its members during the course of such negotiations. Irrespective of the status of any such local collective bargaining agreement negotiations, the affected Union and all of its members will observe and fully comply with the provisions of this Agreement.

Section 2. Wage/Benefit Increases. Should a craft covered by this Agreement negotiate an increase in wages or an increase in benefits with any Contractor to become effective during the term of the Project for the area of Western Pennsylvania, those wage and/or benefit increases shall be paid, as of the effective date of those increases, to those employees in that craft performing work covered by this Agreement.

ARTICLE XIII

HOURS OF WORK, OVERTIME, SHIFTS AND HOLIDAYS

Section 1. Work Day and Work Week. Except as provided in Section 4, the first shift shall consist of eight (8) or ten (10) hours per day between the hours of 6:00 a.m. and 5:30 p.m., plus one-half (1/2) hour for unpaid lunch, approximately mid-way through the shift. Forty (40) hours per week shall constitute a regular week's work, whether consisting of five (5) eight (8) hour days, or four (4) ten (10) hour days. The work week will start on Monday and conclude on Sunday. A uniform starting time will be established for all crafts on each project or segment of work. Nothing herein shall be construed as guaranteeing any employee eight (8) or ten (10) hours per day or forty (40) hours per week. The Union(s) shall be informed of the work starting time set by the contractor at the pre-job conference which may be changed thereafter upon three (3) days' notice to the Union(s) and the employees. A second shift, if used, shall consist of eight hours between the 3:00 p.m. and 1:00 a.m.; a third shift, if used, shall begin between 10:00 p.m. and 1:00 a.m. For the purposes of Section 3, the third shift shall be considered as part of the prior day's work.

Section 2. Starting Times. Employees shall be at their place of work at the starting time and shall remain at their place of work (as designated by the Contractor) performing their assigned functions until quitting time, which is defined as the scheduled end of the shift. The parties reaffirm their policy of a fair day's work for a fair day's wage. There shall be no pay for time not worked unless

the employee is otherwise engaged at the direction of the Contractor. Due to the magnitude of the project and congestion of the site, staggered starting times may be required. If necessary, these starting times would be between 6 AM and 8 AM. This policy could help reduce the transportation problems at start and completion times.

Section 3. Overtime. Overtime shall be defined as all hours worked in excess of forty (40) hours in a week, or for 8 hour shifts, in excess of 8 hours per day; or for 10 hour shifts, for work in excess of 10 hours per day; such work and work performed on Saturday shall be paid at one and one-half times the straight time rate of pay. However, in scheduled five day/eight hour shift work-weeks, Saturday may be scheduled as a "make-up" day at straight time to make up for a day lost (Monday through Friday) due to inclement weather; in scheduled four day/ten hour shift work weeks, Friday and/or Saturday may be scheduled as a "makeup" day at straight time to make up for a lost day (Monday through Thursday) due to inclement weather. In addition, if a makeup day is scheduled, all employees directed to work on such day will be guaranteed a minimum of four (4) hours work or pay. In any week in which employees on the Project are scheduled on four day/ten hour shifts, an employee whose first day of work on the projects begins on Wednesday, or a later day of the schedule shall be paid, during the first week of his employment only, time and a half for all hours worked in excess of eight in a day for each day he worked during said week. Work on Sundays and Holidays shall be at double time. There will be no restriction on any Contractor's scheduling of overtime or the non-discriminatory designation of employees who will work. The Contractor shall have the right to schedule work so as to minimize overtime. There shall be no pyramiding of overtime pay under any circumstances.

Section 4. Shifts.

- (a) Shift work may be performed at the option of the Contractor(s) upon three (3) days' prior notice to the Union and shall continue for a period of not less than five (5) working days. Saturdays and Sundays, if worked, may be used for establishing the five (5) day minimum work shift. If two shifts are worked, each shall consist of eight (8) hours of continuous work exclusive of a one-half (1/2) hour non-paid lunch period for eight (8) hours pay.
- (b) The Contractor may establish a work week of four (4) consecutive ten (10) hour work days (exclusive of one-half hour unpaid lunch, approximately midway through the shift) between Monday and Friday.

Section 5. Holidays. Recognized holidays on the Project shall be New Year's Day, Good Friday, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, the day after Thanksgiving Day, and Christmas Day. Work performed on holidays shall be paid at double the straight time rate of pay. A holiday falling on Sunday shall be observed the following Monday

Section 6. Meal Period. The Contractor will schedule a meal period of not more than one-half hour duration at the work location at approximately the mid-point of the scheduled work shift (4 hours in a five-day work week, 5 hours in a four-day work week), consistent with Section 1; provided, however, that the Contractor may, for efficiency of the operation, establish a schedule which coordinates the meal periods of two or more crafts. If an employee is required to work through his meal period, he shall be compensated for the time worked at the applicable overtime rate and the employee shall, when work permits, eat his lunch "on the fly."

Section 7. No Organized Work Breaks. There will be no organized breaks or other non-working time established during working hours. Individual nonalcoholic beverage containers will be permitted at the employee's work stations.

Section 8. Craft Worker Parking Facilities. Parking facilities or arrangements for employees working on the Project will be established by the Prime Contractors by the time work on the Project commences.

ARTICLE XIV

APPRENTICES AND HELMETS TO HARDHATS

Section 1. Need For. The parties recognize the need to maintain continuing support of programs designed to develop adequate numbers of competent workers in the construction industry. The Contractor(s) will accordingly employ apprentices in their respective crafts to perform work on the Project within the apprentices' capabilities.

Section 2. Ratios. The Union agrees to cooperate with the Contractor in furnishing qualified apprentices as requested. There shall be no restrictions on the utilization of apprentices in performing the work of their craft provided they are properly supervised.

Section 3. The Employers and the Unions recognize a desire to facilitate the entry into the building and construction trades of veterans who are interested in careers in the building and construction industry. The Employers and Unions agree to utilize the services of the Center for Military Recruitment, Assessment and Veterans Employment (hereinafter "Center") and the Center's "Helmets to Hardhats" program to serve as a resource for preliminary orientation, assessment of construction aptitude, referral to apprenticeship programs or hiring halls, counseling and mentoring, support network, employment opportunities and other needs as identified by the parties.

Section 4. The Unions and Employers agree to coordinate with the Center to create and maintain an integrated database of veterans interested in working on this Project and of apprenticeship and employment opportunities for this Project. To the extent permitted by law, the Unions will give credit to such veterans for bona fide, provable past experience.

ARTICLE XV

DRUG AND ALCOHOL POLICY

Section 1. Policy. All parties understand and agree that a substance abuse program has been established by the Master Builders' Association of Western PA, Inc. (MBA) and/or the Constructors Association of Western PA (CAWP), and will be in force for all work performed under the Agreement. The substance abuse program will prohibit the use, sale, transfer, purchase and/or possession of a controlled substance, alcohol and/or firearms while on the Project's premises and will require testing of employees. The substance abuse program will be incorporated into and made part of the Agreement and implemented for all Contractors and employees working on the Project.

ARTICLE XVI

NON-DISCRIMINATION

Section 1. Policy. It is the continuing policy of the Prime Contractors, the Contractors and the Unions that the provisions of this Agreement shall be applied without discrimination because of age, race, sex, color, religion, creed, national origin or union signatory or membership status. There shall be no discrimination against an employee because of her or his membership in, or activities on behalf of Unions.

ARTICLE XVII

SOLE AND COMPLETE AGREEMENT

Section 1. The parties agree that this Agreement constitutes the sole and complete agreement between them governing the rates of pay and working conditions of the construction employees working on the Project, that it settles all demands and issues on the matters subject to collective bargaining, and that it shall not be modified or supplemented in any way except by written agreement executed by both parties.

ARTICLE XVIII

SEPARABILITY AND SAVINGS CLAUSE

Section 1. Intent of Parties. If any article or section of this Agreement shall be held invalid by law or by a tribunal of competent jurisdiction, or if compliance with or enforcement of any article should be restrained pending a final determination as to its validity, the remainder of this Agreement shall not be affected and shall remain in full force and effect. In the event that any article or section is held invalid, the parties hereto shall, upon the request of the Unions, enter into collective bargaining negotiations for the purpose of arriving at a mutually satisfactory replacement for such article during the period of invalidity or restraint. If the parties hereto cannot agree on a mutually satisfactory replacement, either party shall be permitted to submit its demand to formal arbitration.

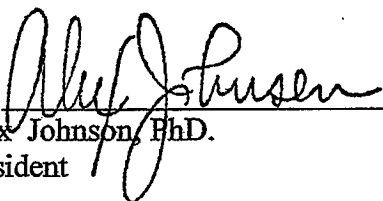
Section 2. Force of Agreement. The parties recognize the right of the CCAC to withdraw, at its absolute discretion, the utilization of this Agreement as part of any bid specification should a court of competent jurisdiction issue any order which could result, temporarily or permanently, in delay of the bidding, awarding, and/or construction work on the Project. Notwithstanding such an action by the Prime Contractors, or such court order, the parties agree that the Agreement shall remain in full force and effect on the Project, to the maximum extent legally possible.

This Project Labor Agreement is made as of this 15th day of February, 2011, by and between the Community College of Allegheny County and the Pittsburgh Regional Building and Construction Trades Council, AFL-CIO.

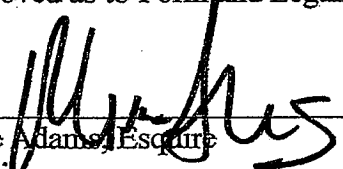
This Agreement replaces, in its entirety, that certain Labor Stabilization Agreement approved by the CCAC and the BCTC dated the 21st day of June, 1993 that covers all construction projects for which the CCAC acts as Owner.

The CCAC and BCTC, intending to be legally bound hereby, and for other good and valuable consideration the receipt and sufficiency of which the parties hereby acknowledged, agree to the above.

**Community College
Of Allegheny County**

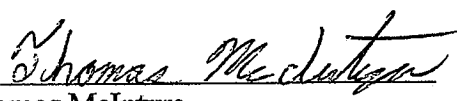
By 
Alex Johnson, PhD.
President

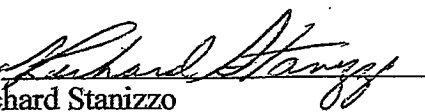
Approved as to Form and Legality:

By 
Mike Adams, Esquire
Solicitor

**Pittsburgh Regional Building
and Construction Trades Council,
AFL-CIO**

By 
William Brooks
President

By 
Thomas McIntyre
Secretary/Treasurer

By 
Richard Stanizzo
Business Manager

**BUREAU OF LABOR LAW COMPLIANCE
PREVAILING WAGES PROJECT RATES**

Project Name:	Roof Replacement - Boyce Campus - Three Prime Contracts
General Description:	Replacement of the Boyce Campus Roof - General Construction, Plumbing, and HVAC
Project Locality	Monroeville, PA
Awarding Agency:	Community College of Allegheny County
Contract Award Date:	6/15/2026
Serial Number:	26-04280
Project Classification:	Building
Determination Date:	4/30/2026
Assigned Field Office:	Pittsburgh
Field Office Phone Number:	(412)565-5300
Toll Free Phone Number:	(877)504-8354
Project County:	Allegheny County

BUREAU OF LABOR LAW COMPLIANCE PREVAILING WAGES PROJECT RATES

Project: 26-04280 - Building	Effective Date	Expiration Date	Hourly Rate	Fringe Benefits	Total
Asbestos & Insulation Workers	8/1/2024		\$43.40	\$29.51	\$72.91
Asbestos & Insulation Workers	8/1/2025		\$45.10	\$30.31	\$75.41
Boilermakers	6/1/2016		\$40.90	\$27.61	\$68.51
Bricklayer	6/1/2025		\$41.50	\$26.09	\$67.59
Bricklayer	12/1/2025		\$42.00	\$26.59	\$68.59
Carpenters - Piledriver/Welder	1/1/2025		\$43.38	\$22.72	\$66.10
Carpenters - Piledriver/Welder	1/1/2026		\$44.63	\$23.47	\$68.10
Carpenters, Drywall Hangers, Framers, Instrument Men, Lathers, Soft Floor Layers	6/1/2024		\$41.49	\$19.93	\$61.42
Carpenters, Drywall Hangers, Framers, Instrument Men, Lathers, Soft Floor Layers	6/1/2025		\$43.34	\$19.93	\$63.27
Cement Masons	7/1/2024		\$34.57	\$25.09	\$59.66
Cement Masons	6/1/2025		\$35.52	\$25.64	\$61.16
Drywall Finisher	6/1/2024		\$34.01	\$24.63	\$58.64
Drywall Finisher	6/1/2025		\$35.16	\$25.98	\$61.14
Electricians & Telecommunications Installation Technician	12/27/2024		\$50.86	\$32.69	\$83.55
Electricians & Telecommunications Installation Technician	12/26/2025		\$53.11	\$33.72	\$86.83
Elevator Constructor	1/1/2025		\$61.07	\$40.05	\$101.12
Elevator Constructor	1/1/2026		\$63.71	\$40.89	\$104.60
Glazier	9/1/2024		\$37.06	\$31.89	\$68.95
Glazier	9/1/2025		\$38.70	\$33.75	\$72.45
Iron Workers	6/1/2024		\$39.89	\$36.47	\$76.36
Iron Workers	6/1/2025		\$41.50	\$37.36	\$78.86
Laborers (Class 01 - See notes)	1/1/2025		\$27.32	\$19.96	\$47.28
Laborers (Class 01 - See notes)	1/1/2026		\$27.82	\$20.46	\$48.28
Laborers (Class 02 - See notes)	1/1/2025		\$27.47	\$19.96	\$47.43
Laborers (Class 02 - See notes)	1/1/2026		\$27.97	\$20.46	\$48.43
Laborers (Class 03 - See notes)	1/1/2025		\$30.47	\$19.96	\$50.43
Laborers (Class 03 - See notes)	1/1/2026		\$30.97	\$20.46	\$51.43
Landscape Laborer (Skilled)	1/1/2025		\$25.79	\$18.78	\$44.57
Landscape Laborer (Skilled)	1/1/2026		\$26.79	\$19.03	\$45.82
Landscape Laborer (Tractor Operator)	1/1/2025		\$26.09	\$18.78	\$44.87
Landscape Laborer (Tractor Operator)	1/1/2026		\$27.09	\$19.03	\$46.12
Landscape Laborer	1/1/2025		\$25.37	\$18.78	\$44.15
Landscape Laborer	1/1/2026		\$26.37	\$19.03	\$45.40
Millwright	6/1/2020		\$41.68	\$20.32	\$62.00
Operators (Class 01 - see notes)	6/1/2024		\$41.69	\$24.39	\$66.08
Operators (Class 01 - see notes)	6/1/2025		\$42.72	\$24.79	\$67.51
Operators (Class 01 - see notes)	6/1/2026		\$43.74	\$25.29	\$69.03
Operators (Class 02 -see notes)	6/1/2024		\$35.62	\$24.39	\$60.01
Operators (Class 02 -see notes)	6/1/2025		\$36.67	\$24.79	\$61.46
Operators (Class 02 -see notes)	6/1/2026		\$37.67	\$25.29	\$62.96
Operators (Class 03 - See notes)	6/1/2024		\$32.83	\$24.39	\$57.22
Operators (Class 03 - See notes)	6/1/2025		\$33.88	\$24.79	\$58.67

BUREAU OF LABOR LAW COMPLIANCE PREVAILING WAGES PROJECT RATES

Project: 26-04280 - Building	Effective Date	Expiration Date	Hourly Rate	Fringe Benefits	Total
Operators (Class 03 - See notes)	6/1/2026		\$34.88	\$25.29	\$60.17
Painters Class 6 (see notes)	6/1/2024		\$32.14	\$24.93	\$57.07
Painters Class 6 (see notes)	6/1/2025		\$34.16	\$25.81	\$59.97
Piledrivers	1/1/2025		\$41.88	\$22.72	\$64.60
Piledrivers	1/1/2026		\$43.13	\$23.47	\$66.60
Plasterers	6/1/2024		\$33.14	\$21.04	\$54.18
plumber	6/1/2025		\$54.95	\$25.87	\$80.82
plumber	6/1/2026		\$58.05	\$25.87	\$83.92
plumber	6/1/2027		\$61.15	\$25.87	\$87.02
Pointers, Caulkers, Cleaners	6/1/2025		\$40.66	\$21.99	\$62.65
Pointers, Caulkers, Cleaners	12/1/2025		\$41.50	\$22.50	\$64.00
Roofers	6/1/2025		\$39.91	\$20.76	\$60.67
Roofers	12/1/2025		\$41.21	\$21.46	\$62.67
Roofers	6/1/2026		\$42.00	\$23.17	\$65.17
Sheet Metal Workers	7/1/2024		\$43.00	\$33.96	\$76.96
Sheet Metal Workers	7/1/2025		\$45.00	\$35.16	\$80.16
Sign Makers and Hangars	7/15/2024		\$32.32	\$25.82	\$58.14
Sign Makers and Hangars	7/15/2025		\$33.48	\$26.41	\$59.89
Sprinklerfitters	1/1/2025		\$44.79	\$27.05	\$71.84
Sprinklerfitters	1/1/2026		\$46.14	\$28.30	\$74.44
Steamfitters	6/1/2024		\$48.15	\$29.57	\$77.72
Steamfitters	6/1/2025		\$50.20	\$31.02	\$81.22
Stone Masons	6/1/2025		\$43.60	\$24.72	\$68.32
Stone Masons	12/1/2025		\$44.10	\$25.22	\$69.32
Terrazzo Finisher	6/1/2025		\$41.73	\$19.03	\$60.76
Terrazzo Finisher	12/1/2025		\$42.75	\$19.51	\$62.26
Terrazzo Mechanics	6/1/2025		\$41.13	\$21.28	\$62.41
Terrazzo Mechanics	12/1/2025		\$42.15	\$21.76	\$63.91
Tile Finisher	6/1/2025		\$33.24	\$18.36	\$51.60
Tile Finisher	12/1/2025		\$33.99	\$18.71	\$52.70
Tile Setter	6/1/2025		\$40.15	\$22.80	\$62.95
Tile Setter	12/1/2025		\$40.80	\$23.25	\$64.05
Truckdriver class 1(see notes)	1/1/2025		\$36.43	\$23.21	\$59.64
Truckdriver class 1(see notes)	1/1/2026		\$37.93	\$23.71	\$61.64
Truckdriver class 2 (see notes)	1/1/2025		\$36.89	\$23.52	\$60.41
Truckdriver class 2 (see notes)	1/1/2026		\$38.39	\$24.02	\$62.41
Window Film / Tint Installer	10/1/2019		\$25.00	\$2.63	\$27.63

**BUREAU OF LABOR LAW COMPLIANCE
PREVAILING WAGES PROJECT RATES**

Project: 26-04280 - Heavy/Highway	Effective Date	Expiration Date	Hourly Rate	Fringe Benefits	Total
Carpenter	1/1/2025		\$41.35	\$22.09	\$63.44
Carpenter	1/1/2026		\$42.60	\$22.84	\$65.44
Carpenter Welder	1/1/2025		\$42.85	\$22.09	\$64.94
Carpenter Welder	1/1/2026		\$44.10	\$22.84	\$66.94
Carpenters - Piledriver/Welder	1/1/2025		\$43.38	\$22.72	\$66.10
Carpenters - Piledriver/Welder	1/1/2026		\$44.63	\$23.47	\$68.10
Cement Finishers	1/1/2024		\$35.14	\$26.30	\$61.44
Cement Finishers	1/1/2025		\$35.94	\$27.50	\$63.44
Cement Masons	1/1/2020		\$32.84	\$21.10	\$53.94
Electric Lineman	6/3/2024		\$53.97	\$31.05	\$85.02
Electric Lineman	6/2/2025		\$57.10	\$31.63	\$88.73
Electricians & Telecommunications Installation Technician	12/27/2024		\$51.76	\$31.80	\$83.56
Electricians & Telecommunications Installation Technician	12/26/2025		\$54.16	\$32.69	\$86.85
Iron Workers (Bridge, Structural Steel, Ornamental, Precast, Reinforcing)	6/1/2024		\$39.89	\$36.47	\$76.36
Iron Workers (Bridge, Structural Steel, Ornamental, Precast, Reinforcing)	6/1/2025		\$41.50	\$37.36	\$78.86
Laborers (Class 01 - See notes)	1/1/2025		\$33.70	\$26.00	\$59.70
Laborers (Class 01 - See notes)	1/1/2026		\$34.70	\$27.00	\$61.70
Laborers (Class 02 - See notes)	1/1/2025		\$33.86	\$26.00	\$59.86
Laborers (Class 02 - See notes)	1/1/2026		\$34.86	\$27.00	\$61.86
Laborers (Class 03 - See notes)	1/1/2025		\$34.25	\$26.00	\$60.25
Laborers (Class 03 - See notes)	1/1/2026		\$35.25	\$27.00	\$62.25
Laborers (Class 04 - See notes)	1/1/2025		\$34.70	\$26.00	\$60.70
Laborers (Class 04 - See notes)	1/1/2026		\$35.70	\$27.00	\$62.70
Laborers (Class 05 - See notes)	1/1/2025		\$35.11	\$26.00	\$61.11
Laborers (Class 05 - See notes)	1/1/2026		\$36.11	\$27.00	\$63.11
Laborers (Class 06 - See notes)	1/1/2025		\$31.95	\$26.00	\$57.95
Laborers (Class 06 - See notes)	1/1/2026		\$32.95	\$27.00	\$59.95
Laborers (Class 07 - See notes)	1/1/2025		\$34.70	\$26.00	\$60.70
Laborers (Class 07 - See notes)	1/1/2026		\$35.70	\$27.00	\$62.70
Laborers (Class 08 - See notes)	1/1/2025		\$36.20	\$26.00	\$62.20
Laborers (Class 08 - See notes)	1/1/2026		\$37.20	\$27.00	\$64.20
Millwright	6/1/2024		\$47.59	\$23.72	\$71.31
Millwright	6/1/2025		\$49.72	\$23.72	\$73.44
Operators (Class 01 - see notes)	1/1/2025		\$40.39	\$24.23	\$64.62
Operators (Class 01 - see notes)	1/1/2026		\$41.96	\$24.66	\$66.62
Operators (Class 02 -see notes)	1/1/2025		\$40.13	\$24.23	\$64.36
Operators (Class 02 -see notes)	1/1/2026		\$41.70	\$24.66	\$66.36
Operators (Class 03 - See notes)	1/1/2025		\$36.48	\$24.23	\$60.71
Operators (Class 03 - See notes)	1/1/2026		\$38.05	\$24.66	\$62.71
Operators (Class 04 - See notes)	1/1/2025		\$36.02	\$24.23	\$60.25
Operators (Class 04 - See notes)	1/1/2026		\$37.59	\$24.66	\$62.25
Operators (Class 05 - See notes)	1/1/2025		\$35.77	\$24.23	\$60.00

**BUREAU OF LABOR LAW COMPLIANCE
PREVAILING WAGES PROJECT RATES**

Project: 26-04280 - Heavy/Highway	Effective Date	Expiration Date	Hourly Rate	Fringe Benefits	Total
Operators (Class 05 - See notes)	1/1/2026		\$37.34	\$24.66	\$62.00
Operators Class 1-A	1/1/2025		\$43.39	\$24.23	\$67.62
Operators Class 1-A	1/1/2026		\$44.96	\$24.66	\$69.62
Operators Class 1-B	1/1/2025		\$42.39	\$24.23	\$66.62
Operators Class 1-B	1/1/2026		\$43.96	\$24.66	\$68.62
Painters Class 1 (see notes)	6/1/2022		\$34.45	\$22.82	\$57.27
Painters Class 2 (see notes)	6/1/2024		\$38.09	\$24.93	\$63.02
Painters Class 2 (see notes)	6/1/2025		\$40.36	\$25.81	\$66.17
Painters Class 3 (see notes)	6/1/2024		\$40.66	\$24.93	\$65.59
Painters Class 3 (see notes)	6/1/2025		\$43.68	\$25.81	\$69.49
Painters Class 4 (see notes)	6/1/2019		\$28.20	\$20.06	\$48.26
Painters Class 5 (see notes)	6/1/2019		\$22.91	\$20.06	\$42.97
Pile Driver Divers (Building, Heavy, Highway)	1/1/2025		\$62.82	\$22.72	\$85.54
Pile Driver Divers (Building, Heavy, Highway)	1/1/2026		\$64.70	\$23.47	\$88.17
Piledrivers	1/1/2025		\$41.88	\$22.72	\$64.60
Piledrivers	1/1/2026		\$43.13	\$23.47	\$66.60
Steamfitters (Heavy and Highway - Gas Distribution)	5/1/2022		\$48.43	\$40.28	\$88.71
Truckdriver class 1(see notes)	1/1/2025		\$36.43	\$23.21	\$59.64
Truckdriver class 1(see notes)	1/1/2026		\$37.93	\$23.71	\$61.64
Truckdriver class 2 (see notes)	1/1/2025		\$36.89	\$23.52	\$60.41
Truckdriver class 2 (see notes)	1/1/2026		\$38.39	\$24.02	\$62.41

CCAC BOYCE ROOF REPLACEMENT

EXISTING HAZARDOUS MATERIAL INFORMATION

1.1 EXISTING HAZARDOUS MATERIAL INFORMATION

- A. This Document with its referenced attachments is part of the Procurement and Contracting Requirements for the Project. They provide Owner's information for Bidders' convenience and are intended to supplement rather than serve in lieu of Bidders' own investigations. They are made available for Bidders' convenience and information. This Document and its attachments are not part of the Contract Documents.
- B. An existing asbestos report for Project, prepared by Performance Environmental Services, Inc. dated 4/17/2026, is available for viewing as appended to this Project Manual.
- C. Hazardous material identification and remediation is the sole responsibility of the General Contractor under the General Construction Contract, including engaging qualified professionals, identification & testing, means & methods of remediation, permitting with the Allegheny County Health Department and coordination with other Prime Contractors.



41850 West Eleven Mile Road, Suite 125 • Novi, Michigan 48375 • Voice: 248.926.3800 • Fax: 248.926.3838
105 Bradford Road, Suite 320 • Wexford, Pennsylvania 15090 • Voice: 412.463.6576

Environmental Services, Inc.

April 20, 2026

Mr. Sarmed S. Shareef, CIH, CSP
Director of Environmental Health and Safety
Community College of Allegheny County
Office of College Services – 420
800 Allegheny Avenue
Pittsburgh, PA 15233

**RE: ASBESTOS PLM TESTING REPORT
COMMUNITY COLLEGE OF ALLEGHENY COUNTY
BOYCE CAMPUS – ROOFING
MONROEVILLE, PENNSYLVANIA
PERFORMANCE PROJECT # 2620260**

Dear Mr. Shareef:

In accordance with your request, Performance Environmental Services, Inc. (*Performance*) conducted asbestos PLM testing of suspect roofing materials and roof drain insulation at the above referenced location. The project included an on-site investigation and collection of samples suspected of containing asbestos in accessible areas of the work area. The purpose of this project was to locate and identify roofing materials and roof drain insulation suspected of containing asbestos.

As a result of our sampling and laboratory analysis, **the following asbestos-containing materials were identified:**

HA #	Material Description ** (See Bulk Sample Location Maps for exact locations)**	Asbestos-Containing Material	~ Quantity
1	Roofing (rubber over foam over tar paper) – Roof A	Tar paper	15,644 ft ²
10	Roofing (rubber over foam over tar paper) – Roof C	Tar paper	4,160 ft ²

Attached, please find the Asbestos PLM Testing Report, which includes the complete laboratory data, the chain of custody record and the Bulk Sample Location Maps. If there are any questions or comments concerning this report or our recommendations, please do not hesitate to contact us.

Respectfully,

PERFORMANCE ENVIRONMENTAL SERVICES, INC.

Curtis V. Wagner, CIEC
Senior Project Manager



Joseph L. Kuchnicki, CIE, CHMM
Senior Project Manager



CVW/JLK:vk

Attachments

TABLE OF CONTENTS

1.0 INTRODUCTION..... 1

2.0 SCOPE OF WORK..... 1

3.0 PLM TESTING OVERVIEW AND FINDINGS..... 1

4.0 SUMMARY AND RECOMMENDATIONS..... 4

APPENDICES

APPENDIX 1..... PLM TESTING DOCUMENTATION

APPENDIX 2..... BULK SAMPLE LOCATION MAPS

1.0 INTRODUCTION

The Community College of Allegheny County (CCAC) contracted Performance Environmental Services, Inc. (*Performance*) to conduct PLM testing of the suspect roofing materials and roof drain insulation for the Roof Replacement at the Boyce Campus located in Monroeville, Pennsylvania. The purpose of the project was to identify and test roofing materials and roof drain insulation suspected of containing asbestos. *Performance* representatives Ms. Amanda Neary (Accreditation #040341) and Mr. Joseph Wesner (Accreditation #068589) conducted the on-site investigation and sample collection activities on April 13, 2026.

2.0 SCOPE OF WORK

The Community College of Allegheny County provided locations for the scope of work and the subsequent sampling area. EPA certified and Pennsylvania accredited Asbestos Building Inspectors performed the work to locate and sample roofing materials and roof drain insulation suspected of containing asbestos. *Performance* also provided project review, report preparation and consultation services during the course of this project.

As part of this study, *Performance* completed the following:

- 1) Conducted sampling of specific accessible areas to locate roofing materials and roof drain insulation suspected of containing asbestos;
- 2) Collected bulk material samples for subsequent analysis by Polarized Light Microscopy (PLM); and,
- 3) Submitted bulk samples collected during this project to a National Voluntary Laboratory Accreditation Program (NVLAP) accredited laboratory for PLM analysis.

Performance assembled the information collected during the study in this report, which details the laboratory results and locations of sampled materials.

3.0 PLM TESTING OVERVIEW AND FINDINGS

3.1 SUSPECTED ASBESTOS-CONTAINING MATERIALS

As a result of our visual inspection of the area, *Performance* observed eleven (11) types of materials suspected of containing asbestos. The suspect materials were classified into homogeneous areas. A homogeneous area (HA) is a building material that appears similar in terms of color, texture and apparent date of application. The materials were assigned HA numbers 1 through 11 and were compiled as follows:

HA #	Material Description	Friable (F) or Nonfriable (Cat I/II NF*)
1	Roofing (rubber over foam over tar paper) – Roof A	Cat I NF
2	Roof caulk (black) – Roof A	Cat II NF
3	Roofing (rubber over foam over tar paper) – Roof B	Cat I NF
4	Roof caulk (black) – Roof B	Cat II NF

HA #	Material Description	Friable (F) or Nonfriable (Cat I/II NF*)
5	Mudded roof drain – Roof C	F
6	Roofing (rubber over foam over tar paper) – Roof D	Cat I NF
7	Roofing (board over foam over lightweight concrete over tar paper) – Roof E	Cat I NF
8	Roof caulk (dark gray) – Roof E	Cat II NF
9	Roof caulk (dark gray) – Roof F	Cat II NF
10	Roofing (rubber over foam over tar paper) – Roof C	Cat I NF
11	Roof caulk (black) – Roof C	Cat II NF

*Cat I NF = Category I NF = Asbestos-containing packings, gaskets, resilient floor covering and asphalt roofing products, Cat II NF = All other nonfriable materials excluding Cat I NF.

Representative roof drains were inspected in each roof section identified by the client. Based on visual review of roof drains, only roof drains within the penthouse area had suspected ACM present (HA #5), which subsequently tested negative for asbestos. All other drains observed either were either fiberglass or uninsulated.

3.2 IDENTIFIED ASBESTOS-CONTAINING MATERIALS

Performance collected twenty-three (23) bulk samples of the identified homogenous areas and submitted them to an NVLAP-accredited laboratory for PLM analysis. As the laboratory results indicate, **asbestos was detected in the following HA numbers:**

HA #	Material Description	Asbestos-Containing Material	Asbestos Content
1	Roofing (rubber over foam over tar paper) – Roof A	Tar paper	2% Chrysotile
10	Roofing (rubber over foam over tar paper) – Roof C	Tar paper	2% Chrysotile

Refer to the attached Appendices for the complete laboratory data, the Chain of Custody record and the Bulk Sample Location Maps.

3.3 DISCUSSION

3.3.1 Asbestos Control and Management

Renovation and demolition activities, as well as some maintenance activities have the potential to disturb materials and release asbestos fibers into the environment; therefore, government agencies have created regulations to protect the health of workers potentially exposed as well as the environment.

EPA:

The Environmental Protection Agency (EPA), under the National Emission Standards for Hazardous Air Pollutants (NESHAPS), requires notification and procedures for emissions control

depending on whether the asbestos material in question falls into the definition of “Regulated Asbestos-Containing Material” (RACM). NESHAPS defines RACM as:

- (a) Friable asbestos material;
- (b) Category I nonfriable ACM that has become friable;
- (c) Category I nonfriable ACM that will be or has been subjected to sanding, grinding, cutting, or abrading; or,
- (d) Category II nonfriable ACM that has a high probability of becoming or has become crumbled, pulverized or reduced to powder by the forces expected to act on the material in the course of demolition or renovation operations.

The proceeding items summarize basic requirements for demolition and renovation projects according to the EPA NESHAPS:

(1) In a facility being **demolished**, notification requirements and procedures for asbestos emission control apply if the combined amount of RACM is (i) At least 260 linear feet on pipes or at least 160 square feet on other facility components, or (ii) At least 35 cubic feet off facility components where the length or area could not be measured previously.

(2) In a facility being **demolished**, only the notification requirements apply, if the combined amount of RACM is (i) Less than 260 linear feet on pipes or less than 160 square feet on other facility components, or (ii) Less than 35 cubic feet off facility components where the length or area could not be measured previously or there is no asbestos.

(3) If the facility is being **demolished** under an order of a State or local government agency issued because the facility is structurally unsound and in danger of imminent collapse, specific requirements apply (see NESHAPS for details).

(4) If the facility is being **renovated**, notification requirements and procedures for asbestos emission control apply if the combined amount of RACM to be stripped, removed, dislodged, cut, drilled or similarly disturbed is (i) at least 260 linear feet on pipes, or (ii) at least 160 square feet on other facility components, or (iii) at least 35 cubic feet off facility components where the length or area could not be measured previously.

ALLEGHENY COUNTY, PENNSYLVANIA

According to Article XXI Air Pollution Control from Allegheny County Health Department, **all** ACM must be removed from a facility prior to a demolition, including Category I non-friable. The only material that may remain is mastic as long as the debris does not remain on-site.

3.3.2 Investigation Limitations and Miscellaneous Field Notes:

The scope of work for this project only included the roofing materials and roof drain insulation; all other materials (suspect or not suspect) were not listed, sampled or quantified.

No flashing materials were identified within the scope of work for this project.

Performance has prepared this report for the express use of its clients and their approved agents. Although some of the information included in this report or in portions of this report may be required to be included in notifications to various parties, this report is not intended to be used as an asbestos specification or work plan.

4.0 SUMMARY AND RECOMMENDATIONS

Friable Materials:

Performance did not locate any friable asbestos-containing materials during the investigation.

Category I Nonfriable Materials:

Referring to the definition of RACM in section 3.3.1, EPA NESHAPS requires removal prior to a renovation or demolition of all Category I nonfriable ACM that has become friable or that will be or has been subjected to sanding, grinding, cutting, or abrading. In addition, Article XXI Air Pollution Control from Allegheny County Health Department requires all Category I nonfriable ACM to be removed from a facility prior to a demolition.

If the facility is being renovated or demolished, *Performance* recommends abating the Roofing materials (HA#1 and HA#10) if they have the potential to be disturbed. If the identified materials are not removed or disturbed and are remaining in place, then *Performance* recommends that an Operations and Maintenance Program be prepared to facilitate the in-place management of these asbestos-containing materials.

Category II Nonfriable Materials:

Performance did not locate any Category II nonfriable asbestos-containing materials during the investigation.

Assumed Materials:

Performance did not locate any assumed asbestos-containing materials during the investigation.

APPENDIX 1

PLM TESTING DOCUMENTATION

CONTENTS

-
- ▶ **CERTIFICATES OF
LABORATORY ANALYSIS**
 - ▶ **CHAIN OF CUSTODY RECORD**



3130 Old Farm Lane, Suite 1
Commerce Twp., MI 48390

877-665-3373

Asbestos Laboratory Report

Prepared Exclusively For:

Performance Environmental Services
Amanda Neary
105 Bradford Road, Suite 320
Wexford, PA 15090
412.463.6576
labdata@perform-env.com





Report Prepared For: Performance Environmental Services
Project Name: Boyce Campus - Roofing
Project Number: 2620260
Report Date: 04/17/26
Lab Number: A40815

Asbestos Report Summary

Test Method: Polarized Light Microscopy (PLM)

21 Samples Analyzed

2 Samples Containing >1% Asbestos

Greater than 1% Asbestos

Client ID	Lab Number	Description	Asbestos
1-01	A40815 - 1	Roofing (Rubber Over Foam Over Tar Paper) / Please See Map	Chrysotile 2%
10-01	A40815 - 20	Roofing (Rubber Over Foam Over Tar Paper) / Please See Map	Chrysotile 2%



Report Prepared For: Performance Environmental Services
 Project Name: Boyce Campus - Roofing
 Project Number: 2620260
 Report Date: 04/17/26
 Lab Number: A40815

Certificate of Laboratory Analysis

Test Method: Polarized Light Microscopy (PLM)

EPA 600/R-93/116 and/or EPA - Appendix E to Subpart E of 40 CFR Part 763;
 Interim Method for the Determination of Asbestos in Bulk Insulation Samples

Project: Boyce Campus - Roofing
 Project Number: 2620260

Prepared For

Performance Environmental Services
 Amanda Neary
 105 Bradford Road, Suite 320
 Wexford, PA 15090
 412.463.6576
 labdata@perform-env.com

IMS Lab No. A40815
 Date Collected: 04/13/26
 Date Received: 04/14/26
 Date Reported: 04/17/26

Client ID Lab No.	Client Description	Sample Color(s)	Laboratory Attributes	Fibrous Components	Non-Fibrous Components	Asbestos Type / Percent
1-01 A40815 - 1	Roofing (Rubber Over Foam Over Tar Paper) / Please See Map	Black	Heterogeneous Friable Fibrous	2% Chrysotile 8% Cellulose	90% Matrix	Chrysotile 2%
1-02 A40815 - 2	Roofing (Rubber Over Foam Over Tar Paper) / Please See Map					Not Tested - Positive Stop # 1
2-01 A40815 - 3	Roof Caulk (Black) / Please See Map	Black	Homogeneous Non-Friable Non-Fibrous		100% Matrix	No Asbestos Detected
2-02 A40815 - 4	Roof Caulk (Black) / Please See Map	Black	Homogeneous Non-Friable Non-Fibrous		100% Matrix	No Asbestos Detected
3-01 A40815 - 5	Roofing (Rubber Over Foam Over Tar Paper) /Please See Map	Black	Homogeneous Non-Friable Non-Fibrous		100% Matrix	No Asbestos Detected
3-02 A40815 - 6	Roofing (Rubber Over Foam Over Tar Paper) /Please See Map	Black	Homogeneous Non-Friable Non-Fibrous		100% Matrix	No Asbestos Detected
4-01 A40815 - 7	Roof Caulk (Black) / Please See Map	Black	Homogeneous Non-Friable Non-Fibrous		100% Matrix	No Asbestos Detected
4-02 A40815 - 8	Roof Caulk (Black) / Please See Map	Black	Homogeneous Non-Friable Non-Fibrous		100% Matrix	No Asbestos Detected



Report Prepared For: Performance Environmental Services
 Project Name: Boyce Campus - Roofing
 Project Number: 2620260
 Report Date: 04/17/26
 Lab Number: A40815

Client ID Lab No.	Client Description	Sample Color(s)	Laboratory Attributes	Fibrous Components	Non-Fibrous Components	Asbestos Type / Percent
5-01 A40815 - 9	Mudded Roof Drain / Please See Map	Gray	Heterogeneous Friable Fibrous	35% Fiberglass	65% Matrix	No Asbestos Detected
5-02 A40815 - 10	Mudded Roof Drain / Please See Map	Gray	Heterogeneous Friable Fibrous	35% Fiberglass	65% Matrix	No Asbestos Detected
5-03 A40815 - 11	Mudded Roof Drain / Please See Map	Gray	Heterogeneous Friable Fibrous	35% Fiberglass	65% Matrix	No Asbestos Detected
6-01 A40815 - 12	Roofing (Rubber Over Foam Over Tar Paper) /Please See Map	Yellow Brown	Heterogeneous Non-Friable Fibrous	15% Cellulose	85% Matrix	No Asbestos Detected
6-02 A40815 - 13	Roofing (Rubber Over Foam Over Tar Paper) /Please See Map	Yellow Brown	Heterogeneous Non-Friable Fibrous	15% Cellulose	85% Matrix	No Asbestos Detected
7-01 A40815 - 14	Roofing (Board Over Foam Over Lightweight Tar Paper) / Please See Map	Gray Black	Heterogeneous Non-Friable Non-Fibrous		100% Matrix	No Asbestos Detected
7-02 A40815 - 15	Roofing (Board Over Foam Over Lightweight Tar Paper) / Please See Map	Gray Black	Heterogeneous Non-Friable Non-Fibrous		100% Matrix	No Asbestos Detected
8-01 A40815 - 16	Roof Caulk (Dark Gray) / Please See Map	Gray	Homogeneous Non-Friable Non-Fibrous		100% Matrix	No Asbestos Detected
8-02 A40815 - 17	Roof Caulk (Dark Gray) / Please See Map	Gray	Homogeneous Non-Friable Non-Fibrous		100% Matrix	No Asbestos Detected
9-01 A40815 - 18	Roof Caulk (Dark Gray) / Please See Map	Gray	Homogeneous Non-Friable Non-Fibrous		100% Matrix	No Asbestos Detected
9-02 A40815 - 19	Roof Caulk (Dark Gray) / Please See Map	Gray	Homogeneous Non-Friable Non-Fibrous		100% Matrix	No Asbestos Detected
10-01 A40815 - 20	Roofing (Rubber Over Foam Over Tar Paper) / Please See Map	Black	Heterogeneous Non-Friable Non-Fibrous	2% Chrysotile	98% Matrix	Chrysotile 2%
10-02 A40815 - 21	Roofing (Rubber Over Foam Over Tar Paper) / Please See Map					Not Tested - Positive Stop # 20
11-01 A40815 - 22	Roof Caulk (Black) / Please See Map	Black	Homogeneous Non-Friable Non-Fibrous		100% Matrix	No Asbestos Detected



Report Prepared For: Performance Environmental Services
Project Name: Boyce Campus - Roofing
Project Number: 2620260
Report Date: 04/17/26
Lab Number: A40815

Client ID Lab No.	Client Description	Sample Color(s)	Laboratory Attributes	Fibrous Components	Non-Fibrous Components	Asbestos Type / Percent
11-02 A40815 - 23	Roof Caulk (Black) / Please See Map	Black	Homogeneous Non-Friable Non-Fibrous		100% Matrix	No Asbestos Detected

IMS Laboratory, LLC is accredited through the National Voluntary Laboratory Accreditation Program (NVLAP). Data is provided in compliance with NVLAP policy modules and ISO 17025:2017 guidelines.



04/17/26

Brandy Schultz, Asbestos Laboratory
Manager



Report Prepared For: Performance Environmental Services
Project Name: Boyce Campus - Roofing
Project Number: 2620260
Report Date: 04/17/26
Lab Number: A40815

Warranties, Legal Disclaimers, and Limitations

Stereoscopic microscopy and polarized light microscopy coupled with dispersion staining is the analytical technique used for sample identification. The percentage of each component is visually estimated by volume. The detection limit for this method is <1% by visual estimation and 0.25% by 400 point counts or 0.1% by 1,000 point counts. The samples were analyzed as submitted by the client and may not be representative of the larger material in question. IMS Laboratory, LLC ("IMS") will discard all samples after 7 days.

Matrix interference and/or resolution limits may yield false results in certain circumstances. Samples collected via tape and/or wipe may reduce sensitivity and reliability of quantification. Suspect floor tiles containing less than 1% asbestos should be tested with SEM or TEM. Many vinyl floor tiles have been manufactured using greater than 1% asbestos. Often the asbestos was milled to a fiber size below the detection limit of polarized light microscopy. Therefore, a "No Asbestos Found" reading on vinyl floor tile does not necessarily exclude the presence of asbestos. TEM provides a more conclusive form of analysis for vinyl floor tiles.

This certificate of analysis relates only to the samples tested, as received by IMS and, to insure the integrity of the results, may only be reproduced in full. IMS is not responsible for the accuracy of the results for layered samples or samples comprising multiple materials. Unless otherwise noted in the body of this report, the condition of samples upon receipt was acceptable.

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- End of Lab Report Number A40815 -

- 6 -

This report has been prepared by IMS Laboratory, LLC at the request of and for the exclusive use of Performance Environmental Services. Read the important terms, conditions, and limitations that apply to this report carefully.

Performance

Environmental Services, Inc.

PLM LABORATORY CHAIN OF CUSTODY

A40815

PROJECT #: 2620260

CLIENT:

CCAC

DATE COLLECTED: 4/13/20

PROJECT: Boyce Campus - Roofing

TECHNICIAN 1: A.N.

TECHNICIAN 2: J.W.

LOCATION: Monroeville, PA

SAMPLES RELINQUISHED BY:			DATE:	SAMPLES ACCEPTED BY:		DATE:
NOTIFY RESULTS VIA:		labdata@perform-env.com	TURNAROUND TIME:	3 days	TEST HA LAYERS UNTIL POSITIVE: POINT COUNT FOR 1% OR LESS:	Yes Yes
HA NUMBER	SAMPLE NUMBER	MATERIAL DESCRIPTION	SAMPLING LOCATION	TEM VERIFY (PLM ≤ 1%)	COMMENTS/RESULTS	
1	1-01	Built-up roof Crubber over foam over tar paper)	Please see map			
1	1-02	↓ ↓				
2	2-01	Roof caulk (black)				
2	2-02	↓ ↓				
3	3-01	Built-up roofing Crubber over foam over tar paper)				
3	3-02	↓ ↓				
4	4-01	Roof caulk (black)				
4	4-02	↓ ↓				

RECEIVED
APR 14 2020

1 of 3

Performance

Environmental Services, Inc.

PLM LABORATORY CHAIN OF CUSTODY

A40815

PROJECT #: 2620260

CLIENT:

CCAC

DATE COLLECTED: 4/13/20

PROJECT: Boyce Campus - Roofing

TECHNICIAN 1: A.W

TECHNICIAN 2: J.W

LOCATION: Monroeville, PA

SAMPLES RELINQUISHED BY:			DATE:	SAMPLES ACCEPTED BY:		DATE:
NOTIFY RESULTS VIA:		labdata@perform-env.com	TURNAROUND TIME:	3 days	TEST HA LAYERS UNTIL POSITIVE: POINT COUNT FOR 1% OR LESS:	Yes Yes
HA NUMBER	SAMPLE NUMBER	MATERIAL DESCRIPTION	SAMPLING LOCATION	TEM VERIFY (PLM ≤ 1%)	COMMENTS/RESULTS	
5	5-01	Muddled roof drain	Please see map			
5	5-02	↓ ↓				
5	5-03	↓ ↓				
6	6-01	Built-up roofing (rubber over foam over tarpaper)				
6	6-02	↓ ↓				
7	7-01	Built-up roofing (board over foam over light weight over tarpaper)				
7	7-02	↓ ↓				
8	8-01	Roof caulking (dark gray)				
8	8-02	↓ ↓				
RECEIVED APR 14 2026						

A40815

Performance

Environmental Services, Inc.

PLM LABORATORY CHAIN OF CUSTODY

PROJECT #: 2620260 CLIENT: CCAC DATE COLLECTED: 7/13/26

PROJECT: Boyce Campus - Roofing

TECHNICIAN 1: AN TECHNICIAN 2: J.W. LOCATION: Monroeville, PA

SAMPLES RELINQUISHED BY:			DATE:	SAMPLES ACCEPTED BY:		DATE:
NOTIFY RESULTS VIA:			labdata@perform-env.com	TURNAROUND TIME:	3 days	TEST HA LAYERS UNTIL POSITIVE: POINT COUNT FOR 1% OR LESS:
						Yes Yes
HA NUMBER	SAMPLE NUMBER	MATERIAL DESCRIPTION	SAMPLING LOCATION	TEM VERIFY (PLM ≤ 1%)	COMMENTS/RESULTS	
9	9-01	Roof cau MC dark gray	Please see map			
9	9-02	↓ ↓				
10	10-01	Built up roof (rubber over foam over tarp paper)				
10	10-02	↓ ↓				
11	11-01	Roof cau MC black				
11	11-02	↓ ↓				

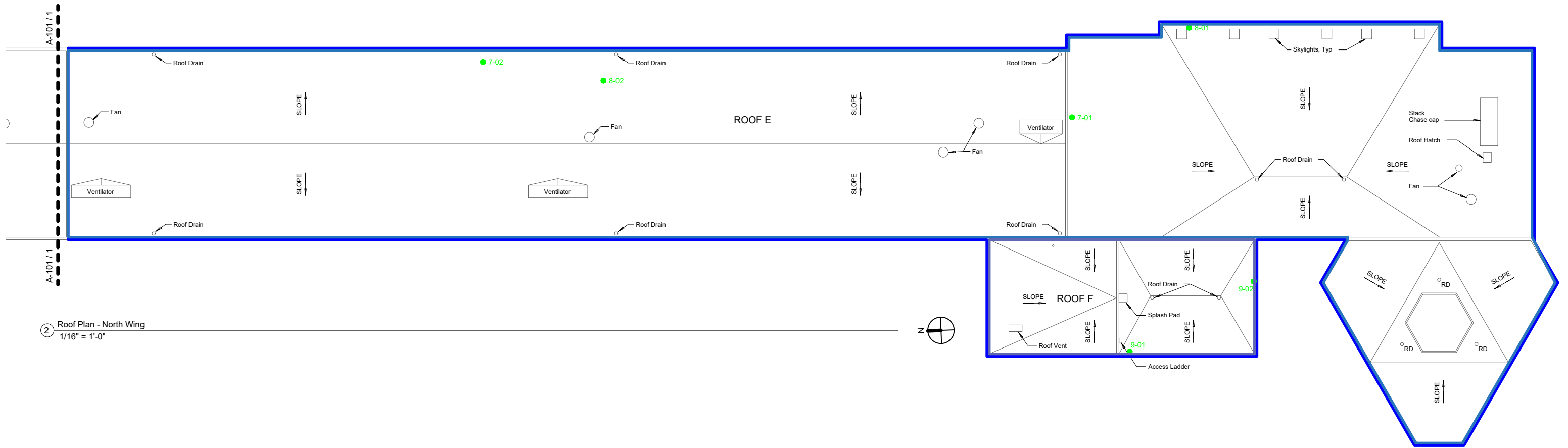
RECEIVED

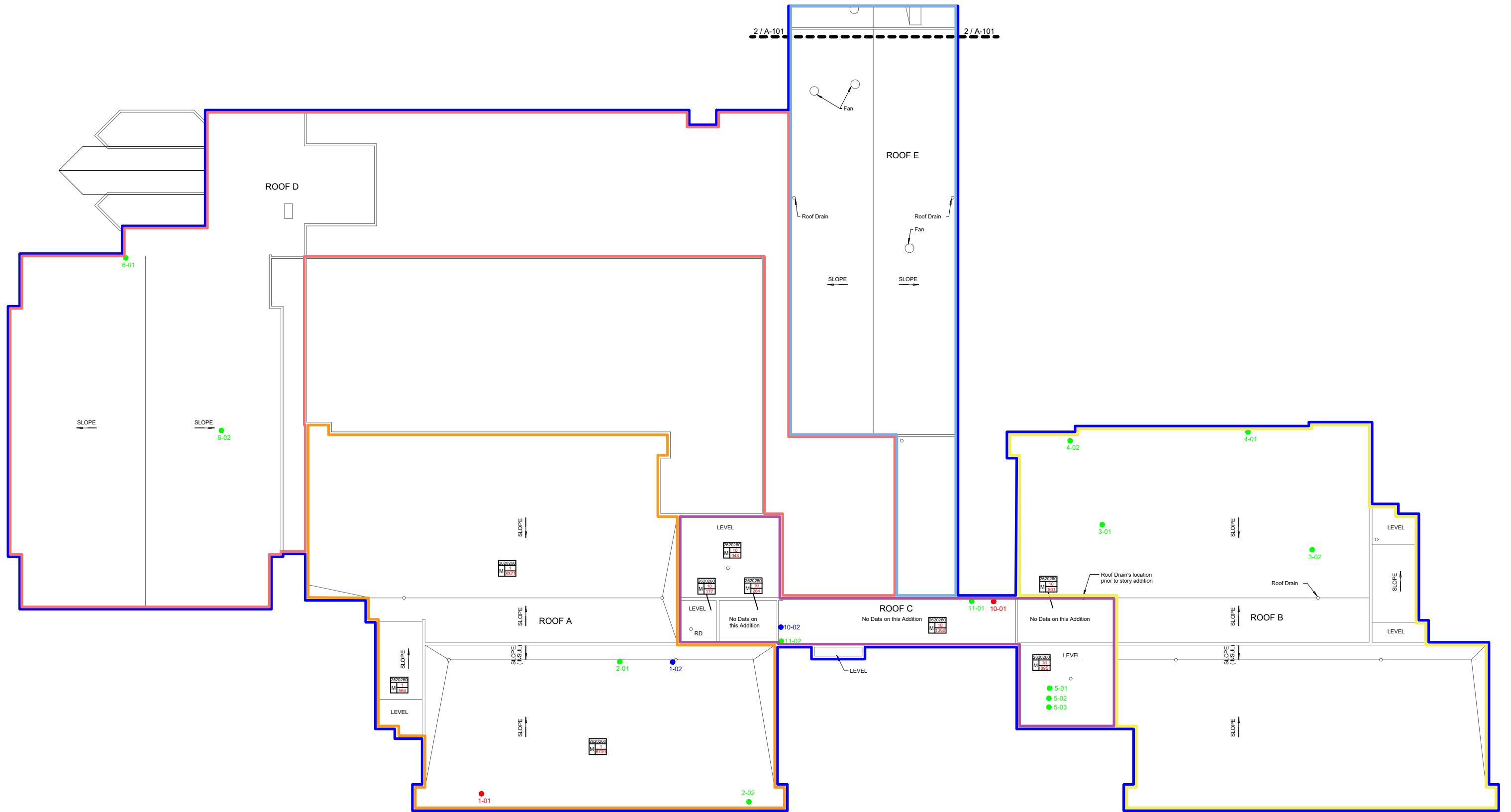
APR 14 2026

3 of 3

APPENDIX 2

BULK SAMPLE LOCATION MAPS



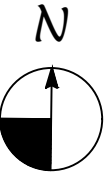


N

LEGEND

Boundary of survey

- Bulk Sample Locations:**
- Negative for asbestos
 - Positive for asbestos
 - Sample not analyzed



Locations of ACMs:

Generalized material type	142105 — Project #	
	F	8
	T	330
	M	3
Material HA number		420
Material quantity		

Generalized Material Letter Key:

- T = Thermal system insulation
- F = Flooring material
- S = Surfacing material
- M = Miscellaneous material

Notes:

Note: The callout tags showing the location of asbestos-containing materials may only be used to locate which room or corridor contains the material. The tags do not indicate the location of the material within the room or corridor.

Prepared For: Community College of Allegheny County Office of College Services- 420 800 Allegheny Avenue Pittsburgh, PA 15233		Bulk Sample Location Map	
Prepared By: Performance Environmental Services, Inc. 105 Bradford Road Suite 320 Wexford, PA 15090		CCAA Boyce Campus Roof Project	
Project Number: 2620260	Date: 04/13/26	Page: 2 of 2	Scale: None



Specifications and Contract Documents

for

CCAC BOYCE ROOF REPLACEMENT

CONSTRUCTION DOCUMENTS

April 29, 2026

Owner: Contact: Noel Knille, AIA, RLA CCAC 202.590.0137 nknille@ccac.edu	Architect: Contact: Rebecca Lowe, AIA Desmone 740.381.5869 rlowe@desmone.com
Structural Engineer: Contact: Nate Babyak, PE, SE Osborn Engineering 724.989.8000 nbabyak@osborn-eng.com	MEP Engineer: Contact: Shane Brant CET, CPD Osborn Engineering 484.928.6778 sbrant@osborn-eng.com



COMMUNITY COLLEGE OF ALLEGHENY COUNTY
BOYCE ROOF REPLACEMENT
CONSTRUCTION DOCUMENTS

TABLE OF CONTENTS

DIVISION 01 GENERAL REQUIREMENTS

011000	SUMMARY
011200	MULTIPLE CONTRACT SUMMARY
012200	UNIT PRICES
012300	ALTERNATES
012500	SUBSTITUTION PROCEDURES
012600	CONTRACT MODIFICATION PROCEDURES
012900	PAYMENT PROCEDURES
013100	PROJECT MANAGEMENT AND COORDINATION
013200	CONSTRUCTION PROGRESS DOCUMENTATION
013300	SUBMITTAL PROCEDURES
014000	QUALITY REQUIREMENTS
014200	REFERENCES
015000	TEMPORARY FACILITIES
016000	PRODUCT REQUIREMENTS
017300	EXECUTION
017700	CLOSEOUT PROCEDURES
017823	OPERATION AND MAINTENANCE DATA
017839	PROJECT RECORD DOCUMENTS

DIVISION 04 MASONRY

040110	MASONRY CLEANING
040120.64	BRICK MASONRY REPOINTING

DIVISION 05 METALS

055200	METAL LADDERS

DIVISION 06 WOOD, PLASTICS, AND COMPOSITES

061053	MISCELLANEOUS ROUGH CARPENTRY
061600	SHEATHING

DIVISION 07 THERMAL AND MOISTURE PROTECTION

070150.19	PREPARATION FOR REROOFING
072713	MODIFIED SELF-ADHERING SHEET AIR BARRIERS
074213.13	FORMED METAL WALL PANELS
075416	KETONE ETHYLENE ESTER (KEE) ROOFING
076200	SHEET METAL FLASHING AND TRIM
077223	ROOF EDGE PROTECTION SYSTEM
077233	ROOF HATCH

CCAC BOYCE ROOF REPLACEMENT

DIVISION 22 PLUMBING

220500	COMMON WORK RESULTS FOR PLUMBING
220517	SLEEVES AND SLEEVE SEALS FOR PLUMBING PIPING
220529	HANGERS AND SUPPORTS FOR PLUMBING PIPING AND EQUIPMENT
220553	IDENTIFICATION FOR PLUMBING PIPING AND EQUIPMENT
220719	PLUMBING PIPING AND EQUIPMENT INSULATION
221005	PLUMBING PIPING
221423	STORM DRAINAGE PIPING SPECIALTIES

END OF TABLE OF CONTENTS

CCAC BOYCE ROOF REPLACEMENT

SECTION 011000 - SUMMARY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Project information.
 - 2. Work covered by Contract Documents.
 - 3. Work under Owner's separate contracts.
 - 4. Access to site.
 - 5. Coordination with occupants.
 - 6. Work restrictions.
 - 7. Specification and Drawing conventions.
- B. Related Requirements:
 - 1. Section 015000 "Temporary Facilities and Controls" for limitations and procedures governing temporary use of Owner's facilities.

1.3 PROJECT INFORMATION

- A. Project Identification: CCAC Boyce Roof Replacement
 - 1. Project Location: 595 Beatty Road, Monroeville, PA 15146
- B. Owner: Community College of Allegheny County
 - 1. Owner's Representative:
Noel Knille, AIA, RLA
Vice President for Facilities and Chief Facilities Officer
Office of College Services
800 Allegheny Ave; Room 419
Pittsburgh, PA 15233
202.590.0137
nknille@ccac.edu
- C. Architect: Desmone Architects.
 - 1. Architect's Representative:
Rebecca Lowe, AIA
3400 Butler Street
Pittsburgh, PA 15201
740.381.5869
rlowe@desmone.com

CCAC BOYCE ROOF REPLACEMENT

- D. Architect's Consultants: Architect has retained the following design professionals who have prepared designated portions of the Contract Documents:
1. Structural Engineer: Osborn Engineering, Nate Babyak, PE, SE, 724.989.8000, nbabyak@osborn-eng.com
 2. MEP & FP Engineer: Osborn Engineering, Shane Brant, CET, CPD, 484.928.6778, sbrant@osborn-eng.com

1.4 WORK COVERED BY CONTRACT DOCUMENTS

- A. The Work of Project is defined by the Contract Documents and includes construction related services for the complete roof replacement at the CCAC Boyce Campus Building. The existing building roof is approximately 105,895 SF. The existing roof is, overall, well beyond its useful life and the Boyce Campus building roof has experienced ongoing leaks for many years. The roof replacement work generally includes, but is not limited to the following:
1. Removal of existing roof in its entirety (membrane, insulation, ballast material and related) down to the existing roof deck and structure.
 2. Roof deck repair where indicated.
 3. Design of new fully adhered, single-ply membrane roof system (all required vapor barriers, insulation and membrane), including parapet wall coping and all required flashing and counterflashing. Current code-required R-value for insulation must be achieved. (Roof system to have 30 year warranty.)
 4. Masonry cleaning and repointing where indicated.
 5. Permanently installed access ladders where indicated.
 6. Metal wall panel replacement and parapet wall extensions where indicated.
 7. Roof hatch installation or component replacement where indicated.
 8. Add Alternate 1: perimeter edge protection system where designated.
 9. Roof drain and leader replacement.
 10. Roof overflow scuppers.
 11. Raising of existing mechanical units and other roof top equipment where indicated.
 12. New mechanical equipment and associated electrical work where indicated.
- B. Type of Contract:
1. Project will be constructed under coordinated, concurrent multiple contracts. See Section 011200 "Multiple Contract Summary" for a description of work included under each of the multiple contracts and for the responsibilities of Project coordinator. Contracts for this Project include the following:
 - a. General Construction
 - b. Mechanical
 - c. Plumbing

1.5 WORK UNDER OWNER'S SEPARATE CONTRACT

- A. Work with Separate Contractors: Cooperate fully with Owner's separate contractors, so work on those contracts may be carried out smoothly, without interfering with or delaying Work under this Contract or other contracts. Coordinate the Work of this Contract with work performed under Owner's separate contracts.
- B. Concurrent Work: Construction of Boyce Biology Lab Project at area indicated on drawings. Those operations will be conducted simultaneously with Work under this

CCAC BOYCE ROOF REPLACEMENT

Contract. Coordination and scheduling of work must be conducted between the two projects General Contractors. General sequencing to be:

1. Biology Lab Project – Remove all mechanical equipment from roof related to Biology Lab Project. Structurally patch all openings in roof deck and make watertight.
2. Roof Project – Remove ballasted roof from this entire roof area.
3. Roof project – Clean and prep roof, repair parapet wall, install insulation and membrane roofing.
4. Biology Lab Project – cut necessary openings, install curbs for new equipment, flash curbs, install new equipment, install crickets as designed. Assure that the roof is weather tight and that warranty remains in place at completion of all new installations related to the Biology Project. installation.

1.6 ACCESS TO SITE

- A. General: Each Contractor shall have limited use of Project site for construction operations as indicated by the Contract limits and as indicated by requirements of this Section.
- B. Use of Site: Limit use of Project site to areas within the Contract limits as much as possible. Owner will identify and provide sufficient space for contractors to place temporary facilities. Do not disturb portions of Project site beyond areas in which the Work is indicated.
 1. Driveways, Walkways and Entrances: Keep driveways, loading areas, and entrances serving premises clear and available to Owner, Owner's employees, Students and emergency vehicles at all times. Do not use these areas for parking or for storage of materials.
 - a. Schedule deliveries to minimize use of driveways and entrances by construction operations.
 - b. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.
- C. Condition of Existing Building: Maintain portions of existing building affected by construction operations in a weathertight condition throughout construction period. Repair damage caused by construction operations.
- D. Condition of Existing Grounds: Maintain portions of existing grounds, landscaping, and hardscaping affected by construction operations throughout construction period. Repair damage caused by construction operations.

1.7 COORDINATION WITH OCCUPANTS

- A. Full Owner Occupancy: Owner will occupy Project site and existing building(s) during entire construction period. Cooperate with Owner during construction operations to minimize conflicts and facilitate Owner usage. Perform the Work so as not to interfere with Owner's day-to-day operations. Maintain existing exits unless otherwise indicated.
 1. Maintain access to existing walkways, corridors, and other adjacent occupied or used facilities. Do not close or obstruct walkways, corridors, or other occupied or used facilities without written permission from Owner and approval of authorities having jurisdiction.

CCAC BOYCE ROOF REPLACEMENT

2. Notify Owner not less than 72 hours in advance of activities that will affect Owner's operations.

1.8 WORK RESTRICTIONS

- A. Work Restrictions, General: Comply with restrictions on construction operations.
- B. On-Site Work Hours: Limit work on the site to 6a.m. to 8p.m., Monday through Friday unless otherwise indicated or approved. Work hours may be modified to meet Project requirements if approved by Owner and authorities having jurisdiction.
 1. Weekend Hours: Coordinate work with Owner and provide notifications within 72 hours.
 2. Early Morning Hours: Coordinate work with Owner and provide notifications within 72 hours.
 3. Work in Existing Building: Coordinate work with Owner and provide notifications within 72 hours.
- C. Existing Utility Interruptions: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after providing temporary utility services according to requirements indicated:
 1. Notify Owner not less than 10 days in advance of proposed utility interruptions.
 2. Obtain Owner's written permission before proceeding with utility interruptions.
- D. Noise, Vibration, and Odors: Coordinate operations that may result in high levels of noise and vibration, odors, or other disruption to Owner occupancy with Owner.
 1. Notify Construction Manager not less than two days in advance of proposed disruptive operations.
 2. Obtain Construction Manager's written permission before proceeding with disruptive operations.
- E. Restricted Substances: Use of tobacco products and other controlled substances on Project site is not permitted.

1.9 SPECIFICATION AND DRAWING CONVENTIONS

- A. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:
 1. Imperative mood and streamlined language are generally used in the Specifications. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.
 2. Specification requirements are to be performed by Contractor unless specifically stated otherwise.
- B. Division 01 General Requirements: Requirements of Sections in Division 01 apply to the Work of all Sections in the Specifications.
- C. Drawing Coordination: Requirements for materials and products identified on Drawings are described in detail in the Specifications. One or more of the following are used on Drawings to identify materials and products:

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1. Terminology: Materials and products are identified by the typical generic terms used in the individual Specifications Sections.
2. Abbreviations: Materials and products are identified by abbreviations scheduled on Drawings.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 011000

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SECTION 011200 - MULTIPLE CONTRACT SUMMARY

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. A summary of each contract, including responsibilities for coordination and temporary facilities and controls.
2. Specific requirements for Work of each contract are also indicated in individual Specification Sections and on Drawings.

B. Related Documents:

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

C. Related Requirements:

1. Section 01 10 00 "Summary" for the Work covered by the Contract Documents, restrictions on use of Project site, coordination with occupants, and work restrictions.
2. Section 01 25 00 "Substitution Procedures" for substitutions.
3. Section 01 31 00 "Project Management and Coordination" for general coordination requirements.
4. Section 01 32 00 "Construction Progress Documentation" for scheduling requirements.
5. Section 01 50 00 "Temporary Facilities and Controls" for limitations and procedures governing temporary use of Owner's facilities.

1.2 ABBREVIATIONS

A. Abbreviations used in this Section relate to project Contractors and Contracts and may be as follows:

1. GC: General Contractor or General Construction Contract.
2. HC, M: HVAC Contractor or HVAC Contract.
3. PC, P: Plumbing Contractor or Plumbing Contract.

1.3 DEFINITIONS

- ##### A. Permanent Enclosure:
- As determined by the Architect, the condition at which roofing is insulated and weathertight; exterior walls are insulated and weathertight; and openings are closed with permanent construction or substantial temporary closures equivalent in weather protection to permanent construction.

1.4 COORDINATION

- ##### A. Lead Contractor shall act as main contractor for project and be responsible for general coordination among various project contracts.

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1. General Contractor shall act as Lead Contractor.
- B. Lead Contractor: Be experienced in administration and supervision of building construction, including mechanical and plumbing work. Coordination activities of Lead Contractor include, but are not limited to, the following:
 1. Provide overall coordination of the Work, including work by separate Contractors.
 2. Coordinate shared access to workspaces.
 3. Coordinate product selections for compatibility.
 4. Provide overall coordination of temporary facilities and controls.
 5. Coordinate, schedule, and approve interruptions of permanent and temporary utilities, including those necessary to make connections for temporary services.
 6. Prepare coordination drawings in collaboration with each contractor to coordinate work by more than one contract.
 7. Coordinate construction and operations of the Work with that performed by each Contract.
 8. Coordinate Owner required quality-assurance and quality-control services specified in Section 01 40 00 "Quality Requirements".
 9. Provide information necessary to adjust, move, or relocate existing utility structures affected by construction.
 10. Provide experienced field superintendent's name and resume for approval by Owner and Architect.
 11. Coordinate product selections for compatibility.
 12. Coordinate sequence of activities to accommodate tests and inspections, and coordinate schedule of tests and inspections.
 13. Coordinate sequencing and scheduling of the Work, as required by Section 01 32 00 "Construction Progress Documentation," including the following:
 - a. Initial Coordination Meeting: At earliest possible date, arrange and conduct a meeting with separate Contractors for sequencing and coordinating the Work; negotiate reasonable adjustments to project schedules.
 - b. Prepare a Construction Schedule for entire Project. Base schedule on Startup Construction Schedule. Secure time commitments for performing critical construction activities from other Contractors. Show activities of each Prime Contract. Prepare a simplified summary sheet indicating combined construction activities for all Contracts.
 - c. Distribute copies to Architect, Owner, and separate Contractors of completed Construction Schedule approved and signed by all Contractors.
 - d. Submit a final Construction Schedule signed by project Contractors prior to first payment application.
 - e. If Lead Contractor fails to provide CPM Construction Schedule as required, Owner will provide Construction Schedule and deduct associated costs from GC's Contract sum.
 14. Provide Construction Schedule updates as required. Provide progress cleaning of common areas and coordinate progress cleaning of areas or

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pieces of equipment where more than one Contractor has worked.

15. Coordinate following actions that are to be taken by each Contractor as is required to complete their Work:
 - a. Cutting and patching.
 - b. Protection of the Work.
 - c. Completion of interrelated punch list items.
16. Coordinate preparation of Project Record Documents if information from more than one Contractor is to be integrated with information from other Contractors to form one combined record.
17. Print and submit Record Documents if installations by more than one contractor are indicated on the same Contract Drawing or shop Drawing.
18. Collect record Specification Sections from contractors, collate Sections into numeric order, and submit complete set.
19. Coordinate preparation of operation and maintenance manuals if information from more than one contractor is to be integrated with information from other contractors to form one combined record.

1.5 GENERAL REQUIREMENTS OF CONTRACTS

- A. Extent of Contract: Unless the Contract Documents contain a more specific description of the Work of each Contract, requirements indicated on Drawings and in Specification Sections determine which Contract includes a specific element of Project.
 1. Local custom and trade-union jurisdictional settlements do not control the scope of the Work of each contract. When a potential jurisdictional dispute or similar interruption of work is first identified or threatened, affected Contractors shall negotiate a reasonable settlement to avoid or minimize interruption and delays.
 2. Perform Work specifically depicted and described by, or reasonably inferable from, the Contract Documents as work necessary to produce intended results of respective Construction Contract. Commonly recognized names and terminology on Drawings and in Specifications may reasonably be used to infer which contract includes a specific element of the Project.
 3. Requirements and Specifications of Project Manual applicable to all Contracts:
 - a. Contract Documents of Division 00 - Procurement and Contracting Requirements.
 - b. Sections of Division 01 - General Requirements.
- B. Unless otherwise indicated, the work described in this Section for each contract shall be complete systems and assemblies, including products, components, accessories, and installation required by the Contract Documents.
 1. Each Contractor is responsible for verification of existing conditions.

CCAC BOYCE ROOF REPLACEMENT

2. Each Contractor is responsible for compliance with Americans with Disability Act Accessibility Guidelines, ADAAG, as relating to its work scope.
 3. Blocking and Backing Panels: Provided by each Contractor for its own Work
 4. Metal Fabrication Supports: Work for each Contractor shall be by Contractor requiring Metal Fabrication Supports, unless noted otherwise.
 5. Roof-Mounted Equipment Curbs: Provided by each Contractor for its own Work.
 6. Field Painting: Work of each Contractor shall be the work of General Contractor.
 7. Cutting and Patching: Provide by each Contractor for its own Work.
 8. Firestopping: Provide by each Contractor for its own Work.
 9. Caulking: Provide by each Contractor for its own Work. Coordinate between Contractors for proper and consistent installation.
- C. It is Contractor's responsibility to review ALL Drawings and Specifications for comprehension of its Contract Work scope.
- D. Project Coordination:
1. Each Contractor shall participate in and cooperate with coordination activities of Lead Contractor and other Contractors. Perform Work in support of most recent updated and approved Construction Schedule, Submittals Schedule, and Coordination Drawings to maintain required sequence and overall progress of project.
 - a. Prepare, circulate and amend Coordination Drawings.
 - b. Provide information requested by Lead Contractor in preparation of Construction Schedule, including time commitments for critical activities.
 - c. Prepare for and attend scheduled project update, coordination and pre-installation meetings, and other project meetings.
 2. Coordinate Work with that of other Contractors and work by Owner, including access and performance of personnel and equipment, staging and storing of tools and materials, sequencing of operations, and use and maintenance of temporary facilities and services.
 - a. Modifications to the Work made necessary by a Contractor's failure to properly coordinate the Work, or costs incurred by a Contractor as a result of such failure, shall be the responsibility of that Contractor. No additional cost shall be incurred by Owner for such failure.
 3. Participate in and cooperate with quality assurance, testing and inspection activities of Lead Contractor, Owner, other Contractors.
 4. Participate in and cooperate with closeout activities and procedures of Lead Contractor, and Architect.
 5. Participate in and cooperate with requirements and procedures for site safety and security measures, daily and periodic cleaning, personnel behavior, worker and delivery access, daily materials delivery, and Owner's continued occupancy and use of sites adjacent to Project areas.
- E. Logistics:

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1. Requirements for use of building and site for specific activities are indicated in Contract Documents are intended to allow for Owner's continued use of site and facilities during project time, and to allow the Work to proceed uninterrupted during project time.
 2. It is responsibility of each Prime Bidder to review logistics requirements prior to bid to fully understand proposed sequencing, restrictions and durations. There will be no extensions of time on the project due to Contractor not fully understanding logistics requirements.
 3. Deviations from specific logistics requirements may be approved, with prior written approval from Owner and properly coordinated with all Contracts, only if there is no adverse impact on Owner's intended continued use of facility and no additional cost to Owner, or to any Contractor.
- F. Recovery Plan: There will be no extensions of time on the project; it is of the essence of the Contract that Substantial Completion be achieved as required by Contract. If it becomes apparent that a Contractor will not meet one of agreed-upon critical milestones, or the date for Substantial Completion, that Contractor shall immediately institute a Recovery Plan. Some or all of following shall be employed at no additional cost to Owner:
- a. Increase manpower.
 - b. Increase man-hours per shift, shifts per workday, days per work week, or any combination thereof. Additional cost for Architect, or Owner for overtime or shift work shall be borne by Contractor.
 - c. Increase construction equipment or expedite material deliveries.
 - d. Revise scheduled sequencing of Contractor's tasks to put project back on schedule.
2. If Contractor fails to institute a recovery plan within 24 hrs from written notice, which will return project to original schedule, appropriate action may be taken involving contractual commitments and performance bonds.
 3. Costs for any recovery plan shall be anticipated by Contractor and included in its Base Bid , plus approved Alternate Bid amounts.
 4. If Contractor fails to return project to original schedule, Contractor shall be responsible for developing a Recovery Schedule as described in Section 01 32 00 "Construction Progress Documentation". Contractor shall be responsible for all costs incurred by other Contractors, and by Owner, resulting from the development and implementation of a Recovery Schedule.
- G. Substitutions: Each contractor shall cooperate with other Contractors involved to coordinate approved substitutions with remainder of the work.
1. Contractor initiating or requesting Substitution shall be responsible for coordinating substitution's installation requirements with other affected Contractors. If other Contractors incur costs (direct or indirect) as a result of the substitution, the Contractor initiating substitution shall be responsible for all costs incurred by other Contractors. Owner shall incur no additional costs as a result of substitution.
 2. Any costs incurred by Architect as a result of Substitution shall be paid for by Contractor initiating the substitution.
 3. Use by any Contractor of products, systems, or assemblies other than those identified as Basis-of-Design, whether or not approved as Substitution, shall not result in additional cost to Owner, Architect or other Contractors.

CCAC BOYCE ROOF REPLACEMENT

Contractor employing such substitutions, whether or not approved, shall be subject to a reduction in Contract Sum to compensate for charges so incurred by Owner, Architect or other Contractors.

4. Substitutions shall be made in accordance with the requirements of Section 01 25 00 "Substitutions."
 - H. Temporary Facilities and Controls: In addition to specific responsibilities for temporary facilities and controls indicated in this Section and in 015000 "Temporary Facilities", each Contractor is responsible for the following:
 1. Installation, operation, maintenance, and removal of each temporary facility necessary for its own normal construction activity, and costs and use charges associated with each facility.
 2. Plug-in electric power cords and extension cords, and any lighting required by Contractor.
 3. Its own field office, complete with necessary furniture, utilities, and telephone service.
 4. Its own storage and fabrication sheds.
 5. Temporary enclosures for its own construction activities.
 6. Hoisting facilities for its own construction activities.
 7. Staging, scaffolding, and shoring for its own construction activities.
 8. Waste disposal facilities, including collection and legal disposal of its own hazardous, dangerous, unsanitary, or other harmful waste materials, and as required by Sections 01 50 00 "Temporary Facilities" and 01 73 00 "Execution."
 9. Progress cleaning of work areas affected by its operations on a daily basis.
 10. Secure lockup of its own tools, materials, and equipment.
 11. Construction aids and miscellaneous services and facilities necessary exclusively for its own construction activities.
 - J. Municipal Permits, Registrations, Certifications, and Inspections:
 1. All Contractors: Obtain and pay for required local licenses, permits and inspections related to their Work.
- 1.2 GENERAL CONSTRUCTION CONTRACT
- A. Work in the General Construction Contract includes but is not limited to, the following:
 1. Remaining work not identified as work under other contracts.
 2. Shall be responsible for submission of compliant prevailing wage documents including those of subcontractors.
 3. Shall be responsible for any maintenance within the perimeter of the construction trailer area in regards to weed abatement and mowing of the grass.
 4. Provide all hoisting and rigging associated with and related to their Work.
 5. Shall be responsible for hazardous material identification and remediation, including engaging qualified professionals, identification & testing, means & methods of remediation, permitting with the Allegheny County Health Department and coordination with other Prime Contractors. The Owner has provided an existing asbestos report for reference in the bid proposal documents.
 6. Provide removal of roofing and demolition related to their scope of their

CCAC BOYCE ROOF REPLACEMENT

- Work.
7. Provide cutting and patching associated with and related to their Work.
 8. Provide fire stopping, fire sealing, tagging and/or labeling for rated walls for all work related/required to their Work.
 9. Provide for and maintain the general safety of the project; as well as safety signage with emergency egress plans out of the structure.
 10. Provide all safety equipment, tools and material required to perform and complete Work.
 11. Provide leading edge and overhead work protection, cables and toe board or netting as required by OSHA including, but not limited to the perimeter of the roof and stairs. Maintain while on site and include final removal.
 12. Provide all temporary dust and sound partitions necessary to fully isolate portions of the building as needed for their Work.
 13. Provide all equipment, tools and material required to perform and complete their Work.
 14. Provide all temporary barricades, signage and protection of their Work.
 15. Provide final cleaning.
 16. Provide all blocking related to their Work.
 17. Shall include all interior and exterior joint sealants of their Work.
 18. Provide a warranted roofing system and fulfill all testing and inspection requirements prior to acceptance.
 19. Provide all openings, flashings and all related accessories/components for the roofing system, including those for all prime contractors' scopes of work related to this project. No work shall be performed on the roofing system that will affect or void the warranty or the roofing system. All openings to be laid out and verified by HC and PC.
 20. Provide a complete roof drainage system.
 21. Provide all exterior skin components including but not limited to metal panels, metal trim and all associated components.
 22. Provide all roof opening framing as required, including for all other Prime Contractor's scope of work.
 23. Provide all flashings at all exterior openings roof/wall penetrations and material transitions including at those for all other Prime Contractor's scopes of work.
 24. Provide all roof hatches and safety components.
 25. Provide all permanent ladders and safety cages.
 26. Provide all roof edge protection systems.
 27. Install all roof curbs and flashings for related scope of Work.
 28. Provide all roof insulation.
 29. Provide all structural and miscellaneous steel assemblies.
 30. Provide all roof anchors.
 31. Provide all masonry cleaning and repointing.
 32. Provide gypsum wall board systems at skylight infill.
 33. Provide all interior and exterior painting as per drawings and specifications.
- B. The Work of this Contract generally consists of the Work described by the following Specification Sections and as shown and indicated on the Drawings. The Work is not restricted by division of Drawings or Specifications. Each Contractor is obligated to view entire project Drawing Set to ascertain Work of this Contract. Unless otherwise specifically noted, all work to be performed shall consist of providing all labor, materials, equipment and whatever is necessary to complete the Work in accordance with the Contract Documents and applicable

CCAC BOYCE ROOF REPLACEMENT

Codes.

1. Specification Sections of the Project Manual:
 - a. All Sections of Divisions 04 through 07.
2. Include the following specification sections only as they pertain to your summary of work:
 - a. All Sections of Division 00 – Procurement and Contracting Requirements
 - b. All Sections of Division 01 – General Requirements
 - c. All Other Sections Not Listed Above

1.3 HVAC CONTRACT

- A. Work in the HVAC Contract includes, but is not limited to, the following:
 1. Shall be responsible for submission of compliant prevailing wage documents including those of subcontractors.
 2. Provide copies of all welding certifications related to their scope of work.
 3. Provide all HVAC piping, ducting, equipment, accessories and components as indicated in the drawings, which meets or exceeds all current code requirements.
 4. Provide all electrical connections related to their scope of work.
 5. Provide all cutting and patching associated with and related to their Work.
 6. Provide all permits, inspections / approvals, testing / debugging, and pay all fees required for their scope of work. This includes all County and Health Department requirements.
 7. Provide all tools, materials, and equipment required for their scope of work.
 8. Provide all fire stopping, fire sealing and sealant related to their Work.
 9. Provide all rooftop curbs and extensions for equipment covered by their Work. Coordinate locations with the General Construction Contractor for roofing and flashing tie-ins.
 10. Shall provide coordination with all other Prime Contractors.
 11. Provide Testing and Balancing.
 12. Provide all hoisting and rigging equipment required by their Work.
 13. Furnish and install all access panels related to their Work.
 14. Provide “As Built Drawings” for all systems related to their scope of work to the Lead Contractor.
 15. Provide all safety equipment/ materials/ tools required to safely perform and complete their Work and comply with all OSHA and local requirements.
 16. Provide all equipment/ material/ tools required to perform and complete their Work.
 17. Provide daily cleanup and debris removal associated with and related to their scope of work.
 18. Provide Construction Schedule input and coordinate with General Construction Contractor who is the Lead Contractor for scheduling.
 19. Provide all required system or equipment start up, including documentation.
 20. Provide Owner training and service as specified.
 21. Provide all floor and wall penetrations required/related and any/all associated boots, sleeves, and rain hoods for their Work. Openings at roof and tie-in to

CCAC BOYCE ROOF REPLACEMENT

- roofing, weather barrier, or waterproofing systems shall be by General Construction Contractor.
22. Shall provide coordination with all other Prime Contractors.
 23. Shall notify Owner and General Construction Contractor of any suspected hazardous materials prior to starting any demolition work.
- B. The Work of this Contract generally consists of the Work described by the following Specification Sections and as shown and indicated on the Drawings. The Work is not restricted by division of Drawings or Specifications. Each Contractor is obligated to view entire project Drawing Set to ascertain Work of this Contract. Unless otherwise specifically noted, all work to be performed shall consist of providing all labor, materials, equipment and whatever is necessary to complete the Work in accordance with the Contract Documents and applicable Codes.
1. Include the following specification sections only as they pertain to your summary of work:
 - a. All Sections of Division 00 – Procurement and Contracting Requirements
 - b. All Sections of Division 01 – General Requirements
 - c. All Other Sections Not Listed Above
- 1.4 PLUMBING CONTRACT
- A. Work in the Plumbing Contract includes but is not limited to the following:
1. Shall be responsible for submission of compliant prevailing wage documents including those of subcontractors.
 2. Provide all hangers, supports, insulation, identification and painting required for their Work.
 3. Provide all cutting and patching related to their Work.
 4. Provide all permits, inspections / approvals, testing / debugging, and pay all fees required for their scope of work. This includes all County and Health Department requirements.
 5. Provide Record Drawings for all systems related to their scope of work.
 6. Provide Construction Schedule input and coordinate with General Construction Contractor who is the Lead Contractor for scheduling.
 7. Provide all tools, materials and equipment required for their Work.
 8. Provide all hoisting and rigging equipment required for their Work.
 9. Provide all access panels related to their Work..
 10. Provide all fire stopping, fire sealing and interior acoustical sealant for their Work.
 11. Provide all safety equipment, materials and tools required to safely perform and complete their Work and comply with all OSHA and local requirements.
 12. Provide complete roof drainage system including all drains and downspout nozzles. Tie-in to roofing or weather barrier system by General Construction Contractor.
 13. Provide all above ground storm sanitary piping to below grade and possibly back to the main storm system. Provide all necessary components for a complete, functional and code compliant system.
 14. Provide all trenching / excavation, bedding and backfill materials and remove all spoils related to their scope of work.
 15. Removal and reinstallation/repair of all walls, ceilings, floors, and other interior

CCAC BOYCE ROOF REPLACEMENT

finishes and components being disturbed by the sanitary storm drainage work. Components and finishes shall be returned to finished conditions to match existing. Demolition and temporary removal of materials shall be performed in such a manner that will not damage adjoining surfaces or equipment by using protective measures.

16. Provide daily cleanup and debris removal associated with and related to their scope of work.
17. Shall be responsible for all dewatering related to their scope of work.
18. Provide temporary rainwater conductors as required for construction and removal once permanent systems are operational.
19. Is responsible for all foundation, slab and wall sleeves related to their Work.
20. Provide all floor and wall penetrations required/related and any/all associated boots, sleeves, and rain hoods for their Work. Openings at roof and tie-in to roofing, weather barrier, or waterproofing systems shall be by General Construction Contractor.
21. Shall be responsible for supplying, installing, and maintaining all barricades/coverings required/related to all openings/penetrations in floors, walls, or roof per current OSHA standards and local code requirements for safety required/related to their Work.
22. Shall provide coordination with all other Prime Contractors.
23. Shall notify Owner and General Construction Contractor of any suspected hazardous materials prior to starting any demolition work.

- B. The Work of this Contract generally consists of the Work described by the following Specification Sections and as shown and indicated on the Drawings. The Work is not restricted by division of Drawings or Specifications. Each Contractor is obligated to view entire project Drawing Set to ascertain Work of this Contract. Unless otherwise specifically noted, all work to be performed shall consist of providing all labor, materials, equipment and whatever is necessary to complete the Work in accordance with the Contract Documents and applicable Codes.

1. Specification Sections of the Project Manual:
 - a. All Sections of Division 22.
2. Include the following specification sections only as they pertain to your summary of work:
 - a. All Sections of Division 00 – Procurement and Contracting Requirements
 - b. All Sections of Division 01 – General Requirements
 - c. All Other Sections Not Listed Above

PART 2 – PRODUCTS (Not Used)

PART 3 – EXECUTION (Not Used)

END OF SECTION 011200

CCAC BOYCE ROOF REPLACEMENT

SECTION 012200 - UNIT PRICES

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 unit prices.
- B. Related Requirements:
 - 1. Section 012600 "Contract Modification Procedures" for procedures for submitting and handling Change Orders.
 - 2. Section 014000 "Quality Requirements" for field testing by an independent testing agency.

1.3 DEFINITIONS

- A. Unit price is an amount incorporated into the Agreement, applicable during the duration of the Work as a price per unit of measurement for materials, equipment, or services, or a portion of the Work, added to or deducted from the Contract Sum by appropriate modification, if the scope of Work or estimated quantities of Work required by the Contract Documents are increased or decreased.

1.4 PROCEDURES

- A. Unit prices include all necessary material, plus cost for delivery, installation, insurance, applicable taxes, overhead, and profit.
- B. Measurement and Payment: See individual Specification Sections for work that requires establishment of unit prices. Methods of measurement and payment for unit prices are specified in those Sections.
- C. Owner reserves the right to reject Contractor's measurement of work-in-place that involves use of established unit prices and to have this work measured, at Owner's expense, by an independent surveyor acceptable to Contractor.
- D. List of Unit Prices: A schedule of unit prices is included in Part 3. Specification Sections referenced in the schedule contain requirements for materials described under each unit price.

CCAC BOYCE ROOF REPLACEMENT

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 SCHEDULE OF UNIT PRICES

A. Unit Price No. 1-GC: MASONRY CLEANING

1. Description: Masonry cleaning of additional areas not identified on the construction drawings and according to Section 040110 "Masonry Cleaning". Additional cleaning will be determined and approved by Architect and Owner.
2. Unit of Measurement: Square foot of masonry cleaned.
3. Unit prices include labor, materials, tools, equipment, and incidentals required for cleaning masonry during the course of construction.

B. Unit Price No. 2-GC: BRICK MASONRY REPOINTING

1. Description: Brick masonry repointing of additional areas not identified on the construction drawings and according to Section 040120.64 "Brick Masonry Repointing". Additional cleaning will be determined and approved by Architect and Owner.
2. Unit of Measurement: Square foot of masonry repointing.
3. Unit prices include labor, materials, tools, equipment, and incidentals required for repointing masonry during the course of construction.

C. Unit Price No. 3-GC: STEEL DECK REPAIR

1. Description: Steel deck repair at areas discovered to be damage or structurally unsound after roof removal and according to Structural Drawings. Areas in question discovered by contractor shall be brought to the structural engineer's attention for review and direction.
2. Unit of Measurement: Square foot for each size indicated.
3. Unit prices include labor, materials, tools, equipment, and incidentals required for spot repairing roof decking.

D. Unit Price No. 4-GC: ROOF EDGE PROTECTION SYSTEMS

1. Description: Provide Roof Edge Protection System at perimeter of roof as specified in Section 077223 "Roof Edge Protection System".
2. Unit of Measurement: Linear foot per edge protection system
3. Unit prices include labor, materials, tools, equipment, and incidentals required for installing

E. Unit Price No. 1-HC: EQUIPMENT CURB REPLACEMENT

1. Description: Replace equipment curbs at areas discovered to be damaged or too low that are not already indicated on drawings to be replaced. See mechanical drawings for curb details.
2. Unit of Measurement: Linear foot for curb.
3. Unit prices include labor, materials, tools, equipment, and incidentals required for replacement of curbs.

END OF SECTION 012200

CCAC BOYCE ROOF REPLACEMENT

SECTION 012300 - ALTERNATES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

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

1.3 DEFINITIONS

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

1.4 PROCEDURES

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

CCAC BOYCE ROOF REPLACEMENT

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 SCHEDULE OF ALTERNATES

A. Deduct Alternate A-GC: Roof AC/NW

1. Base Bid: Complete structural and general work scope showing on this roof section.
2. Alternate: Remove scope of work associated with the demolition and re-roofing of the complete roofing assembly of this roof section, including new roof hatch, roof davits and skylight infill. Masonry repointing and cleaning to remain in scope.

B. Deduct Alternate A-PC: Roof AC/NW

1. Base Bid: Complete plumbing work scope showing on this roof section.
2. Alternate: Remove scope of work associated with the demolition and new roof drains and associated piping of this roof section.

C. Deduct Alternate A-HC: Roof AC/NW

1. Base Bid: Complete HVAC work scope showing on this roof section.
2. Alternate: Remove scope of work associated with the demolition and new HVAC of this roof section including curb extensions.

D. Deduct Alternate B-GC: Roof AD/NW

1. Base Bid: Complete structural and general work scope showing on this roof section.
2. Alternate: Remove scope of work associated with the demolition and re-roofing of the complete roofing assembly of this roof section, including new roof hatch and roof davits. Masonry repointing and cleaning to remain in scope.

E. Deduct Alternate B-PC: Roof AD/NW

1. Base Bid: Complete plumbing work scope showing on this roof section.
2. Alternate: Remove scope of work associated with the demolition and new roof drains and associated piping of this roof section.

F. Deduct Alternate B-HC: Roof AD/NW

1. Base Bid: Complete HVAC work scope showing on this roof section.
2. Alternate: Remove scope of work associated with the demolition and new HVAC of this roof section including curb extensions.

G. Deduct Alternate C-GC: Roof J/NW & H/NW

1. Base Bid: Complete structural and general work scope showing on this roof section.

CCAC BOYCE ROOF REPLACEMENT

2. Alternate: Remove scope of work associated with the demolition and re-roofing of the complete roofing assembly of this roof section, including new roof hatch and roof davits. Masonry repointing and cleaning and metal ladder from Roof F to remain in scope.
- H. Deduct Alternate C-PC: Roof J/NW & H/NW
1. Base Bid: Complete plumbing work scope showing on this roof section.
 2. Alternate: Remove scope of work associated with the demolition and new roof drains and associated piping of this roof section.
- I. Deduct Alternate C-HC: Roof J/NW & H/NW
1. Base Bid: Complete HVAC work scope showing on this roof section.
 2. Alternate: Remove scope of work associated with the demolition and new HVAC of this roof section including curb extensions.
- J. Add Alternate D-PC: Underground Storm Sanitary Piping.
1. Base Bid: No underground Storm Sanitary Piping.
 2. Alternate: Remove existing 4" storm piping that is below grade, back to existing storm main and provide new 6" storm piping below grade and reconnect into existing storm main in accordance with General Demolition Note #14 on Sheet PD-101 and General Sheet note #8 and Sheet Keynote #4 on Sheets P-101, P-102, P-103 and P-104.

END OF SECTION 012300

CCAC BOYCE ROOF REPLACEMENT

SECTION 012500 - SUBSTITUTION PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes administrative and procedural requirements for substitutions.
- B. Related Requirements:
 - 1. Division 01 Section "Product Requirements" for requirements for submitting comparable product submittals for products by listed manufacturers.

1.2 DEFINITIONS

- A. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by Contractor.
 - 1. Substitutions for Cause: Changes proposed by Contractor that are required due to changed Project conditions, such as unavailability of product, regulatory changes, or unavailability of required warranty terms.
 - 2. Substitutions for Convenience: Changes proposed by Contractor or Owner that are not required in order to meet other Project requirements but may offer advantage to Contractor or Owner.

1.3 ACTION SUBMITTALS

- A. Substitution Requests: Submit three copies of each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles. A substitution request can only be submitted by an acceptable bidder (roofing contractor) of the project. Any requests must be supplied 10 days prior to the bid opening date.
 - 1. Substitution Request Form: Use facsimile of form provided in Project Manual, or if not provided, use form acceptable to Architect.
 - 2. Documentation: Show compliance with requirements for substitutions and the following, as applicable:
 - a. Statement indicating why specified product or fabrication or installation cannot be provided, if applicable.
 - b. Coordination information, including a list of changes or revisions needed to other parts of the Work and to construction performed by Owner and separate contractors, that will be necessary to accommodate proposed substitution.
 - c. Detailed comparison of significant qualities of proposed substitution with those of the Work specified. Include annotated copy of applicable Specification Section. Significant qualities may include attributes such as

CCAC BOYCE ROOF REPLACEMENT

performance, weight, size, durability, visual effect, sustainable design characteristics, warranties, and specific features and requirements indicated. Indicate deviations, if any, from the Work specified.

- d. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
 - e. Samples, where applicable or requested.
 - f. Certificates and qualification data, where applicable or requested.
 - g. List of similar installations for completed projects with project names and addresses. Include names and addresses of architects/owner's consultants, and owners.
 - h. Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.
 - i. Evidence of compliance with building code in effect for Project.
 - j. Detailed comparison of Contractor's construction schedule using proposed substitution with products specified for the Work, including effect on the overall Contract Time. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating date of receipt of purchase order, lack of availability, or delays in delivery.
 - k. Cost information, including a proposal of change, if any, in the Contract Sum.
 - l. Contractor's certification that proposed substitution complies with requirements in the Contract Documents except as indicated in substitution request, is compatible with related materials, and is appropriate for applications indicated.
 - m. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.
3. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within seven days of receipt of a request for substitution. Architect notify Contractor of acceptance or rejection of proposed substitution within 7 days of receipt of request, or 5 days of receipt of additional information or documentation, whichever is later.
- a. Forms of Acceptance: Change Order, Construction Change Directive, or Architect's Supplemental Instructions for minor changes in the Work
 - b. Use product specified if Owner does not issue a decision on use of a proposed substitution within time allocated.

CCAC BOYCE ROOF REPLACEMENT

1.4 QUALITY ASSURANCE

- A. Compatibility of Substitutions: Investigate and document compatibility of proposed substitution with related products and materials. Engage a qualified testing agency to perform compatibility tests recommended by manufacturers.

1.5 PROCEDURES

- A. Coordination: Revise or adjust affected work as necessary to integrate work of the approved substitutions.

PART 2 - PRODUCTS

2.1 SUBSTITUTIONS

- A. Substitutions for Cause: Submit requests for substitution immediately on discovery of need for change, but not later than 10 days prior to time required for preparation and review of related submittals.

- 1. Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Owner will return requests without action, except to record noncompliance with these requirements:

- a. Requested substitution is consistent with the Contract Documents and will produce indicated results.
 - b. Requested substitution provides sustainable design characteristics that are not less than specified product for achieving applicable sustainable design objectives.
 - c. Substitution request is fully documented and properly submitted.
 - d. Requested substitution will not adversely affect Contractor's construction schedule.
 - e. Requested substitution has received necessary approvals of authorities having jurisdiction.
 - f. Requested substitution is compatible with other portions of the Work.
 - g. Requested substitution has been coordinated with other portions of the Work.
 - h. Requested substitution provides specified warranty.
 - i. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.

- B. Substitutions for Convenience: Not allowed.

CCAC BOYCE ROOF REPLACEMENT

PART 3 - EXECUTION (Not Used)

END OF SECTION 012500

CCAC BOYCE ROOF REPLACEMENT

SECTION 012600 - CONTRACT MODIFICATION PROCEDURES

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 handling and processing Contract modifications.
- B. Related Requirements:
 - 1. Section 012500 "Substitution Procedures" for administrative procedures for handling requests for substitutions made after the Contract award.

1.3 MINOR CHANGES IN THE WORK

- A. Architect will issue supplemental instructions authorizing minor changes in the Work, not involving adjustment to the Contract Sum or the Contract Time, on AIA Document G710.

1.4 PROPOSAL REQUESTS

- A. Owner-Initiated Proposal Requests: Architect will issue a detailed description of proposed changes in the Work that may require adjustment to the Contract Sum or the Contract Time. If necessary, the description will include supplemental or revised Drawings and Specifications.
 - 1. Work Change Proposal Requests issued by Architect are not instructions either to stop work in progress or to execute the proposed change.
 - 2. Within time specified in Proposal Request or 20 days, when not otherwise specified, after receipt of Proposal Request, submit a quotation estimating cost adjustments to the Contract Sum and the Contract Time necessary to execute the change.
 - a. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
 - b. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
 - c. Include costs of labor and supervision directly attributable to the change.
 - d. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity

CCAC BOYCE ROOF REPLACEMENT

duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.

- e. Quotation Form: Use forms acceptable to Architect.

- B. Contractor-Initiated Proposals: If latent or changed conditions require modifications to the Contract, Contractor may initiate a claim by submitting a request for a change to Architect.

1. Include a statement outlining reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and the Contract Time.
2. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
3. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
4. Include costs of labor and supervision directly attributable to the change.
5. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
6. Comply with requirements in Section 012500 "Substitution Procedures" if the proposed change requires substitution of one product or system for product or system specified.
7. Proposal Request Form: Use form acceptable to Architect.

1.5 ADMINISTRATIVE CHANGE ORDERS

- A. Unit-Price Adjustment: See Section 012200 "Unit Prices" for administrative procedures for preparation of Change Order Proposal for adjusting the Contract Sum to reflect measured scope of unit-price work.

1.6 CHANGE ORDER PROCEDURES

- A. On Owner's approval of a Work Change Proposal Request, Architect will issue a Change Order for signatures of Owner and Contractor on AIA Document G701.

1.7 CONSTRUCTION CHANGE DIRECTIVE

- A. Construction Change Directive: Architect may issue a Construction Change Directive on AIA Document G714. Construction Change Directive instructs Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order.
 1. Construction Change Directive contains a complete description of change in the Work. It also designates method to be followed to determine change in the Contract Sum or the Contract Time.
- B. Documentation: Maintain detailed records on a time and material basis of work required by the Construction Change Directive.

CCAC BOYCE ROOF REPLACEMENT

1. After completion of change, submit an itemized account and supporting data necessary to substantiate cost and time adjustments to the Contract.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 012600

CCAC BOYCE ROOF REPLACEMENT

SECTION 012900 - PAYMENT PROCEDURES

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 necessary to prepare and process Applications for Payment.
- B. Related Requirements:
 - 1. Section 012200 "Unit Prices" for administrative requirements governing the use of unit prices.
 - 2. Section 012600 "Contract Modification Procedures" for administrative procedures for handling changes to the Contract.
 - 3. Section 013200 "Construction Progress Documentation" for administrative requirements governing the preparation and submittal of the Contractor's construction schedule.

1.3 DEFINITIONS

- A. Schedule of Values: A statement furnished by Contractor allocating portions of the Contract Sum to various portions of the Work and used as the basis for reviewing Contractor's Applications for Payment.

1.4 SCHEDULE OF VALUES

- A. Coordination: Coordinate preparation of the schedule of values with preparation of Contractor's construction schedule.
 - 1. Coordinate line items in the schedule of values with items required to be indicated as separate activities in Contractor's construction schedule.
 - 2. Submit the schedule of values to Architect at earliest possible date, but no later than seven days before the date scheduled for submittal of initial Applications for Payment.
 - 3. Subschedules for Separate Elements of Work: Where the Contractor's construction schedule defines separate elements of the Work, provide subschedules showing values coordinated with each element.
- B. Format and Content: Use Project Manual table of contents as a guide to establish line items for the schedule of values. Provide at least one line item for each Specification Section.

CCAC BOYCE ROOF REPLACEMENT

1. Identification: Include the following Project identification on the schedule of values:
 - a. Project name and location.
 - b. Name of Architect.
 - c. Architect's Project number.
 - d. Contractor's name and address.
 - e. Date of submittal.
2. Arrange schedule of values consistent with format of AIA Document G703.
3. Arrange the schedule of values in tabular form, with separate columns to indicate the following for each item listed:
 - a. Related Specification Section or Division.
 - b. Description of the Work.
 - c. Name of subcontractor.
 - d. Name of manufacturer or fabricator.
 - e. Name of supplier.
 - f. Change Orders (numbers) that affect value.
 - g. Dollar value of the following, as a percentage of the Contract Sum to nearest one-hundredth percent, adjusted to total 100 percent. Round dollar amounts to whole dollars, with total equal to Contract Sum.
 - 1) Labor.
 - 2) Materials.
 - 3) Equipment.
4. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Provide multiple line items for principal subcontract amounts in excess of five percent of the Contract Sum.
5. Provide a separate line item in the schedule of values for each part of the Work where Applications for Payment may include materials or equipment purchased or fabricated and stored, but not yet installed.
 - a. Differentiate between items stored on-site and items stored off-site.
6. Overhead Costs: Show cost of temporary facilities and other major cost items that are not direct cost of actual work-in-place as separate line items.
7. Closeout Costs. Include separate line items under Contractor and principal subcontracts for Project closeout requirements in an amount totaling two percent of the Contract Sum and subcontract amount.
8. Schedule of Values Revisions: Revise the schedule of values when Change Orders or Construction Change Directives result in a change in the Contract Sum. Include at least one separate line item for each Change Order and Construction Change Directive.

1.5 APPLICATIONS FOR PAYMENT

- A. Each Application for Payment following the initial Application for Payment shall be consistent with previous applications and payments as certified by Architect and paid for by Owner.

CCAC BOYCE ROOF REPLACEMENT

- B. Payment Application Times: The date for each progress payment is indicated in the Agreement between Owner and Contractor. The period of construction work covered by each Application for Payment is the period indicated in the Agreement.
- C. Application for Payment Forms: Use AIA Document G702 and AIA Document G703 as form for Applications for Payment.
- D. Application Preparation: Complete every entry on form. Notarize and execute by a person authorized to sign legal documents on behalf of Contractor. Architect will return incomplete applications without action.
 - 1. Entries shall match data on the schedule of values and Contractor's construction schedule. Use updated schedules if revisions were made.
 - 2. Include amounts for work completed following previous Application for Payment, whether or not payment has been received. Include only amounts for work completed at time of Application for Payment.
 - 3. Include amounts of Change Orders and Construction Change Directives issued before last day of construction period covered by application.
 - 4. Indicate separate amounts for work being carried out under Owner-requested project acceleration.
- E. Stored Materials: Include in Application for Payment amounts applied for materials or equipment purchased or fabricated and stored, but not yet installed. Differentiate between items stored on-site and items stored off-site.
 - 1. Provide certificate of insurance, evidence of transfer of title to Owner, and consent of surety to payment for stored materials.
 - 2. Provide supporting documentation that verifies amount requested, such as paid invoices. Match amount requested with amounts indicated on documentation; do not include overhead and profit on stored materials.
 - 3. Provide summary documentation for stored materials indicating the following:
 - a. Value of materials previously stored and remaining stored as of date of previous Applications for Payment.
 - b. Value of previously stored materials put in place after date of previous Application for Payment and on or before date of current Application for Payment.
 - c. Value of materials stored since date of previous Application for Payment and remaining stored as of date of current Application for Payment.
- F. Transmittal: Submit electronically signed and notarized pdf of each Application for Payment to Architect. Include waivers of lien and similar attachments if required.
- G. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of first Application for Payment include the following:
 - 1. List of subcontractors.
 - 2. Schedule of values.
 - 3. Contractor's construction schedule (preliminary if not final).
 - 4. Combined Contractor's construction schedule (preliminary if not final) incorporating Work of multiple contracts, with indication of acceptance of schedule by each Contractor.
 - 5. Products list (preliminary if not final).

CCAC BOYCE ROOF REPLACEMENT

6. Sustainable design action plans, including preliminary project materials cost data.
 7. Schedule of unit prices.
 8. Submittal schedule (preliminary if not final).
 9. List of Contractor's staff assignments.
 10. List of Contractor's principal consultants.
 11. Copies of building permits.
 12. Copies of authorizations and licenses from authorities having jurisdiction for performance of the Work.
 13. Initial progress report.
 14. Report of preconstruction conference.
- H. Application for Payment at Substantial Completion: After Architect issues the Certificate of Substantial Completion, submit an Application for Payment showing 100 percent completion for portion of the Work claimed as substantially complete.
1. Include documentation supporting claim that the Work is substantially complete and a statement showing an accounting of changes to the Contract Sum.
 2. This application shall reflect Certificate(s) of Substantial Completion issued previously for Owner occupancy of designated portions of the Work.
- I. Final Payment Application: After completing Project closeout requirements, submit final Application for Payment with releases and supporting documentation not previously submitted and accepted, including, but not limited, to the following:
1. Evidence of completion of Project closeout requirements.
 2. Insurance certificates for products and completed operations where required and proof that taxes, fees, and similar obligations were paid.
 3. Updated final statement, accounting for final changes to the Contract Sum.
 4. AIA Document G706.
 5. AIA Document G706A.
 6. AIA Document G707.
 7. Evidence that claims have been settled.
 8. Final meter readings for utilities, a measured record of stored fuel, and similar data as of date of Substantial Completion or when Owner took possession of and assumed responsibility for corresponding elements of the Work.
 9. Final liquidated damages settlement statement.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 012900

CCAC BOYCE ROOF REPLACEMENT

SECTION 013100 - PROJECT MANAGEMENT AND COORDINATION

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes administrative provisions for coordinating construction operations on Project including, but not limited to, the following:
 - 1. Start-up and project organization.
 - 2. General coordination procedures.
 - 3. Coordination of project space.
 - 4. Submittals.
 - 5. Coordination Drawings.
 - 6. Requests for interpretation (RFIs).
 - 7. Project meetings.
 - 8. Safety.
- B. Related Requirements:
 - 1. Section 01 12 00 "Multiple Contract Summary" for a description of the division of work among separate contracts and responsibility for coordination activities not in this Section.
 - 2. Section 01 32 00 "Construction Progress Documentation" for preparing and submitting Contractor's construction schedule.
 - 3. Section 01 73 00 "Execution" for procedures for coordinating general installation and field-engineering services, including establishment of benchmarks and control points.
 - 4. Section 01 77 00 "Closeout Procedures" for coordinating closeout of the Contract.

1.2 DEFINITIONS

- A. RFI: Request from Owner, Architect, or Contractor seeking interpretations or clarifications of Contract Documents.
- B. Frivolous RFIs: When Contractor forwards multiple RFIs that include inappropriate questions, means and methods, substitution requests, repeating questions, and submitting RFIs where information is clearly indicated on Contract Documents.

1.3 START-UP, PROJECT ORGANIZATION

- A. Architect authority includes establishing on-site lines of authority and communications:
 - 1. Architect will have authority in matters concerning the coordination of all

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- aspects of the project.
- 2. Schedule and conduct a pre-construction meeting and project meetings as specified.
- 3. Approve procedures for project communications:
 - a. Submittals.
 - b. Reports and records.
 - c. Recommendations.
 - d. Coordination drawings.
 - e. Schedules.
 - f. Resolution of conflicts.
- 4. Control site use:
 - a. Allocate space for each Prime Contractor's use for field offices, sheds, work and storage areas.
 - b. Establish locations for access, traffic, and parking allocations and regulations.
 - c. Monitor use of site during construction.
- 5. Enforce Contract Documents requirements and immediately report deficiencies in writing to Architect and Owner.
- 6. Observe the Work at all construction phases and for all Contracts.
- 7. Maintain reports and records at job site and/or through construction project management platform and provide to Architect and Owner:
 - a. Daily log of progress of work of each Contractor.
 - b. Records:
 - 1) Contracts.
 - 2) Purchase orders.
 - 3) Materials and equipment records.
 - 4) Applicable handbooks, codes, and standards.
 - c. Obtain information from contractors and maintain file of record documents.
 - d. Assemble documentation for handling of claims and disputes.
- 8. Close-out Duties:
 - a. Mechanical and electrical equipment start-up:
 - 1) Coordinate checkout of utilities, operational systems, and equipment.
 - 2) Assist in coordinating initial start-up, testing, and commissioning
 - 3) Record dates of start of operation of systems and equipment.
 - 4) Submit to Owner, written notice of beginning of warranty period of equipment put into services.
 - b. Conduct inspections at Substantial Completion of each Contract, to assure that:

CCAC BOYCE ROOF REPLACEMENT

- 1) Specified cleaning has been accomplished.
 - 2) Temporary facilities have been removed from site.
 - 3) Conduct an inspection to confirm or supplement Contractor's list of work to be completed or corrected.
 - 4) Assist Architect in inspection and preparation of punch list.
 - 5) Supervise correction and completion of work as established in Certificate of Substantial Completion.
- c. When Owner occupies a portion of project prior to final completion, coordinate established responsibilities of Contractor and Owner.
 - d. Final Completion:
 - 1) When each Contractor determines that work is finally complete, conduct a final inspection to verify completion of work.
 - 2) Assist Architect in field observation.
 - e. Administration of Contract close-out:
 - 1) Receive and review Contractor's final submittals.
 - 2) Transmit to Architect with recommendation for action.
- B. Contractor shall:
1. Coordinate its own Work, schedules, and progress of Work with other Contractors and subcontractors.
 - a. Ensure proper fitting of Work, both new or existing materials and substrates.
 - b. Manage operations of various trades, subcontractors, and laborers employed to perform the Work of its Contract.
 - c. Provide to each subcontractor the dimensions that may be required for fitting of its work to surrounding work.
 - d. Fitting the work to receive or to be received by other Contractors.
 2. Monitor and document use of Temporary Utilities:
 - a. Verify that adequate services are provided and maintained.
 - b. Coordinate use of Owner's facilities.

1.4 GENERAL COORDINATION PROCEDURES

- A. Carefully study and compare Contract Documents before proceeding with fabrication and installation of Work. Promptly advise Architect of any apparent error, inconsistency, omission or discrepancy discovered.
- B. Coordinate scheduling, submittals, and Work results described in various Specification sections to avoid conflicts and ensure efficient and orderly sequence of installation of interdependent construction elements.
 1. Coordinate Work of various Specification sections having interdependent

CCAC BOYCE ROOF REPLACEMENT

- responsibilities for installation, connection, and operation.
- 2. Verify that characteristics of operating equipment are compatible with building utilities and services.
- 3. Prepare coordination documents in a timely manner and distribute as required.
- C. Coordinate construction operations included in different Sections of the Specifications to ensure efficient and orderly installation of each part of the Work. Coordinate construction operations included in different Sections that depend on each other for proper installation, connection, and operation.
 - 1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
 - 2. Coordinate installation of different components to ensure maximum performance and accessibility for required maintenance, service, and repair.
 - 3. Coordinate Work of various Specification sections having interdependent responsibilities for installation, connection, and operation.
 - 4. Verify that characteristics of operating equipment are compatible with building utilities and services.
 - 5. Make adequate provisions to accommodate items scheduled for later installation.
 - 6. Where availability of space is limited, coordinate installation of different components to ensure maximum performance and accessibility for required maintenance, service, and repair of components, including mechanical and electrical.
- D. Prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and list of attendees at meetings.
 - 1. Prepare similar memoranda for Owner, Architect, and separate Contractors if coordination of their Work is required.
- E. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:
 - 1. Preparation of Construction Schedule.
 - 2. Preparation of the Schedule of Values.
 - 3. Installation, maintenance, and removal of temporary facilities and controls.
 - 4. Delivery and processing of submittals, including coordination drawings.
 - 5. Project and coordination meetings.
 - 6. Pre-installation conferences.
 - 7. Updating, coordination and submittal of record documents.
 - 8. Startup and adjustment of systems.
 - 9. Project closeout activities.
- F. Administrative Personnel: In addition to Project superintendent, provide other

CCAC BOYCE ROOF REPLACEMENT

administrative and supervisory personnel as required for proper performance of the Work. Include special personnel required for coordination of operations with other Contractors.

- G. Conservation: Coordinate construction activities to ensure that operations are carried out with consideration given to conservation of energy, water, and materials. Coordinate use of temporary utilities to minimize waste.
 - 1. Salvage materials and equipment involved in performance of, but not actually incorporated into, the Work. See other Sections for disposition of salvaged materials that are designated as Owner's property.
- H. Closeout: Coordinate completion and clean-up of Work in preparation for Substantial Completion and for portions of Work designated for partial occupancy.
 - 1. Minimize disruption of Owner's activities after occupancy of premises by coordinating access to site by various trades for correction of defective Work and Work not in accordance with Contract Documents.

1.5 INFORMATIONAL SUBMITTALS

- A. Subcontract List: Within 15 days of receipt of executed Contract, submit a written summary identifying individuals or firms proposed for each portion of the Work, including those who are to furnish products or equipment fabricated to a special design. Use CSI Form 1.5A or other form approved by Architect. Include the following information in tabular form:
 - 1. Name, address, and telephone number of entity performing subcontract or supplying products.
 - 2. Number and title of related Specification Sections covered by subcontract.
 - 3. Drawing number and detail references, as appropriate, covered by subcontract.
- B. Key Personnel Names: Within 15 days of starting construction operations, submit a list of key personnel assignments, including superintendent and other personnel in attendance at Project site.
 - 1. Identify Project Manager, Superintendent, Scheduling Consultant, and other Project staff. For each Key Personnel list: work addresses; list telephone numbers, including home, office, and cellular telephone numbers; list e-mail addresses.
 - 2. Provide names, addresses, and telephone numbers of individuals assigned as alternates in the absence of Key Personnel.
 - 3. Post copies of list of Key Personnel in project meeting room, in temporary field office, and by each temporary telephone. Keep list current at all times.
 - 4. Provide supervisory personnel consistent with project size and complexity, who shall be fully capable of controlling their workers and subcontractors, coordinating work through Architect, working in harmony with other trades, and completing work in accordance with Construction Schedule.

CCAC BOYCE ROOF REPLACEMENT

1.6 REQUESTS FOR INTERPRETATION (RFIs)

- A. Allot time in construction scheduling for liaison with Architect; establish procedures for handling queries and clarifications.
- B. Immediately on discovery of need for additional information or interpretation of Contract Documents, and if not possible to request interpretation at a Project meeting, prepare and submit an RFI to Architect. Architect shall review RFIs to determine their validity.
- C. Contractor shall remain responsible for a complete Request for Interpretation with knowledge that in the event that RFI is NOT complete, they are still responsible for detailed, accurate, and complete information prior to Architect's review and response.
 - 1. RFIs shall originate with Prime Contractor or Owner and be submitted to Architect. Architect will return RFIs submitted by other entities controlled by Contractor with no response.
 - 2. Coordinate and submit RFIs in a prompt manner so as to avoid delays in Contractor's work or work of subcontractors.
- D. Content of the RFI: Include a detailed, legible description of item needing information or interpretation and the following:
 - 1. Project name and number.
 - 2. Date.
 - 3. Name of Contractor.
 - 4. Name of Architect.
 - 5. RFI number, numbered sequentially.
 - 6. RFI subject.
 - 7. Specification Section number and title and related paragraph references, as appropriate.
 - 8. Drawing number and detail references, as appropriate.
 - 9. Field dimensions and conditions, as appropriate.
 - 10. Contractor's suggested resolution. If Contractor's suggested resolution impacts Contract Time or Contract Sum, Contractor shall state impact in RFI.
 - 11. Cost impact: (yes/no; dollar amount).
 - 12. Schedule impact: (yes/no; number of days).
 - 13. Contractor's signature.
 - 14. Attachments: Include drawings, sketches, descriptions, measurements, photos, Product Data, Shop Drawings, coordination drawings, and other information necessary to fully describe items needing interpretation.
 - a. Supplementary drawings prepared by Contractor shall include dimensions, thicknesses, structural grid references, and details of affected materials, assemblies, and attachments.
- E. Architect's Action: Architect will review each RFI, determine action required, and respond.

CCAC BOYCE ROOF REPLACEMENT

1. Allow an average of ten calendar days for Architect's response for each RFI, as some RFIs will take longer to answer than others. RFIs received by Architect after 1:00 p.m. will be considered as received the following working day.
 2. The following Contractor-generated RFIs will be returned without action:
 - a. Requests for approval of submittals.
 - b. Requests for approval of substitutions.
 - c. Requests for approval of Contractor's means and methods.
 - d. Requests for coordination information already indicated in Contract Documents.
 - e. Requests for adjustments in Contract Time or Contract Sum.
 - f. Requests for interpretation of Architect's actions on submittals.
 - g. Incomplete RFIs or inaccurately prepared RFIs.
 3. Architect's action may include a request for additional information, in which case Architect's time for response will date from time of receipt of additional information.
 4. Architect's action on RFIs that may result in a change to Contract Time or Contract Sum may be eligible for Contractor to submit Change Proposal according to Section 01 26 00 "Contract Modification Procedures."
 - a. If Contractor believes RFI response warrants change in Contract Time or Contract Sum, notify Architect in writing within 10 calendar days of receipt of RFI response.
- F. On receipt of Architect's action, update RFI log and immediately distribute RFI response to affected parties. Review response and notify Architect within 10 calendar days if Contractor disagrees with response.
1. Lack of such notification shall be understood to mean that Contractor agrees with response.
 2. Identification of related Minor Change in the Work, Construction Change Directive, and Proposal Request, as appropriate.
- G. Architect's Action: Architect will review each RFI, determine action required, and respond.
- H. Improper or Frivolous RFIs submitted by Contractor shall be subject to following:
1. Contractor shall be responsible for payment of processing fees calculated using Architect's standard billing rates.
 2. Returning RFI unanswered with the notation: Not Reviewed.
- 1.7 CONFERENCES AND MEETINGS
- A. General: Lead Contractor shall schedule and conduct various project conferences

CCAC BOYCE ROOF REPLACEMENT

and meetings, as will Architect at Project site as indicated in following paragraphs.

1. Attendees: Inform participants and others involved, and individuals whose presence is required, of date and time of each meeting. Notify Owner and Architect of scheduled meeting dates and times.
 2. Agenda: Prepare meeting agenda. Distribute agenda to all invited attendees.
 3. Minutes: Entity responsible for conducting meeting will record significant discussions and agreements achieved. Distribute meeting minutes to everyone concerned, including Owner and Architect, within five calendar days of the meeting.
- B. KICK-OFF MEETING: Contractor will schedule and conduct a Kick-Off Meeting (preconstruction conference) before starting construction, at a time convenient to Owner and Architect, but no later than 15 days after execution of the Agreement.
1. Attendees: Authorized representatives of Owner, Architect, and their consultants; Contractor and its project manager and superintendent; major subcontractors; suppliers; and other concerned parties shall attend the conference. Participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
 2. Agenda: Discuss items of significance that could affect progress, including the following
 - a. Review responsibilities and key personnel assignments.
 - b. Tentative construction schedule, including phasing.
 - c. Critical work sequencing and long-lead items.
 - d. Lines of communications.
 - e. Review Startup Construction Schedule and Construction Schedule requirements.
 - f. Work by Owner, Work Under Separate Contracts, and Owner Related Products.
 - g. Procedures for processing field decisions and Change Orders.
 - h. Procedures for RFIs.
 - i. Procedures for testing and inspecting.
 - j. Procedures for processing Applications for Payment.
 - k. Distribution of the Contract Documents.
 - l. Owner Controlled Insurance Program Requirements
 - m. Submittal procedures.
 - n. Closeout procedures and preparation of record documents.
 - o. Use of the premises.
 - p. Work restrictions and working hours.
 - q. Owner's occupancy requirements.
 - r. Site logistics.
 - s. Phasing.
 - t. Temporary utilities.
 - u. Responsibility for temporary facilities and controls.
 - v. Procedures for moisture and mold control.
 - w. Procedures for disruptions and shutdowns.

CCAC BOYCE ROOF REPLACEMENT

- x. Parking availability.
 - aa. Equipment deliveries and priorities.
 - bb. First aid, safety, and security.
 - cc. Progress cleaning.
 - 3. Minutes: Entity responsible for conducting meeting will record and distribute meeting minutes.
- C. PROJECT MEETINGS: Contractor will conduct progress meetings at weekly intervals, unless otherwise indicated. Project meetings are in addition to specific conferences and meetings held for other purposes.
- 1. Meeting dates may be coordinated with preparation of payment requests.
 - 2. Attendees: In addition to representatives of Owner, Architect, each Contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. Meeting participants shall be familiar with Project and authorized to conclude matters relating to the Work.
 - 3. Agenda: Review and correct or approve minutes of previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project. Agenda includes the following:
 - a. Safety.
 - b. Administrative.
 - c. RFIs
 - d. Submittals.
 - e. Schedule.
 - f. Project Changes.
 - g. General.
 - 4. Minutes: Contractor will record and distribute the meeting minutes to each party present and to parties requiring information.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 013100

CCAC BOYCE ROOF REPLACEMENT

SECTION 013200 - CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes administrative and procedural requirements for documenting the progress of construction during performance of the Work, including the following:
 - 1. Startup Construction Schedule.
 - 2. Baseline Construction Schedule
 - 3. Construction Schedule and Construction Schedule Updates.
 - 4. Recovery Schedule.
 - 5. Daily construction reports.
 - 6. Stored Material location reports.
 - 7. Site condition reports.
 - 8. Special reports.
- B. Related Requirements:
 - 1. Document "Agreement Between Owner and Contractor"
 - 2. Section 01 26 00 "Contract Modification Procedures" for submitting the Schedule of Values.
 - 3. Section 01 33 00 "Submittal Procedures" for submitting schedules and reports.
 - 4. Section 01 40 00 "Quality Requirements" for submitting a schedule of tests and inspections.

1.2 DEFINITIONS

- A. Activity: A discrete part of a project that can be identified for planning, scheduling, monitoring, and controlling the construction project. Activities included in a construction schedule consume time and resources.
 - 1. Critical Activity: An activity on the critical path that must start and finish on planned early start and finish times.
 - 2. Predecessor Activity: An activity that precedes another activity in the network.
 - 3. Successor Activity: An activity that follows another activity in the network.
- B. Baseline Construction Schedule: The earliest complete and accepted schedule for project. Also commonly referred to as Baseline Schedule.
- C. CPM: Critical path method, which is a method of planning and scheduling a construction project where activities are arranged based on activity relationships. Network calculations determine when activities can be performed and the critical path of Project.

CCAC BOYCE ROOF REPLACEMENT

- D. Critical Path: Longest connected chain of interdependent activities through network schedule that establishes overall Project duration and contains no float.
- E. Critical Procurement Items: Items listed in this Section, whose procurement (submittals and approvals, manufacturing and fabrication, and delivery), will likely impact the timely completion of the Project.
- F. Date of Substantial Completion: As stated in the Agreement Between Owner and Contractor.
- G. Event: Starting or ending point of an activity.
- H. Float: Measure of leeway in starting and completing an activity.
 - 1. Float time is not for the exclusive use or benefit of either Owner or Contractor, but is a jointly owned, expiring Project resource available to both parties as needed to meet schedule milestones and Contract completion date.
 - 2. Free float is amount of time an activity can be delayed without delaying early start of successor activity.
 - 3. Total float is amount of time an activity can be delayed without delaying Project completion date.
- I. Fragnet: A partial or fragmentary network that breaks down activities into smaller activities for greater detail.
- J. Interim Milestone: Milestones occurring prior to Date of Substantial Completion, and specified within this Section.
- K. Milestone: A key or critical point in time for reference or measurement.
- L. Network Diagram: A graphic diagram of a network schedule, showing activities and activity relationships.
- M. Operational Constraints: Contractual requirements that limit when work can be performed.
- N. Startup Construction Schedule: A short-term schedule depicting mobilization and early work activities for each Contractor.
- O. Target Schedule: A schedule used as a basis of comparison to a later version of same project's schedule. For easy visual comparison, each target schedule activity bar or milestone is shown immediately below compared schedule's activity or milestone.
- P. Work Breakdown Structure (WBS): Division, or breakdown, of a project into tasks and subtasks. Activities are assigned to each task or subtask.

1.3 INFORMATIONAL SUBMITTALS

- A. Format for Submittals: Submit required submittals in the following format:

CCAC BOYCE ROOF REPLACEMENT

1. PDF electronic file.
 - B. Baseline Construction Schedule: Of size required to display entire schedule for entire construction period.
 - C. Construction Schedule and Construction Schedule Update: Of size required to display entire schedule for entire construction period.
 - D. Construction Schedule Update Reports: Concurrent with Construction Schedule Update, submit each of following reports. Format for each activity in reports shall contain activity number, activity description, original duration, remaining duration, early start date, early finish date, late start date, late finish date, and total float in calendar days.
 1. Activity Report: Two reports, with one being a list of all activities sorted by activity number, and the second being a list of all activities sorted by early start date, or actual start date if known.
 2. Logic Report: List of preceding and succeeding activities for each activity, sorted in ascending order by activity number and then early start date, or actual start date if known.
 3. Total Float Report: List of all incomplete activities sorted in ascending order of total float (least float to greatest float).
 - E. Daily Construction Reports: Each Contractor shall complete this report and provide in PDF format weekly. The report shall include:
 1. Weather (low and high temperature, precipitation and wind information).
 2. Contractor Labor and Equipment working.
 3. Work performed by Contractor.
 4. Deliveries received by Contractor.
 5. Subcontractor Labor and Equipment working.
 6. Work performed by Subcontractor.
 7. Deliveries received by Subcontractor.
 8. Inspections of Contractor's and subcontractors' work.
 - F. Stored Material Location Reports: Submit at bi-weekly intervals.
 - G. Site Condition Reports: Submit at time of discovery of differing conditions.
 - H. Special Reports: Submit at time of unusual event.
 - I. Qualification Data: For Lead Contractor's scheduling consultant or Lead Contractor's in-house scheduler.
- 1.4 COORDINATION
- A. Coordinate Construction Schedule with each Contractor's schedule of values, list of subcontracts, submittal schedule, progress reports, payment requests, and other required schedules and reports.
 1. Secure time commitments for performing critical elements of the Work from entities involved.

CCAC BOYCE ROOF REPLACEMENT

2. Coordinate each construction activity in network with other activities and schedule them in proper sequence.
- B. Contractors shall cooperate with Lead Contractor in scheduling and reporting of construction activities within their scope. Lead Contractor shall:
1. Provide Scheduling Consultant/In-House Scheduler to coordinate preparation and completion of Construction Schedule, with input from project Contractors.
 2. Process schedule updates and reports with actual performance of construction activities, including activities by all Contractors and subcontractors.
 3. Secure time commitments for performing all elements of the Work from all Contractors.
 4. Coordinate each activity with other activities and schedule them in logical sequence.
- C. Architect shall represent Owner when schedule information is required from these parties.

PART 2 - PRODUCTS

2.1 BASELINE CONSTRUCTION SCHEDULE AND CONSTRUCTION SCHEDULE

- A. Format and Organization: The schedule shall be formatted and organized by the Lead Contractor as follows.
1. A WBS shall be developed, and all activities assigned to WBS tasks/subtasks.
 2. The Activity Data Table shall show: activity ID, activity name, responsible contractor, original and remaining durations, early start and early finish dates, Baseline Schedule early start and early finish dates, and total float.
 3. The activities shall be shown in a GANTT chart with a timeline sufficient in length to show all milestones and activities, from the Notice to Proceed through Date of Substantial Completion. Timeline shall fit on one page.
- B. The Date of Substantial Completion shall not be changed by submission of a schedule that shows substantial completion occurring either before or after the Date of Substantial Completion, unless specifically authorized by Change Order.
- C. Work Breakdown Structure: Lead Contractor shall establish a WBS for the Project and Schedule. WBS shall separately show: Contract Milestones; Interim Milestones; Critical Procurement Items; site work; commissioning; and building work, including a breakdown by building level/floor/story and building area.
- D. Activities and Milestones: Treat each roof section, as a separate numbered activity for each main element of the Work. Comply with the following:
1. The schedule shall start with a start milestone representing the Notice to Proceed, and a finish milestone representing Substantial Completion. All activities and milestones between these two milestones shall be logically related, with a minimum of one predecessor and one successor.

CCAC BOYCE ROOF REPLACEMENT

2. Activity Duration: Define activities so no activity is longer than 20 work days, unless specifically allowed by Architect. Activity Duration shall be reasonable for the type and extent of work being performed, and the manpower and equipment planned to be utilized.
 3. Submittal Review Time: Include review and resubmittal times indicated in Section 01 33 00 "Submittal Procedures" in schedule. Coordinate submittal review times in Construction Schedule with submittal schedule. For Critical Procurement Items and other critical items, include a submittal re-submission and re-review cycle.
 4. Substantial Completion: Indicate completion in advance of the Date of Substantial Completion milestone, so as to allow time for Architect's and Architect's administrative procedures necessary for certification of Substantial Completion.
- E. Punch List and Final Completion: No more than 30 days after Date of Substantial Completion shall be allowed for Contractor to complete punch list items and final completion, unless otherwise stated by Architect and Architect.
- F. Work Restrictions and Operational Constraints: Include work restrictions and Operational Constraints indicated in Contract Documents and as follows in schedule. Schedule work so as to achieve on-time Substantial Completion, and on-time completion of required Phases and Milestones.
1. Must Finish On Date: The Final Completion Date shall be set as the "Must Finish On Date" for the project schedule. The Date of Substantial Completion shall be set as a constraint. The purpose is to allow the Construction Schedule to show negative float when Substantial Completion milestone calculated by the schedule forward pass is later than the contractual Date of Substantial Completion.
 2. Phasing: Create start and finish milestones for all specified Phases, and constrain milestones to mandatory start and finish dates corresponding to the contractual dates. Unless otherwise permitted by Architect, activities for each Phase shall logically start after Phase's start milestone, and be completed prior to Phase's completion milestone.
 3. Similar Work under More Than One Contract: Include a separate activity for each Contractor performing similar work.
 4. Work by Owner: To the extent that such work is coordinated with, or otherwise affects, Contractor's Work, include separate activities for each portion of Work by Owner.
 5. Work Under Separate Contracts: To the extent that such work is coordinated with, or otherwise affects, Contractor's Work, include separate activities for each portion of the Work performed under such contracts.
 6. Owner Related Products: For Owner-furnished and Owner-provided products, include a separate delivery activity or milestone for each product. For Contractor-furnished/Owner-installed products, include all procurement activities required above for Activities and Milestones. Apply schedule constraints to such activities or milestones equal to delivery dates indicated in Section 011000 "Summary." Delivery dates indicated stipulate the earliest possible delivery date.
 7. Work Restrictions: Show effect of following items on the schedule:
 - a. Coordination with existing construction.
 - b. Limitations of continued occupancies.
 - c. Uninterruptible services.

CCAC BOYCE ROOF REPLACEMENT

- d. Use of premises restrictions.
 - e. Seasonal variations.
 - f. Permanent space enclosure.
 - g. Completion of mechanical installation.
 - h. Completion of electrical installation.
 - i. Substantial Completion.
8. Other Operational Constraints:
- a. Roads and parking areas.
 - b. Landscape development.
 - c. Other non-building work.
- G. Milestones: Include milestones but not limited to: Notice to Proceed; Substantial Completion; Phased Construction Substantial Completion; Delivery of Owner Furnished Products, if any
- H. Target Schedule: Once Baseline Construction Schedule has been finalized, it will serve as Asta Powerproject Project Baseline Schedule and Target Schedule. Beginning with first Construction Schedule Update, Baseline Construction Schedule shall be shown as a Target Schedule on each update.
- 1. Target schedule may be changed from Baseline Construction Schedule to a later schedule, such as a recovery schedule or schedule revised by cardinal change order, if authorized by Architect.

2.2 CONSTRUCTION SCHEDULE UPDATE

- A. Lead Contactor shall update Construction Schedule bi-weekly per the following procedure.
- B. Architect and Lead Contractor will review and agree upon updates. Following the review, Lead Contractor shall make necessary electronic updates to schedule and issue final Construction Schedule Update to Architect (Asta Powerproject compatible format file and PDF) 2 work days prior to next Project Meeting.
- C. Construction Schedule Update shall be issued by Lead Contractor to Owner, Architect and Contractors at Project Meeting.

2.3 RECOVERY SCHEDULE

- A. If Architect or Owner determines that a Contractor is not maintaining adequate progress, Lead Contractor will be notified in writing and shall prepare a recovery plan and Recovery Schedule with the assistance and input of Contractor not maintaining progress. Other Contractors must also accept Recovery Schedule before it is submitted.
 - 1. Submit recovery plan within 7 calendar days of notification include activities and to demonstrate Contractor's plan to recover progress. No payment applications will be processed to Contractor not maintaining progress without submission and approval of recovery schedule.
 - 2. When developing recovery Plan, some or all of following actions are to be

CCAC BOYCE ROOF REPLACEMENT

instituted by appropriate Contractor(s) at no additional cost to Owner:

- a. Increase manpower.
 - b. Increase man-hours per shift, shifts per workday, days per work week, or any combination thereof.
 - c. Increase construction equipment or expedite material deliveries.
 - d. Revise schedule logic based on the above actions.
 - e. If any Contractor fails to institute a recovery plan within 7 days from written notice that will return project to original schedule, Owner will take appropriate action involving contractual commitments and performance bonds.
 - f. Additional cost for Architect or its consultants, Owner or Owner's representatives for overtime or shift work is responsibility of Contractor(s) at fault.
- B. Time extensions will only occur if approved in writing by Owner and Architect.
- C. Recovery Schedule shall use Baseline Construction Schedule, or current baseline schedule if Initial Project Schedule is no longer baseline schedule, as its Target Schedule.
- D. Submit Recovery Schedule to Architect for review. When accepted, Contractor shall replace current Baseline Construction Schedule as Target Schedule.

2.4 SCHEDULE REVISIONS

- A. When progress of the Work varies sufficiently from schedule that schedule no longer accurately reflects critical path to Substantial Completion, Lead Contractor, with input from all Contractors, shall revise schedule to reflect changes in sequence of work and time required to perform the work.
- B. Submit Revised Construction Schedule to Architect for review. When accepted, Architect will determine if Revised Construction Schedule will replace current Baseline Construction Schedule as Target Schedule.

2.5 REPORTS

- A. Daily Construction Reports: Prepare a daily construction report and submitted to in PDF format recording the following information concerning events at Project site:
- 1. List of subcontractors at Project site.
 - 2. Approximate count of personnel at Project site.
 - 3. Equipment at Project site.
 - 4. Material deliveries.
 - 5. High and low temperatures and general weather conditions, including presence of rain or snow.
 - 6. Accidents.
 - 7. Unusual events (see special reports).
 - 8. Stoppages, delays, shortages, and losses.
 - 9. Meter readings and similar recordings.
 - 10. Emergency procedures.
 - 11. Orders and requests of authorities having jurisdiction.

CCAC BOYCE ROOF REPLACEMENT

- B. Stored Material Location Reports: Prepare and submit a comprehensive list of materials delivered to and stored at Project site. List shall be cumulative, showing materials previously reported plus items recently delivered. Include with list a statement of progress on and delivery dates for materials or items of equipment fabricated or stored away from Project site. Indicate the following categories for stored materials:
1. Material stored prior to previous report and remaining in storage.
 2. Material stored prior to previous report and since removed from storage and installed.
 3. Material stored following previous report and remaining in storage.
 4. When materials have been incorporated into the Work, report that this occurred on next report and then remove materials from future reports.
- C. Site Condition Reports: Immediately on discovery of a difference between site conditions and the Contract Documents, prepare and submit a detailed report. Submit with a Request for Information. Include a detailed description of the differing conditions, together with recommendations for changing the Contract Documents.

2.6 SPECIAL REPORTS

- A. General: Submit special reports to Architect within one day of an occurrence. Distribute copies of report to parties affected by the occurrence.
- B. Reporting Unusual Events: When an event of an unusual and significant nature occurs at Project site, whether or not related directly to the Work, prepare and submit a special report. List chain of events, persons participating, response by Contractor's personnel, evaluation of results or effects, and similar pertinent information. Advise Architect in advance when these events are known or predictable.

PART 3 - EXECUTION

3.1 CONSTRUCTION SCHEDULE

- A. Scheduling Consultant: Engage a consultant to provide planning, evaluation, and reporting using CPM scheduling.
1. In-House Option: Owner may waive the requirement to retain a consultant if Contractor employs skilled personnel with experience in CPM scheduling and reporting techniques. Submit qualifications.
 2. Meetings: Scheduling consultant shall attend all meetings related to Project progress, alleged delays, and time impact.
- B. Contractor's Construction Schedule Updating: At previously stated intervals, update schedule to reflect actual construction progress and activities and issue to Architect for next Project Meeting.

END OF SECTION 013200

CCAC BOYCE ROOF REPLACEMENT

SECTION 013300 - SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:

1. Submittal schedule requirements.
2. Administrative and procedural requirements for submittals.

- B. Related Requirements:

1. Section 012900 "Payment Procedures" for submitting Applications for Payment and the schedule of values.
2. Section 013100 "Project Management and Coordination" for submitting coordination drawings and subcontract list and for requirements for web-based Project software.
3. Section 013200 "Construction Progress Documentation" for submitting schedules and reports, including Contractor's construction schedule.
4. Section 014000 "Quality Requirements" for submitting test and inspection reports, and schedule of tests and inspections.
5. Section 017700 "Closeout Procedures" for submitting closeout submittals and maintenance material submittals.
6. Section 017823 "Operation and Maintenance Data" for submitting operation and maintenance manuals.
7. Section 017839 "Project Record Documents" for submitting record Drawings, record Specifications, and record Product Data.
8. Section 017900 "Demonstration and Training" for submitting video recordings of demonstration of equipment and training of Owner's personnel.

1.3 DEFINITIONS

- A. Action Submittals: Written and graphic information and physical samples that require Architect's responsive action. Action submittals are those submittals indicated in individual Specification Sections as "action submittals."
- B. Informational Submittals: Written and graphic information and physical samples that do not require Architect's responsive action. Submittals may be rejected for not complying with requirements. Informational submittals are those submittals indicated in individual Specification Sections as "informational submittals."

CCAC BOYCE ROOF REPLACEMENT

1.4 SUBMITTAL SCHEDULE

- A. Submittal Schedule: Submit, as an action submittal, a list of submittals, arranged in chronological order by dates required by construction schedule. Include time required for review, ordering, manufacturing, fabrication, and delivery when establishing dates. Include additional time required for making corrections or revisions to submittals noted by Architect and additional time for handling and reviewing submittals required by those corrections.
1. Coordinate submittal schedule with list of subcontracts, the schedule of values, and Contractor's construction schedule.
 2. Initial Submittal: Submit concurrently with startup construction schedule. Include submittals required during the first 60 days of construction. List those submittals required to maintain orderly progress of the Work and those required early because of long lead time for manufacture or fabrication.
 3. Final Submittal: Submit concurrently with the first complete submittal of Contractor's construction schedule.
 - a. Submit revised submittal schedule to reflect changes in current status and timing for submittals.
 4. Format: Arrange the following information in a tabular format:
 - a. Scheduled date for first submittal.
 - b. Specification Section number and title.
 - c. Submittal Category: Action; informational.
 - d. Name of subcontractor.
 - e. Description of the Work covered.

1.5 SUBMITTAL FORMATS

- A. Electronic Submittals: Identify and incorporate information in each electronic submittal file as follows:
1. Assemble complete submittal package into a single indexed file incorporating submittal requirements of a single Specification Section and transmittal form with links enabling navigation to each item.
 2. Name file with submittal number or other unique identifier, including revision identifier in format established by Architect .
 3. Provide means for insertion to permanently record Contractor's review and approval markings and action taken by Architect .
 4. Transmittal Form for Electronic Submittals: Use electronic form acceptable to Owner and Architect , containing the following information:
 - a. Project name.
 - b. Date.
 - c. Name of Architect .
 - d. Name of Contractor.
 - e. Name of firm or entity that prepared submittal.

CCAC BOYCE ROOF REPLACEMENT

- f. Names of subcontractor, manufacturer, and supplier. Revise first subparagraph below to suit Project and office practice.
 - g. Unique submittal number, including revision identifier. Include Specification Section number with sequential alphanumeric identifier; and alphanumeric suffix for resubmittals.
 - h. Category and type of submittal.
 - i. Submittal purpose and description.
 - j. Number and title of Specification Section, with paragraph number and generic name for each of multiple items.
 - k. Drawing number and detail references, as appropriate.
 - l. Indication of full or partial submittal.
 - m. Location(s) where product is to be installed, as appropriate.
 - n. Other necessary identification.
 - o. Remarks.
 - p. Signature of transmitter.
- B. Options: Identify options requiring selection by Architect.
 - C. Deviations and Additional Information: On each submittal, clearly indicate deviations from requirements in the Contract Documents, including minor variations and limitations; include relevant additional information and revisions, other than those requested by Architect on previous submittals. Indicate by highlighting on each submittal or noting on attached separate sheet.
 - D. Submittals for Web-Based Project Software: Prepare submittals as PDF files.

1.6 SUBMITTAL PROCEDURES

- A. Prepare and submit submittals required by individual Specification Sections. Types of submittals are indicated in individual Specification Sections.
 - 1. Web-Based Project Software: Prepare submittals in PDF form and upload. Enter required data in Submittals Workflow module.
- B. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.
 - 1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
 - 2. Submit all submittal items required for each Specification Section concurrently unless partial submittals for portions of the Work are indicated on approved submittal schedule.
 - 3. Submit action submittals and informational submittals required by the same Specification Section as separate packages under separate transmittals.
 - 4. Coordinate transmittal of submittals for related parts of the Work specified in different Sections so processing will not be delayed because of need to review submittals concurrently for coordination.
 - a. Architect reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.
- C. Processing Time: Allow time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Architect's receipt of submittal. No

CCAC BOYCE ROOF REPLACEMENT

extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.

1. Initial Review: Allow 15 days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. Architect will advise Contractor when a submittal being processed must be delayed for coordination.
 2. Intermediate Review: If intermediate submittal is necessary, process it in same manner as initial submittal.
 3. Resubmittal Review: Allow 15 days for review of each resubmittal.
 4. Sequential Review: Where sequential review of submittals by Architect's consultants, Owner, or other parties is indicated, allow 21 days for initial review of each submittal.
 5. Concurrent Consultant Review: Where the Contract Documents indicate that submittals may be transmitted simultaneously to Architect and to Architect's consultants, allow 15 days for review of each submittal. Submittal will be returned to Architect before being returned to Contractor.
- D. Resubmittals: Make resubmittals in same form and number of copies as initial submittal.
1. Note date and content of previous submittal.
 2. Note date and content of revision in label or title block and clearly indicate extent of revision.
 3. Resubmit submittals until they are marked with approval notation from Architect's action stamp.
- E. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.

1.7 SUBMITTAL REQUIREMENTS

- A. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.
1. If information must be specially prepared for submittal because standard published data are unsuitable for use, submit as Shop Drawings, not as Product Data.
 2. Mark each copy of each submittal to show which products and options are applicable.
 3. Include the following information, as applicable:
 - a. Manufacturer's catalog cuts.
 - b. Manufacturer's product specifications.
 - c. Standard color charts.
 - d. Statement of compliance with specified referenced standards.
 - e. Testing by recognized testing agency.
 - f. Application of testing agency labels and seals.
 - g. Notation of coordination requirements.

CCAC BOYCE ROOF REPLACEMENT

- h. Availability and delivery time information.
 - 4. For equipment, include the following in addition to the above, as applicable:
 - a. Wiring diagrams that show factory-installed wiring.
 - b. Printed performance curves.
 - c. Operational range diagrams.
 - d. Clearances required to other construction, if not indicated on accompanying Shop Drawings.
 - 5. Submit Product Data before Shop Drawings, and before or concurrent with Samples.
- B. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data.
- 1. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:
 - a. Identification of products.
 - b. Schedules.
 - c. Compliance with specified standards.
 - d. Notation of coordination requirements.
 - e. Notation of dimensions established by field measurement.
 - f. Relationship and attachment to adjoining construction clearly indicated.
 - g. Seal and signature of professional engineer if specified.
- C. Samples: Submit Samples for review of kind, color, pattern, and texture for a check of these characteristics with other materials.
- 1. Transmit Samples that contain multiple, related components such as accessories together in one submittal package.
 - 2. Identification: Permanently attach label on unexposed side of Samples that includes the following:
 - a. Project name and submittal number.
 - b. Generic description of Sample.
 - c. Product name and name of manufacturer.
 - d. Sample source.
 - e. Number and title of applicable Specification Section.
 - f. Specification paragraph number and generic name of each item.
 - 3. Web-Based Project Software: Prepare submittals in PDF form and upload to Submittals Workflow. Enter required data to fully identify submittal.
 - 4. For projects where electronic submittals are required, provide corresponding electronic submittal of Sample transmittal, digital color image file illustrating Sample characteristics, and identification information for record in addition to actual samples.
 - 5. Disposition: Maintain sets of approved Samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.

CCAC BOYCE ROOF REPLACEMENT

- a. Samples that may be incorporated into the Work are indicated in individual Specification Sections. Such Samples must be in an undamaged condition at time of use.
 - b. Samples not incorporated into the Work, or otherwise designated as Owner's property, are the property of Contractor.
6. Samples for Initial Selection: Submit manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available.
 - a. Number of Samples: Submit one full set(s) of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. Architect, will return submittal with options selected.
7. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from same material to be used for the Work, cured and finished in manner specified, and physically identical with material or product proposed for use, and that show full range of color and texture variations expected. Samples include, but are not limited to, the following: partial sections of manufactured or fabricated components; small cuts or containers of materials; complete units of repetitively used materials; swatches showing color, texture, and pattern; color range sets; and components used for independent testing and inspection.
 - a. Number of Samples: Submit three sets of Samples. Architect will retain two Sample sets; remainder will be returned. Mark up and retain one returned Sample set as a project record Sample.
 - 1) Submit a single Sample where assembly details, workmanship, fabrication techniques, connections, operation, and other similar characteristics are to be demonstrated.
 - 2) If variation in color, pattern, texture, or other characteristic is inherent in material or product represented by a Sample, submit at least three sets of paired units that show approximate limits of variations.
- D. Qualification Data: Prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, contact information of architects and owners, and other information specified.
- E. Design Data: Prepare and submit written and graphic information indicating compliance with indicated performance and design criteria in individual Specification Sections. Include list of assumptions and summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Number each page of submittal.
- F. Certificates:
 1. Certificates and Certifications Submittals: Submit a statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be signed by an officer or other individual authorized to sign

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documents on behalf of that entity. Provide a notarized signature where indicated.

2. Installer Certificates: Submit written statements on manufacturer's letterhead certifying that Installer complies with requirements in the Contract Documents and, where required, is authorized by manufacturer for this specific Project.
3. Manufacturer Certificates: Submit written statements on manufacturer's letterhead certifying that manufacturer complies with requirements in the Contract Documents. Include evidence of manufacturing experience where required.
4. Material Certificates: Submit written statements on manufacturer's letterhead certifying that material complies with requirements in the Contract Documents.
5. Product Certificates: Submit written statements on manufacturer's letterhead certifying that product complies with requirements in the Contract Documents.
6. Welding Certificates: Prepare written certification that welding procedures and personnel comply with requirements in the Contract Documents. Submit record of Welding Procedure Specification and Procedure Qualification Record on AWS forms. Include names of firms and personnel certified.

G. Test and Research Reports:

1. Compatibility Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of compatibility tests performed before installation of product. Include written recommendations for primers and substrate preparation needed for adhesion.
2. Field Test Reports: Submit written reports indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements in the Contract Documents.
3. Material Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements in the Contract Documents.
4. Preconstruction Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of tests performed before installation of product, for compliance with performance requirements in the Contract Documents.
5. Product Test Reports: Submit written reports indicating that current product produced by manufacturer complies with requirements in the Contract Documents. Base reports on evaluation of tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.
6. Research Reports: Submit written evidence, from a model code organization acceptable to authorities having jurisdiction, that product complies with building code in effect for Project. Include the following information:
 - a. Name of evaluation organization.
 - b. Date of evaluation.
 - c. Time period when report is in effect.
 - d. Product and manufacturers' names.
 - e. Description of product.
 - f. Test procedures and results.
 - g. Limitations of use.

CCAC BOYCE ROOF REPLACEMENT

1.8 DELEGATED-DESIGN SERVICES

- A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.
 - 1. If criteria indicated are insufficient to perform services or certification required, submit a written request for additional information to Architect.
- B. Delegated-Design Services Certification: In addition to Shop Drawings, Product Data, and other required submittals, submit digitally signed PDF file paper copies of certificate, signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional.
 - 1. Indicate that products and systems comply with performance and design criteria in the Contract Documents. Include list of codes, loads, and other factors used in performing these services.

1.9 CONTRACTOR'S REVIEW

- A. Action Submittals and Informational Submittals: Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Architect.
- B. Contractor's Approval: Indicate Contractor's approval for each submittal with indication in web-based Project software. Include name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.
 - 1. Architect will not review submittals received from Contractor that do not have Contractor's review and approval.

1.10 ARCHITECT'S REVIEW

- A. Action Submittals: Architect will review each submittal, indicate corrections or revisions required, and return it.
 - 1. Submittals by Web-Based Project Software: Architect will indicate, the appropriate action.
- B. Informational Submittals: Architect will review each submittal and will not return it, or will return it if it does not comply with requirements. Architect will forward each submittal to appropriate party.
- C. Partial submittals prepared for a portion of the Work will be reviewed when use of partial submittals has received prior approval from Architect.
- D. Incomplete submittals are unacceptable, will be considered nonresponsive, and will be returned for resubmittal without review.

CCAC BOYCE ROOF REPLACEMENT

- E. Architect will return without review submittals received from sources other than Contractor.
- F. Submittals not required by the Contract Documents will be returned by Architect without action.

END OF SECTION 013300

CCAC BOYCE ROOF REPLACEMENT

SECTION 014000 - QUALITY 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 quality assurance and quality control.
- B. Testing and inspection services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.
 - 1. Specific quality-assurance and quality-control requirements for individual work results are specified in their respective Specification Sections. Requirements in individual Sections may also cover production of standard products.
 - 2. Specified tests, inspections, and related actions do not limit Contractor's other quality-assurance and quality-control procedures that facilitate compliance with the Contract Document requirements.
 - 3. Requirements for Contractor to provide quality-assurance and quality-control services required by Architect, Owner, or authorities having jurisdiction are not limited by provisions of this Section.
 - 4. Specific test and inspection requirements are not specified in this Section.

1.3 DEFINITIONS

- A. Experienced: When used with an entity or individual, "experienced" unless otherwise further described means having successfully completed a minimum of five previous projects similar in nature, size, and extent to this Project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.
- B. Field Quality-Control Tests: Tests and inspections that are performed on-site for installation of the Work and for completed Work.
- C. Installer/Applicator/Erector: Contractor or another entity engaged by Contractor as an employee, Subcontractor, or Sub-subcontractor, to perform a particular construction operation, including installation, erection, application, assembly, and similar operations.
 - 1. Use of trade-specific terminology in referring to a trade or entity does not require that certain construction activities be performed by accredited or

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unionized individuals, or that requirements specified apply exclusively to specific trade(s).

- D. Mockups: Full-size physical assemblies that are constructed on-site either as freestanding temporary built elements or as part of permanent construction. Mockups are constructed to verify selections made under Sample submittals; to demonstrate aesthetic effects and qualities of materials and execution; to review coordination, testing, or operation; to show interface between dissimilar materials; and to demonstrate compliance with specified installation tolerances. Mockups are not Samples. Unless otherwise indicated, approved mockups establish the standard by which the Work will be judged.
 - 1. Integrated Exterior Mockups: Mockups of the exterior envelope constructed on-site as freestanding temporary built elements, consisting of multiple products, assemblies, and subassemblies.
 - a. Design and provide standard framework assemblies necessary to support and display mock-ups.
 - b. Mock-up shall be 10'-0" wide minimum by necessary height to demonstrate all wall and roofing transitions.
 - c. Mock-up shall include all elements of the exterior wall, demonstrating surface and material changes from the ground to the roof types.
 - d. Mock-ups shall be complete in all respects and shall represent the final complete exterior "wall assembly" including framing, sheathing, waterproofing/air/vapor barrier, thermal insulation, masonry elements, glazing, aluminum window, sealants and metal finishes and parapet caps. The mock-up should transition to the "exterior roof assembly" with one portion of the mock-up including the roof membrane, flashing transitions, cover board, insulation and roof deck and the other portion including the integral gutter, flashing transitions, metal roof panels, underlayment, sheathing, insulation and roof deck.
- E. Product Tests: Tests and inspections that are performed by a nationally recognized testing laboratory (NRTL) according to 29 CFR 1910.7, by a testing agency accredited according to NIST's National Voluntary Laboratory Accreditation Program (NVLAP), or by a testing agency qualified to conduct product testing and acceptable to authorities having jurisdiction, to establish product performance and compliance with specified requirements.
- F. Source Quality-Control Tests: Tests and inspections that are performed at the source; for example, plant, mill, factory, or shop.
- G. Testing Agency: An entity engaged to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency.
- H. Quality-Assurance Services: Activities, actions, and procedures performed before and during execution of the Work to guard against defects and deficiencies and substantiate that proposed construction will comply with requirements.
- I. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that actual products incorporated into the Work and completed construction comply with requirements. Contractor's quality-control services do not include contract administration activities performed by Architect.

CCAC BOYCE ROOF REPLACEMENT

1.4 DELEGATED-DESIGN SERVICES

- A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.
 - 1. If criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to Architect.

1.5 CONFLICTING REQUIREMENTS

- A. Conflicting Standards and Other Requirements: If compliance with two or more standards or requirements are specified and the standards or requirements establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer conflicting requirements that are different, but apparently equal, to Architect for direction before proceeding.
- B. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to Architect for a decision before proceeding.

1.6 ACTION SUBMITTALS

- A. Delegated-Design Services Submittal: In addition to Shop Drawings, Product Data, and other required submittals, submit a statement signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional, indicating that the products and systems are in compliance with performance and design criteria indicated. Include list of codes, loads, and other factors used in performing these services.

1.7 INFORMATIONAL SUBMITTALS

- A. Contractor's Quality-Control Plan: For quality-assurance and quality-control activities and responsibilities.
- B. Qualification Data: For Contractor's quality-control personnel.
- C. Contractor's Statement of Responsibility: When required by authorities having jurisdiction, submit copy of written statement of responsibility submitted to authorities having jurisdiction before starting work on the following systems:
 - 1. Main wind-force-resisting system or a wind-resisting component listed in the Statement of Special Inspections.
- D. Testing Agency Qualifications: For testing agencies specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include proof of

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qualifications in the form of a recent report on the inspection of the testing agency by a recognized authority.

- E. Schedule of Tests and Inspections: Prepare in tabular form and include the following:
 - 1. Specification Section number and title.
 - 2. Entity responsible for performing tests and inspections.
 - 3. Description of test and inspection.
 - 4. Identification of applicable standards.
 - 5. Identification of test and inspection methods.
 - 6. Number of tests and inspections required.
 - 7. Time schedule or time span for tests and inspections.
 - 8. Requirements for obtaining samples.
 - 9. Unique characteristics of each quality-control service.
- F. Reports: Prepare and submit certified written reports and documents as specified.
- G. Permits, Licenses, and Certificates: For Owner's record, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents established for compliance with standards and regulations bearing on performance of the Work.

1.8 CONTRACTOR'S QUALITY-CONTROL PLAN

- A. Quality-Control Plan, General: Submit quality-control plan within 15 days of Notice to Proceed, and not less than five days prior to preconstruction conference. Submit in format acceptable to Architect. Identify personnel, procedures, controls, instructions, tests, records, and forms to be used to carry out Contractor's quality-assurance and quality-control responsibilities. Coordinate with Contractor's Construction Schedule.
- B. Quality-Control Personnel Qualifications: Engage qualified personnel trained and experienced in managing and executing quality-assurance and quality-control procedures similar in nature and extent to those required for Project.
 - 1. Project quality-control manager may also serve as Project superintendent.
- C. Submittal Procedure: Describe procedures for ensuring compliance with requirements through review and management of submittal process. Indicate qualifications of personnel responsible for submittal review.
- D. Testing and Inspection: In quality-control plan, include a comprehensive schedule of Work requiring testing or inspection, including the following:
 - 1. Contractor-performed tests and inspections including Subcontractor-performed tests and inspections. Include required tests and inspections and Contractor-elected tests and inspections. Distinguish source quality-control tests and inspections from field quality-control tests and inspections.
 - 2. Special inspections required by authorities having jurisdiction and indicated on the Statement of Special Inspections.

CCAC BOYCE ROOF REPLACEMENT

3. Owner-performed tests and inspections indicated in the Contract Documents, including tests and inspections indicated to be performed by Commissioning Authority.
- E. Continuous Inspection of Workmanship: Describe process for continuous inspection during construction to identify and correct deficiencies in workmanship in addition to testing and inspection specified. Indicate types of corrective actions to be required to bring work into compliance with standards of workmanship established by Contract requirements and approved mockups.
- F. Monitoring and Documentation: Maintain testing and inspection reports including log of approved and rejected results. Include work Architect has indicated as nonconforming or defective. Indicate corrective actions taken to bring nonconforming work into compliance with requirements. Comply with requirements of authorities having jurisdiction.

1.9 REPORTS AND DOCUMENTS

- A. Test and Inspection Reports: Prepare and submit certified written reports specified in other Sections. Include the following:
 1. Date of issue.
 2. Project title and number.
 3. Name, address, telephone number, and email address of testing agency.
 4. Dates and locations of samples and tests or inspections.
 5. Names of individuals making tests and inspections.
 6. Description of the Work and test and inspection method.
 7. Identification of product and Specification Section.
 8. Complete test or inspection data.
 9. Test and inspection results and an interpretation of test results.
 10. Record of temperature and weather conditions at time of sample taking and testing and inspection.
 11. Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements.
 12. Name and signature of laboratory inspector.
 13. Recommendations on retesting and reinspecting.
- B. Manufacturer's Technical Representative's Field Reports: Prepare written information documenting manufacturer's technical representative's tests and inspections specified in other Sections. Include the following:
 1. Name, address, telephone number, and email address of technical representative making report.
 2. Statement on condition of substrates and their acceptability for installation of product.
 3. Statement that products at Project site comply with requirements.
 4. Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken.
 5. Results of operational and other tests and a statement of whether observed performance complies with requirements.
 6. Statement whether conditions, products, and installation will affect warranty.
 7. Other required items indicated in individual Specification Sections.

CCAC BOYCE ROOF REPLACEMENT

- C. Factory-Authorized Service Representative's Reports: Prepare written information documenting manufacturer's factory-authorized service representative's tests and inspections specified in other Sections. Include the following:
1. Name, address, telephone number, and email address of factory-authorized service representative making report.
 2. Statement that equipment complies with requirements.
 3. Results of operational and other tests and a statement of whether observed performance complies with requirements.
 4. Statement whether conditions, products, and installation will affect warranty.
 5. Other required items indicated in individual Specification Sections.

1.10 QUALITY ASSURANCE

- A. General: Qualifications paragraphs in this article establish the minimum qualification levels required; individual Specification Sections specify additional requirements.
- B. Manufacturer Qualifications: A firm experienced in manufacturing products or systems similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units. As applicable, procure products from manufacturers able to meet qualification requirements, warranty requirements, and technical or factory-authorized service representative requirements.
- C. Fabricator Qualifications: A firm experienced in producing products similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
- D. Installer Qualifications: A firm or individual experienced in installing, erecting, applying, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.
- E. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of the system, assembly, or product that are similar in material, design, and extent to those indicated for this Project.
- F. Specialists: Certain Specification Sections require that specific construction activities shall be performed by entities who are recognized experts in those operations. Specialists shall satisfy qualification requirements indicated and shall be engaged for the activities indicated.
1. Requirements of authorities having jurisdiction shall supersede requirements for specialists.
- G. Testing Agency Qualifications: An NRTL, an NVLAP, or an independent agency with the experience and capability to conduct testing and inspection indicated, as documented according to ASTM E 329; and with additional qualifications specified in individual Sections; and, where required by authorities having jurisdiction, that is acceptable to authorities.

CCAC BOYCE ROOF REPLACEMENT

- H. Manufacturer's Technical Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to observe and inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.
- I. Factory-Authorized Service Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.
- J. Mockups: Before installing portions of the Work requiring mockups, build mockups for each form of construction and finish required to comply with the following requirements, using materials indicated for the completed Work:
 - 1. Build mockups of size indicated.
 - 2. Build mockups in location indicated or, if not indicated, as directed by Architect.
 - 3. Notify Architect, Owner, Commissioning Authority seven days in advance of dates and times when mockups will be constructed.
 - 4. Employ supervisory personnel who will oversee mockup construction. Employ workers that will be employed to perform same tasks during the construction at Project.
 - 5. Demonstrate the proposed range of aesthetic effects and workmanship.
 - 6. Obtain Architect's approval of mockups before starting corresponding work, fabrication, or construction.
 - a. Allow seven days for initial review and each re-review of each mockup.
 - 7. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
 - 8. Demolish and remove mockups when directed unless otherwise indicated.

1.11 QUALITY CONTROL

- A. Owner Responsibilities: Where quality-control services are indicated as Owner's responsibility, Owner will engage a qualified testing agency to perform these services.
 - 1. Owner will furnish Contractor with names, addresses, and telephone numbers of testing agencies engaged and a description of types of testing and inspection they are engaged to perform.
 - 2. Costs for retesting and reinspecting construction that replaces or is necessitated by work that failed to comply with the Contract Documents will be charged to Contractor, and the Contract Sum will be adjusted by Change Order.
- B. Contractor Responsibilities: Tests and inspections not explicitly assigned to Owner are Contractor's responsibility. Perform additional quality-control activities, whether specified or not, to verify and document that the Work complies with requirements.
 - 1. Unless otherwise indicated, provide quality-control services specified and those required by authorities having jurisdiction. Perform quality-control services required of Contractor by authorities having jurisdiction, whether specified or not.

CCAC BOYCE ROOF REPLACEMENT

2. Engage a qualified testing agency to perform quality-control services.
 - a. Contractor shall not employ same entity engaged by Owner, unless agreed to in writing by Owner.
 3. Notify testing agencies at least 24 hours in advance of time when Work that requires testing or inspection will be performed.
 4. Where quality-control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality-control service.
 5. Testing and inspection requested by Contractor and not required by the Contract Documents are Contractor's responsibility.
 6. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.
- C. Retesting/Reinspecting: Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including retesting and reinspecting, for construction that replaced Work that failed to comply with the Contract Documents.
- D. Manufacturer's Field Services: Where indicated, engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including service connections. Report results in writing as specified in Section 013300 "Submittal Procedures."
- E. Manufacturer's Technical Services: Where indicated, engage a manufacturer's technical representative to observe and inspect the Work. Manufacturer's technical representative's services include participation in preinstallation conferences, examination of substrates and conditions, verification of materials, observation of Installer activities, inspection of completed portions of the Work, and submittal of written reports.
- F. Associated Contractor Services: Cooperate with agencies and representatives performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:
1. Access to the Work.
 2. Incidental labor and facilities necessary to facilitate tests and inspections.
 3. Adequate quantities of representative samples of materials that require testing and inspection. Assist agency in obtaining samples.
 4. Facilities for storage and field curing of test samples.
 5. Preliminary design mix proposed for use for material mixes that require control by testing agency.
 6. Security and protection for samples and for testing and inspection equipment at Project site.
- G. Coordination: Coordinate sequence of activities to accommodate required quality-assurance and quality-control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspection.
1. Schedule times for tests, inspections, obtaining samples, and similar activities.

CCAC BOYCE ROOF REPLACEMENT

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 TEST AND INSPECTION LOG

- A. Test and Inspection Log: Prepare a record of tests and inspections. Include the following:
 - 1. Date test or inspection was conducted.
 - 2. Description of the Work tested or inspected.
 - 3. Date test or inspection results were transmitted to Architect.
 - 4. Identification of testing agency or special inspector conducting test or inspection.
- B. Maintain log at Project site. Post changes and revisions as they occur. Provide access to test and inspection log for Architect's reference during normal working hours.
 - 1. Submit log at Project closeout as part of Project Record Documents.

3.2 REPAIR AND PROTECTION

- A. General: On completion of testing, inspection, sample taking, and similar services, repair damaged construction and restore substrates and finishes.
 - 1. Provide materials and comply with installation requirements specified in other Specification Sections or matching existing substrates and finishes. Restore patched areas and extend restoration into adjoining areas with durable seams that are as invisible as possible. Comply with the Contract Document requirements for cutting and patching in Section 017300 "Execution."
- B. Protect construction exposed by or for quality-control service activities.
- C. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.

END OF SECTION 014000

CCAC BOYCE ROOF REPLACEMENT

SECTION 014200 - REFERENCES

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 DEFINITIONS

- A. General: Basic Contract definitions are included in the Conditions of the Contract.
- B. "Approved": When used to convey Architect's action on Contractor's submittals, applications, and requests, "approved" is limited to Architect's duties and responsibilities as stated in the Conditions of the Contract.
- C. "Directed": A command or instruction by Architect. Other terms including "requested," "authorized," "selected," "required," and "permitted" have the same meaning as "directed."
- D. "Indicated": Requirements expressed by graphic representations or in written form on Drawings, in Specifications, and in other Contract Documents. Other terms including "shown," "noted," "scheduled," and "specified" have the same meaning as "indicated."
- E. "Regulations": Laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, and rules, conventions, and agreements within the construction industry that control performance of the Work.
- F. "Furnish": Supply and deliver to Project site, ready for unloading, unpacking, assembly, installation, and similar operations.
- G. "Install": Unload, temporarily store, unpack, assemble, erect, place, anchor, apply, work to dimension, finish, cure, protect, clean, and similar operations at Project site.
- H. "Provide": Furnish and install, complete and ready for the intended use.
- I. "Project Site": Space available for performing construction activities. The extent of Project site is shown on Drawings and may or may not be identical with the description of the land on which Project is to be built.

1.3 INDUSTRY STANDARDS

- A. Applicability of Standards: Unless the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents to the extent

CCAC BOYCE ROOF REPLACEMENT

referenced. Such standards are made a part of the Contract Documents by reference.

- B. Publication Dates: Comply with standards in effect as of date of the Contract Documents unless otherwise indicated.
- C. Copies of Standards: Each entity engaged in construction on Project should be familiar with industry standards applicable to its construction activity. Copies of applicable standards are not bound with the Contract Documents.
 - 1. Where copies of standards are needed to perform a required construction activity, obtain copies directly from publication source.

1.4 ABBREVIATIONS AND ACRONYMS

- A. Industry Organizations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. This information is subject to change and is believed to be accurate as of the date of the Contract Documents.
 - 1. AABC - Associated Air Balance Council; www.aabc.com.
 - 2. AAMA - American Architectural Manufacturers Association; www.aamanet.org.
 - 3. AAPFCO - Association of American Plant Food Control Officials; www.aapfco.org.
 - 4. AASHTO - American Association of State Highway and Transportation Officials; www.transportation.org.
 - 5. AATCC - American Association of Textile Chemists and Colorists; www.aatcc.org.
 - 6. ABMA - American Bearing Manufacturers Association; www.americanbearings.org.
 - 7. ABMA - American Boiler Manufacturers Association; www.abma.com.
 - 8. ACI - American Concrete Institute; (Formerly: ACI International); www.concrete.org
 - 9. ACPA - American Concrete Pipe Association; www.concrete-pipe.org.
 - 10. AEIC - Association of Edison Illuminating Companies, Inc. (The); www.aeic.org.
 - 11. AF&PA - American Forest & Paper Association; www.afandpa.org.
 - 12. AGA - American Gas Association; www.aga.org.
 - 13. AHAM - Association of Home Appliance Manufacturers; www.aham.org.
 - 14. AHRI - Air-Conditioning, Heating, and Refrigeration Institute (The); www.ahrinet.org.
 - 15. AI - Asphalt Institute; www.asphaltinstitute.org.
 - 16. AIA - American Institute of Architects (The); www.aia.org.
 - 17. AISC - American Institute of Steel Construction; www.aisc.org.
 - 18. AISI - American Iron and Steel Institute; www.steel.org.
 - 19. AITC - American Institute of Timber Construction; www.aitc-glulam.org.
 - 20. AMCA - Air Movement and Control Association International, Inc.; www.amca.org.
 - 21. ANSI - American National Standards Institute; www.ansi.org.
 - 22. AOSA - Association of Official Seed Analysts, Inc.; www.aosaseed.com.
 - 23. APA - APA - The Engineered Wood Association; www.apawood.org.
 - 24. APA - Architectural Precast Association; www.archprecast.org.
 - 25. API - American Petroleum Institute; www.api.org.

CCAC BOYCE ROOF REPLACEMENT

26. ARI – Air-Conditioning & Refrigeration Institute; (See AHRI).
27. ARI – American Refrigeration Institute; (See AHRI).
28. ARMA – Asphalt Roofing Manufacturers Association; www.asphaltroofing.org.
29. ASCE – American Society of Civil Engineers; www.asce.org.
30. ASCE/SEI – American Society of Civil Engineers/Structural Engineering Institute; (See ASCE).
31. ASHRAE – American Society of Heating, Refrigerating and Air-Conditioning Engineers; www.ashrae.org.
32. ASME – ASME International; (American Society of Mechanical Engineers); www.asme.org.
33. ASSE – American Society of Safety Engineers (The); www.asse.org.
34. ASSE – American Society of Sanitary Engineering; www.asse-plumbing.org.
35. ASTM – ASTM International; www.astm.org.
36. ATIS – Alliance for Telecommunications Industry Solutions; www.atis.org.
37. AWEA – American Wind Energy Association; www.awea.org.
38. AWI – Architectural Woodwork Institute; www.awinet.org.
39. AWMAC – Architectural Woodwork Manufacturers Association of Canada; www.awmac.com.
40. AWPA – American Wood Protection Association; www.awpa.com.
41. AWS – American Welding Society; www.aws.org.
42. AWWA – American Water Works Association; www.awwa.org.
43. BHMA – Builders Hardware Manufacturers Association; www.buildershardware.com.
44. BIA – Brick Industry Association (The); www.gobrick.com.
45. BICSI – BICSI, Inc.; www.bicsi.org.
46. BIFMA – BIFMA International; (Business and Institutional Furniture Manufacturer's Association); www.bifma.org.
47. BISSC – Baking Industry Sanitation Standards Committee; www.bissc.org.
48. BWF – Badminton World Federation; (Formerly: International Badminton Federation); www.bissc.org.
49. CDA – Copper Development Association; www.copper.org.
50. CE – Conformite Europeenne; <http://ec.europa.eu/growth/single-market/ce-marking/>
51. CEA – Canadian Electricity Association; www.electricity.ca.
52. CEA – Consumer Electronics Association; www.ce.org.
53. CFFA – Chemical Fabrics and Film Association, Inc.; www.chemicalfabricsandfilm.com.
54. CFSEI – Cold-Formed Steel Engineers Institute; www.cfsei.org.
55. CGA – Compressed Gas Association; www.cganet.com.
56. CIMA – Cellulose Insulation Manufacturers Association; www.cellulose.org.
57. CISCA – Ceilings & Interior Systems Construction Association; www.cisca.org.
58. CISPI – Cast Iron Soil Pipe Institute; www.cispi.org.
59. CLFMI – Chain Link Fence Manufacturers Institute; www.chainlinkinfo.org.
60. CPA – Composite Panel Association; www.pbmdf.com.
61. CRI – Carpet and Rug Institute (The); www.carpet-rug.org.
62. CRRC – Cool Roof Rating Council; www.coolroofs.org.
63. CRSI – Concrete Reinforcing Steel Institute; www.crsi.org.
64. CSA – CSA Group; www.csa.ca.
65. CSA – CSA International; (Formerly: IAS – International Approval Services); www.csa-international.org.
66. CSI – Construction Specifications Institute (The); www.csinet.org.
67. CSSB – Cedar Shake & Shingle Bureau; www.cedarbureau.org.

CCAC BOYCE ROOF REPLACEMENT

68. CTI - Cooling Technology Institute; (Formerly: Cooling Tower Institute); www.cti.org.
69. CWC - Composite Wood Council; (See CPA).
70. DASMA - Door and Access Systems Manufacturers Association; www.dasma.com.
71. DHI - Door and Hardware Institute; www.dhi.org.
72. ECA - Electronic Components Association; (See ECIA).
73. ECAMA - Electronic Components Assemblies & Materials Association; (See ECIA).
74. ECIA - Electronic Components Industry Association; www.eciaonline.org.
75. EIA - Electronic Industries Alliance; (See TIA).
76. EIMA - EIFS Industry Members Association; www.eima.com.
77. EJMA - Expansion Joint Manufacturers Association, Inc.; www.ejma.org.
78. ESD - ESD Association; (Electrostatic Discharge Association); www.esda.org.
79. ESTA - Entertainment Services and Technology Association; (See PLASA).
80. ETL - Intertek (See Intertek); www.intertek.com.
81. EVO - Efficiency Valuation Organization; www.evo-world.org.
82. FCI - Fluid Controls Institute; www.fluidcontrolsintstitute.org.
83. FIBA - Federation Internationale de Basketball; (The International Basketball Federation); www.fiba.com.
84. FIVB - Federation Internationale de Volleyball; (The International Volleyball Federation); www.fivb.org.
85. FM Approvals - FM Approvals LLC; www.fmglobal.com.
86. FM Global - FM Global; (Formerly: FMG - FM Global); www.fmglobal.com.
87. FRSA - Florida Roofing, Sheet Metal & Air Conditioning Contractors Association, Inc.; www.floridarroof.com.
88. FSA - Fluid Sealing Association; www.fluidsealing.com.
89. FSC - Forest Stewardship Council U.S.; www.fscus.org.
90. GA - Gypsum Association; www.gypsum.org.
91. GANA - Glass Association of North America; www.glasswebsite.com.
92. GS - Green Seal; www.greenseal.org.
93. HI - Hydraulic Institute; www.pumps.org.
94. HI/GAMA - Hydronics Institute/Gas Appliance Manufacturers Association; (See AHRI).
95. HMMA - Hollow Metal Manufacturers Association; (See NAAMM).
96. HPVA - Hardwood Plywood & Veneer Association; www.hpva.org.
97. HPW - H. P. White Laboratory, Inc.; www.hpwhite.com.
98. IAPSC - International Association of Professional Security Consultants; www.iapsc.org.
99. IAS - International Accreditation Service; www.iasonline.org.
100. IAS - International Approval Services; (See CSA).
101. ICBO - International Conference of Building Officials; (See ICC).
102. ICC - International Code Council; www.iccsafe.org.
103. ICEA - Insulated Cable Engineers Association, Inc.; www.icea.net.
104. ICPA - International Cast Polymer Alliance; www.icpa-hq.org.
105. ICRI - International Concrete Repair Institute, Inc.; www.icri.org.
106. IEC - International Electrotechnical Commission; www.iec.ch.
107. IEEE - Institute of Electrical and Electronics Engineers, Inc. (The); www.ieee.org.
108. IES - Illuminating Engineering Society; (Formerly: Illuminating Engineering Society of North America); www.ies.org.
109. IESNA - Illuminating Engineering Society of North America; (See IES).
110. IEST - Institute of Environmental Sciences and Technology; www.iest.org.

CCAC BOYCE ROOF REPLACEMENT

111. IGMA – Insulating Glass Manufacturers Alliance; www.igmaonline.org.
112. IGSHPA – International Ground Source Heat Pump Association; www.igshpa.okstate.edu.
113. ILI – Indiana Limestone Institute of America, Inc.; www.ili.ai.com.
114. Intertek – Intertek Group; (Formerly: ETL SEMCO; Intertek Testing Service NA); www.intertek.com.
115. ISA – International Society of Automation (The); (Formerly: Instrumentation, Systems, and Automation Society); www.isa.org.
116. ISAS – Instrumentation, Systems, and Automation Society (The); (See ISA).
117. ISFA – International Surface Fabricators Association; (Formerly: International Solid Surface Fabricators Association); www.isfanow.org.
118. ISO – International Organization for Standardization; www.iso.org.
119. ISSFA – International Solid Surface Fabricators Association; (See ISFA).
120. ITU – International Telecommunication Union; www.itu.int/home.
121. KCMA – Kitchen Cabinet Manufacturers Association; www.kcma.org.
122. LMA – Laminating Materials Association; (See CPA).
123. LPI – Lightning Protection Institute; www.lightning.org.
124. MBMA – Metal Building Manufacturers Association; www.mbma.com.
125. MCA – Metal Construction Association; www.metalconstruction.org.
126. MFMA – Maple Flooring Manufacturers Association, Inc.; www.maplefloor.org.
127. MFMA – Metal Framing Manufacturers Association, Inc.; www.metalframingmfg.org.
128. MHIA – Material Handling Industry of America; www.mhia.org.
129. MIA – Marble Institute of America; www.marble-institute.com.
130. MMPA – Moulding & Millwork Producers Association; www.wmmpa.com.
131. MPI – Master Painters Institute; www.paintinfo.com.
132. MSS – Manufacturers Standardization Society of The Valve and Fittings Industry Inc.; www.mss-hq.org.
133. NAAMM – National Association of Architectural Metal Manufacturers; www.naamm.org.
134. NACE – NACE International; (National Association of Corrosion Engineers International); www.nace.org.
135. NADCA – National Air Duct Cleaners Association; www.nadca.com.
136. NAIMA – North American Insulation Manufacturers Association; www.naima.org.
137. NBGQA – National Building Granite Quarries Association, Inc.; www.nbgqa.com.
138. NBI – New Buildings Institute; www.newbuildings.org.
139. NCAA – National Collegiate Athletic Association (The); www.ncaa.org.
140. NCMA – National Concrete Masonry Association; www.ncma.org.
141. NEBB – National Environmental Balancing Bureau; www.nebb.org.
142. NECA – National Electrical Contractors Association; www.necanet.org.
143. NeLMA – Northeastern Lumber Manufacturers Association; www.nelma.org.
144. NEMA – National Electrical Manufacturers Association; www.nema.org.
145. NETA – InterNational Electrical Testing Association; www.netaworld.org.
146. NFHS – National Federation of State High School Associations; www.nfhs.org.
147. NFPA – National Fire Protection Association; www.nfpa.org.
148. NFPA – NFPA International; (See NFPA).
149. NFRC – National Fenestration Rating Council; www.nfrc.org.
150. NHLA – National Hardwood Lumber Association; www.nhla.com.
151. NLGA – National Lumber Grades Authority; www.nlga.org.
152. NOFMA – National Oak Flooring Manufacturers Association; (See NWFA).
153. NOMMA – National Ornamental & Miscellaneous Metals Association; www.nomma.org.

CCAC BOYCE ROOF REPLACEMENT

154. NRCA – National Roofing Contractors Association; www.nrca.net.
155. NRMCA – National Ready Mixed Concrete Association; www.nrmca.org.
156. NSF – NSF International; www.nsf.org.
157. NSPE – National Society of Professional Engineers; www.nspe.org.
158. NSSGA – National Stone, Sand & Gravel Association; www.nssga.org.
159. NTMA – National Terrazzo & Mosaic Association, Inc. (The); www.ntma.com.
160. NWFA – National Wood Flooring Association; www.nwfa.org.
161. PCI – Precast/Prestressed Concrete Institute; www.pci.org.
162. PDI – Plumbing & Drainage Institute; www.pdionline.org.
163. PLASA – PLASA; (Formerly: ESTA – Entertainment Services and Technology Association); <http://www.plasa.org>.
164. RCSC – Research Council on Structural Connections; www.boltcouncil.org.
165. RFCI – Resilient Floor Covering Institute; www.rfci.com.
166. RIS – Redwood Inspection Service; www.redwoodinspection.com.
167. SAE – SAE International; www.sae.org.
168. SCTE – Society of Cable Telecommunications Engineers; www.scte.org.
169. SDI – Steel Deck Institute; www.sdi.org.
170. SDI – Steel Door Institute; www.steeldoor.org.
171. SEFA – Scientific Equipment and Furniture Association (The); www.sefalabs.com.
172. SEI/ASCE – Structural Engineering Institute/American Society of Civil Engineers; (See ASCE).
173. SIA – Security Industry Association; www.siaonline.org.
174. SJI – Steel Joist Institute; www.steeljoist.org.
175. SMA – Screen Manufacturers Association; www.smainfo.org.
176. SMACNA – Sheet Metal and Air Conditioning Contractors' National Association; www.smacna.org.
177. SMPTE – Society of Motion Picture and Television Engineers; www.smpte.org.
178. SPFA – Spray Polyurethane Foam Alliance; www.sprayfoam.org.
179. SPIB – Southern Pine Inspection Bureau; www.spib.org.
180. SPRI – Single Ply Roofing Industry; www.spri.org.
181. SRCC – Solar Rating & Certification Corporation; www.solar-rating.org.
182. SSINA – Specialty Steel Industry of North America; www.ssina.com.
183. SSPC – SSPC: The Society for Protective Coatings; www.sspc.org.
184. STI – Steel Tank Institute; www.steeltank.com.
185. SWI – Steel Window Institute; www.steelwindows.com.
186. SWPA – Submersible Wastewater Pump Association; www.swpa.org.
187. TCA – Tilt-Up Concrete Association; www.tilt-up.org.
188. TCNA – Tile Council of North America, Inc.; www.tileusa.com.
189. TEMA – Tubular Exchanger Manufacturers Association, Inc.; www.tema.org.
190. TIA – Telecommunications Industry Association (The); (Formerly: TIA/EIA – Telecommunications Industry Association/Electronic Industries Alliance); www.tiaonline.org.
191. TIA/EIA – Telecommunications Industry Association/Electronic Industries Alliance; (See TIA).
192. TMS – The Masonry Society; www.masonrysociety.org.
193. TPI – Truss Plate Institute; www.tpinst.org.
194. TPI – Turfgrass Producers International; www.turfgrasssod.org.
195. TRI – Tile Roofing Institute; www.tilerroofing.org.
196. UL – Underwriters Laboratories Inc.; <http://www.ul.com>.
197. UNI – Uni-Bell PVC Pipe Association; www.uni-bell.org.
198. USAV – USA Volleyball; www.usavolleyball.org.
199. USGBC – U.S. Green Building Council; www.usgbc.org.

CCAC BOYCE ROOF REPLACEMENT

200. USITT – United States Institute for Theatre Technology, Inc.; www.usitt.org.
201. WA – Wallcoverings Association; www.wallcoverings.org
202. WASTEC – Waste Equipment Technology Association; www.wastec.org.
203. WCLIB – West Coast Lumber Inspection Bureau; www.wclib.org.
204. WCMA – Window Covering Manufacturers Association; www.wcmanet.org.
205. WDMA – Window & Door Manufacturers Association; www.wdma.com.
206. WI – Woodwork Institute; www.wicnet.org.
207. WSRCA – Western States Roofing Contractors Association; www.wsrca.com.
208. WWPA – Western Wood Products Association; www.wwpa.org.

B. Code Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. This information is believed to be accurate as of the date of the Contract Documents.

1. IAPMO – International Association of Plumbing and Mechanical Officials; www.iapmo.org.
2. ICC – International Code Council; www.iccsafe.org.
3. ICC-ES – ICC Evaluation Service, LLC; www.icc-es.org.

C. Federal Government Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. Information is subject to change and is up to date as of the date of the Contract Documents.

1. CPSC – Consumer Product Safety Commission; www.cpsc.gov.
2. DOC – Department of Commerce; National Institute of Standards and Technology; www.nist.gov.
3. DOE – Department of Energy; www.energy.gov.
4. EPA – Environmental Protection Agency; www.epa.gov.
5. FG – Federal Government Publications; www.gpo.gov/fdsys.
6. LBL – Lawrence Berkeley National Laboratory; Environmental Energy Technologies Division; www.eetd.lbl.gov.
7. OSHA – Occupational Safety & Health Administration; www.osha.gov.

D. State Government Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. This information is subject to change and is believed to be accurate as of the date of the Contract Documents.

1. CBHF; State of California; Department of Consumer Affairs; Bureau of Electronic and Appliance Repair, Home Furnishings and Thermal Insulation; www.bearhfti.ca.gov.
2. CCR; California Code of Regulations; Office of Administrative Law; California Title 24 Energy Code; www.calregs.com.
3. CDHS; California Department of Health Services; (See CDPH).
4. CDPH; California Department of Public Health; Indoor Air Quality Program; www.cal-iaq.org.
5. CPUC; California Public Utilities Commission; www.cpuc.ca.gov.
6. SCAQMD; South Coast Air Quality Management District; www.aqmd.gov.
7. TFS; Texas A&M Forest Service; Sustainable Forestry and Economic Development; www.txforestservice.tamu.edu.

CCAC BOYCE ROOF REPLACEMENT

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 014200

CCAC BOYCE ROOF REPLACEMENT

SECTION 015000 - TEMPORARY FACILITIES

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: General administrative and procedural requirements governing temporary facilities and controls including, but not limited to, the following:

- 1. Temporary Construction Facilities:

- a. Field offices and sheds.
 - b. First aid.
 - c. Equipment
 - d. Sanitary facilities.
 - e. Temporary utilities
 - f. Construction aids.
 - g. Cranes and hoists.
 - h. Security.
 - i. Access roads.
 - j. Snow removal.
 - k. Parking.

- 2. Temporary Controls:

- a. Barriers.
 - b. Enclosures.
 - c. Building perimeter protection and floor openings protection.
 - d. Miscellaneous controls.
 - e. Waste.
 - f. Precautions.
 - g. Protection of Installed Work.

1.3 FIELD OFFICES AND SHEDS - CONTRACTORS

- A. Each Contractor shall construct, furnish, and maintain temporary structures, tool trailers, material sheds, and other similar structures required for the performance of their contracts only at locations shown on Drawings or otherwise as directed by Owner. Contractors shall establish and maintain field offices.
- B. Coordinate tool trailer and shed locations with Owner and all Contractors working on site. Relocate temporary trailers and sheds as required to perform the work; move by appropriate Contractor furnishing temporary offices and sheds, including temporary services.

CCAC BOYCE ROOF REPLACEMENT

- C. Each Contractor shall maintain field offices and sheds until completion of their respective scope of work. Heating, lighting, A/C, and land-line communication services are to be provided by each Prime Contractor.
- D. Storage Sheds for Tools, Materials, and Equipment: Weather-tight, with heat and ventilation for products requiring controlled conditions, with adequate space for organized storage and access, and lighting for observation of stored materials.
 - 1. Do not use other than approved designated work areas for storage of materials.

1.4 FIRST AID

- A. General Contractor shall provide and maintain until Acceptance of Final Inspection by Owner a completely equipped First Aid Kit at a central location at Site. Equip first aid station for rendering of minor medical services.
 - 1. First Aid Kit shall be readily available at all times for workmen at Site.
 - 2. Keep in a clean, orderly condition. Restock as items are used.
- B. General Contractor shall designate certain employees, who shall have been properly trained, to be in charge of first aid. At least one such employee shall be available whenever work is being performed.
- C. General Contractor shall post conspicuously a telephone call list for summoning aid from outside sources such as doctors, ambulances, fire department and rescue squads.
- D. Other Contractors may provide their own first aid as part of their safety program, which is the responsibility of each Contractor.

1.5 EQUIPMENT

- A. Fire Extinguisher: Provide hand carried, portable UL rated, class "A" fire extinguisher for temporary offices and similar spaces. In other locations provide hand carried, portable, UL rated, class "ABC" dry chemical extinguisher, or a combination of extinguisher of NFPA recommended classes for the exposures.

1.6 SANITARY FACILITIES

- A. General Contractor shall provide, maintain and move temporary sanitary facilities for duration of construction period in required quantity. Use of new, permanent and existing fixtures will not be permitted.
- B. Sanitary Facilities: Enclosed portable self-contained units (portajohn) with toilet paper replaced as required. Includes cleaning and waste removal, weekly or more frequent as required by use and condition).
- C. Provide quantity of sanitary facilities as required by 29 CFR 1926 (OSHA).
- D. Coordinate location with Owner.

CCAC BOYCE ROOF REPLACEMENT

- E. Maintain temporary facilities in a neat and sanitary condition.
- F. Do not dispose flammables, solids, or liquids used as part of construction into sanitary facilities.

1.7 TEMPORARY UTILITIES

A. General: Install temporary service or connect to existing service.

1. Arrange with utility company, Owner, and existing users for time when service can be interrupted, if necessary, to make connections for temporary services.
2. Sewers and Drainage: Provide temporary utilities to remove effluent lawfully.
3. Connect temporary roof drains during replacement to municipal system as required.

B. Water Supply:

1. CCAC, within its facilities, will furnish water for construction purposes, free of charge to the contractors.

C. Construction Power:

1. CCAC, within its facilities, will furnish electricity (from existing outlets only) for construction purposes, free of charge to the contractors.

D. Lighting: Provide temporary lighting as required that provides adequate illumination for construction operations, observations, inspections, and traffic conditions.

E. Telephone Service: Provide temporary telephone service in common-use facilities for use by all construction personnel. Install WiFi cell phone access equipment.

1.8 CONSTRUCTION AIDS

- A. Each Contractor shall provide construction aids and equipment required to facilitate execution of its work. Construction aids include but are not limited to ramps; stairs; scaffolding; ladders; platforms; railings; chutes; hoists; and cranes.
- B. Comply with applicable local, state, and federal regulations for worker safety, public safety and fire protection.
- C. Relocate construction aids as required by progress of construction, work schedule, and to accommodate legitimate requirements of Owner and other Contractors on site.
- D. Where required by the work, provide strong, safe temporary stairs, ladders, scaffolding, etc., for use of workmen and inspectors.

CCAC BOYCE ROOF REPLACEMENT

- E. Comply with applicable OSHA, BOCA, and Labor and Industry requirements.
- F. Do not use Owner owned equipment and materials to perform contract work.
- G. Provide necessary shoring of excavations by means of shores and braces to avoid cave-ins of excavations until backfilling is completed.

1.9 CRANES AND HOISTS

- A. Each Contractor shall provide hoisting of materials as required for the performance of their work. Certify, inspect, install, operate and dismantle cranes and hoists in accordance with 29 CFR 1926, and safety regulations of authorities having jurisdiction.
- B. Use of cranes and hoists over any occupied building or area, or general public, is prohibited.
- C. Crane and hoist inspections shall be performed as required by and 29 CFR 1926 (OSHA).
- D. Crane and hoist operators shall be trained and certified as required by 29 CFR 1926 (OSHA) and authorities having jurisdiction.

1.10 SECURITY

- A. Provide security to protect the Work from unauthorized entry, vandalism, and theft.
- B. Security shall include but not be limited to following new materials stored and installed; tools, equipment, and field offices and sheds; and other new materials.
- C. Each Contractor and subcontractor shall be responsible for maintaining security of their own work. Any materials or finished Work stolen, damaged, or vandalized shall be repaired or replaced to satisfaction of Architect at no additional cost to Owner by appropriate Contractor and subcontractor.

1.11 TEMPORARY ACCESS ROADS

- A. If required General Contractor shall construct and maintain temporary access roads interfacing with public thoroughfares serving construction areas. Construct temporary access roads as approved by Owner.
- B. Provide and maintain access to fire hydrants, free of obstructions.
- C. General Contractor shall clean and maintain on-site roads, drives and parking lots to the satisfaction of the Owner and Architect. When notified that on-site roads, drives and parking lots are not being properly cleaned and maintained, General Contractor shall within 24 hours (1 calendar day) perform the necessary cleaning and maintenance.
- D. General Contractor shall clean and maintain adjacent roadways affected by project

CCAC BOYCE ROOF REPLACEMENT

work to the satisfaction of the Owner and Architect. When notified that adjacent roadways are not being properly cleaned and maintained, General Contractor shall within 24 hours (1 calendar day) perform the necessary cleaning and maintenance.

1. When the cleaning and maintenance of adjacent roadways is governed by any permit condition (for example, NPDES or local earthmoving or building permit), local law or ordinance, or other authority having jurisdiction, General Contractor shall clean and maintain adjacent roads to the satisfaction of such permit, law, ordinance or authority having jurisdiction.
- E. Traffic Control: Each Contractor shall provide traffic control barriers and flag persons throughout construction period at any point in time that construction traffic obstructs normal on- site or off-site vehicular or pedestrian traffic conditions, especially during times of high student traffic.

1.12 SNOW AND ICE REMOVAL

- A. General Contractor shall remove snow and ice from buildings, temporary roads and laydown areas, building access walkways, temporary parking areas, and other areas associated with general construction areas to ensure safe access and working conditions. When within the Limits of Disturbance or Limits of Construction, remove snow and ice from existing walks, roads, drives, and parking lots, whether for use by Contractors or Owner.
- B. Each Contractor: Remove snow and ice accumulations from their excavation areas.
- C. Contractors to coordinate with each other and with Owner's snow removal program.

1.13 PARKING

- A. Each Contractor to coordinate and obtain approval from Owner for parking as needed for their operations.

1.14 BARRIERS AND CONSTRUCTION FENCE

- A. Each Contractor shall provide as required by 29 CFR 1926, law, and authorities having jurisdiction, and as required to warn public of construction areas, and to protect existing facilities and adjacent properties from damage as a result of construction operations.
- B. Contractor or Subcontractor creating an opening, excavation or hazard shall be the entity responsible for providing the barrier.
- C. Erect and maintain all barriers, barricades, lanterns, and fences required by law.
- D. Contractor shall be sole party to determine extent of barriers required to protect the work site, installed materials, and individuals whether they be workmen or general public.
- E. Provide barriers and fences which are structurally stable, neatly constructed, and suitable for purpose intended.

CCAC BOYCE ROOF REPLACEMENT

- F. Provide and maintain barriers and barricades required by governing authorities for public rights-of-way.
- G. Provide barriers around existing items designated to remain. Protect against vehicular traffic, stored materials, dumping, chemically injurious materials, and puddling or continuous running water.
- H. General Contractor shall provide and maintain following construction fences as coordinated with Owner:
 - 1. Chain Link Fence: 6 ft. high relocatable type mesh fencing system as shown on Site Logistics Drawings.
 - 2. Provide 2 vehicular gates of adequate size to facilitate construction vehicles and 1 pedestrian gate for each fenced area. Lock each gate using master keys; give 2 keys to each Contractor and Owner.
 - 3. Place NO TRESPASSING signs around the site as directed by Owner.
 - a. Minimum one every 100 feet of fence, and one on each gate.
 - 4. Relocate and provide additional fencing for various project phasing and as directed by Owner.

1.15 TEMPORARY ENCLOSURES

- A. At such times as weather circumstances and security requirements warrant as necessary for progress of the work, General Contractor shall protect interior of each building section or area from entry by unauthorized persons and from inclement weather. Close outside openings either by permanent closure material according to Contract Documents or by temporary weathertight insulated enclosures of material and construction as specifically approved by Architect and Owner.
- B. Remove temporary enclosures from the site when directed by the Owner. Provide as part of each Contract requirement as applicable.
- C. Provide additional temporary enclosures as applicable to perform required work as part of each Contract requirement.

1.16 BUILDING PERIMETER AND FLOOR OPENINGS PROTECTION

- A. General Contractor shall provide and maintain building perimeter protection, which allows for workers to work on elevated decks and surfaces without the requirement of harnesses, lanyards, and similar equipment, in accordance with 29 CFR 1926 (OSHA). Such perimeter protection shall be available for use by all contractors.
- B. When the work of any Contractor requires workers to work on or from areas outside of the building perimeter protection, each such Contractor shall provide harnesses, lanyards, positioning devices, and other equipment as required by 29 CFR 1926 (OSHA).

CCAC BOYCE ROOF REPLACEMENT

- C. Each Contractor shall be responsible for securely covering floor and deck openings in accordance with 29 CFR 1926 (OSHA).

1.17 MISCELLANEOUS CONTROLS

- A. Each Contractor shall provide temporary miscellaneous controls as follows: dust control, pollution control, and noise control.
- B. Execute work by methods to minimize raising dust from construction operations. Provide positive means to restrict air-borne dust from dispersing into atmosphere.
- C. Provide methods, means, and facilities to prevent contamination of soil, water, and atmosphere from discharge of noxious, toxic substances, and pollutants produced during construction.
- D. Noise Control: Fit compressors, generating equipment, and other noise generating equipment with mufflers or other noise abatement attachments.
- E. Each contractor shall supply and maintain a fire extinguisher in temporary rooms, jobsite trailer, at flammable material storage areas, and at all locations where welding or burning occurs.
- F. Drinking Water and Ice: Each Contractor is responsible to provide for their own work forces.

1.18 WASTE

- A. Each Contractor shall collect waste and construction debris from its work areas daily, and deposit waste and construction debris in on-site dumpsters. Strictly enforce collection and disposal of waste.
- B. General Contractor shall provide dumpsters for use by all Contractors. General Contractor shall be responsible for all costs associated with delivering, hauling and replacing dumpsters for the Contract duration, and shall pay all costs associated with disposing of waste.
 - 1. Do not hold materials more than 7 days during normal weather and 3 days when temperature is expected to rise above 85 degrees.
 - 2. Comply with requirements of NFPA 241 for removal of combustible waste material and debris.
 - 3. Locate dumpsters as coordinated with Owner.
 - 4. Dispose of waste lawfully; submit original manifest to Owner.
- C. Each Contractor shall be responsible for the disposal of its own hazardous, dangerous, and unsanitary waste materials.
- D. Each Contractor shall dismantle crates, crush cardboard boxes, and otherwise attempt to compact its waste so as to minimize its volume.

1.19 PRECAUTIONS

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- A. Each Contractor shall promulgate and enforce rules to prevent following circumstances.
 - 1. Lighting of open fires upon premises.
 - 2. Burning of any combustible material on site.
 - 3. Smoking within project site at any time.
 - 4. Use of drugs and alcohol anywhere on or near project site.
- B. Each Contractor shall store paints, varnishes, volatile oils, and similar combustible materials in properly labeled storage containers and in storage area as required by law.
- C. Each Contractor shall bring in, handle, use and dispose of gasoline, benzine, other like volatile flammable liquids in accordance with regulations of Fire Underwriters, 29 CFR 1926 (OSHA) and Authorities Having Jurisdiction. Store in properly labeled storage containers.
- D. Follow applicable regulatory hot and safe work procedures when performing welding, cutting, torching, grinding, brazing, or tacking, including protecting personnel and the adjacent work area from fire hazards.

1.20 REMOVAL OF TEMPORARY FACILITIES AND CONTROLS

- A. Each Contractor shall remove its temporary facilities and controls prior to Substantial Completion inspection.
- B. Each Contractor shall clean and repair damage caused by installation or use of temporary facilities.
- C. Each Contractor shall remove temporary underground installations completely; grade site as indicated.
- D. Each Contractor shall restore existing facilities used during construction to specified or to original condition.
- E. General Contractor: Restore area under and adjacent to each temporary office and shed after removal from site.

1.21 PROTECTION OF INSTALLED WORK

- A. Provide temporary and removable protection for installed products. Control traffic and activities in immediate area to minimize damage. Remove protections at appropriate times.
- B. Provide protective coverings at walls, projections, jambs, sills, and soffits of openings.
- C. Protect all finished floors and other surfaces from traffic, dirt, wear, and damage. Protect with durable sheet materials.
- D. Restrict traffic and storage on roof surfaces and lawn areas.

CCAC BOYCE ROOF REPLACEMENT

- E. Protect roofing membrane as required during subsequent work during entire construction period.
- F. Each Contractor is responsible for any damage, which may occur to property of any other Contractor connected with the work, to adjacent private or public properties, or to any portion of structure that in any way results from acts of neglect of their employees.
- G. Provide as part of each Contract requirement as applicable. Remove protection of installed work immediately prior to Substantial Completion, or earlier if approved by Owner. Contractors are wholly responsible for protection of finished work, both their own and that of others, as may be required to perform their work.

PART 2 - PRODUCTS

Not Used.

PART 3 - EXECUTION

Not Used.

END OF SECTION 015000

CCAC BOYCE ROOF REPLACEMENT

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 012300 "Alternates" for products selected under an alternate.
 - 2. Section 012500 "Substitution Procedures" for requests for substitutions.
 - 3. Section 014200 "References" for applicable industry standards for products specified.

1.3 DEFINITIONS

- A. Products: Items obtained for incorporating into the Work, whether purchased for Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.
 - 1. Named Products: Items identified by manufacturer's product name, including make or model number or other designation shown or listed in manufacturer's published product literature 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. Products salvaged or recycled from other projects are not considered new products.
 - 3. Comparable Product: Product that is demonstrated and approved by Architect through submittal process to have the indicated qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics that equal or exceed those of specified product.
- B. Basis-of-Design Product Specification: A specification in which a single manufacturer's product is named and accompanied by the words "basis-of-design product," including make or model number or other designation. 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.

CCAC BOYCE ROOF REPLACEMENT

- 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, if applicable.

1.4 ACTION SUBMITTALS

- A. Comparable Product Request Submittal: Submit request for consideration of each comparable product. Identify basis-of-design product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
 - 1. Include data to indicate compliance with the requirements specified in "Comparable Products" Article.
 - 2. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within seven days of receipt of a comparable product request. Architect will notify Contractor through Construction Manager of approval or rejection of proposed comparable product request within 15 days of receipt of request, or seven days of receipt of additional information or documentation, whichever is later.
 - a. Form of Architect's Approval of Submittal: As specified in Section 013300 "Submittal Procedures."
 - b. Use product specified if Architect does not issue a decision on use of a comparable product request within time allocated.
- B. Basis-of-Design Product Specification Submittal: Comply with requirements in Section 013300 "Submittal Procedures." Show compliance with requirements.

1.5 QUALITY ASSURANCE

- A. Compatibility of Options: If Contractor is given option of selecting between two or more products for use on Project, select product compatible with products previously selected, even if previously selected products were also options.
 - 1. Each contractor is responsible for providing products and construction methods compatible with products and construction methods of other contractors.
 - 2. If a dispute arises between contractors over concurrently selectable but incompatible products, Architect will determine which products shall be used.
- 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.

CCAC BOYCE ROOF REPLACEMENT

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-connected 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 identification requirements.

1.6 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, and handle products using means and methods that will prevent damage, deterioration, and loss, including theft and vandalism. Comply with manufacturer's written instructions.
- B. Delivery and Handling:
 1. Schedule delivery to minimize long-term storage at Project site and to prevent overcrowding of construction spaces.
 2. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
 3. Deliver products to Project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
 4. Inspect products on delivery to determine compliance with the Contract Documents and to determine that products are undamaged and properly protected.
- C. Storage:
 1. Store products to allow for inspection and measurement of quantity or counting of units.
 2. Store materials in a manner that will not endanger Project structure.
 3. Store products that are subject to damage by the elements, under cover in a weathertight enclosure above ground, with ventilation adequate to prevent condensation.
 4. Protect foam plastic from exposure to sunlight, except to extent necessary for period of installation and concealment.
 5. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.
 6. Protect stored products from damage and liquids from freezing.
 7. Provide a secure location and enclosure at Project site for storage of materials and equipment by Owner's construction forces. Coordinate location with Owner.

CCAC BOYCE ROOF REPLACEMENT

1.7 PRODUCT WARRANTIES

- A. Warranties specified in other Sections shall be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.
 - 1. Manufacturer's Warranty: Written warranty furnished by individual manufacturer for a particular product and specifically endorsed by manufacturer to Owner.
 - 2. Special Warranty: Written warranty required by the Contract Documents to provide specific rights for Owner.
- B. Special Warranties: Prepare a written document that contains appropriate terms and identification, ready for execution.
 - 1. Manufacturer's Standard Form: Modified to include Project-specific information and properly executed.
 - 2. Specified Form: When specified forms are included with the Specifications, prepare a written document using indicated form properly executed.
 - 3. See 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 "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 through Construction Manager in order to establish equivalency of proposed

CCAC BOYCE ROOF REPLACEMENT

products. Evaluation of "or equal" product status is by the Architect, whose determination is final.

B. Product Selection Procedures:

1. Sole Product: Where Specifications name a single manufacturer and product, provide the named product that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.
 - a. Sole product may be indicated by the phrase: "Subject to compliance with requirements, provide the following: ..."
2. Sole Manufacturer/Source: Where Specifications name a single manufacturer or source, provide a product by the named manufacturer or source that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.
 - a. Sole manufacturer/source may be indicated by the phrase: "Subject to compliance with requirements, provide products by the following: ..."
3. 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, which 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: ..."
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, which 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: ..."
5. Basis-of-Design Product: Where Specifications name a product, or refer to a product indicated on Drawings, and include a list of manufacturers, provide the specified or indicated product or a comparable product by one of the other named manufacturers. Drawings and Specifications indicate sizes, profiles, dimensions, and other characteristics that are based on the product named. Comply with requirements in "Comparable Products" Article for consideration of an unnamed product by one of the other named manufacturers.
 - 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 "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.

CCAC BOYCE ROOF REPLACEMENT

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 similar phrase, select a product that complies with requirements. Architect will select color, gloss, pattern, density, or texture from manufacturer's product line that includes both standard and premium items.

2.2 COMPARABLE PRODUCTS

- A. Conditions for Consideration 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 these 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. Detailed comparison of significant qualities of proposed product with those named in the Specifications. 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.
 2. Evidence that proposed product provides specified warranty.
 3. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners, if requested.
 4. Samples, if requested.
- B. Submittal Requirements: 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.

PART 3 - EXECUTION (Not Used)

END OF SECTION 016000

CCAC BOYCE ROOF REPLACEMENT

SECTION 017300 - EXECUTION

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 general administrative and procedural requirements governing execution of the Work including, but not limited to, the following:
 - 1. Construction layout.
 - 2. Installation of the Work.
 - 3. Cutting and patching.
 - 4. Coordination of Owner-installed products.
 - 5. Progress cleaning.
 - 6. Starting and adjusting.
 - 7. Protection of installed construction.
- B. Related Requirements:
 - 1. Section 011000 "Summary" for limits on use of Project site.
 - 2. Section 013300 "Submittal Procedures" for submitting surveys.
 - 3. Section 017700 "Closeout Procedures" for submitting final property survey with Project Record Documents, recording of Owner-accepted deviations from indicated lines and levels, replacing defective work, and final cleaning.

1.3 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.

1.4 QUALITY ASSURANCE

- A. Cutting and Patching: Comply with requirements for and limitations on cutting and patching of construction elements.
 - 1. Structural Elements: When cutting and patching structural elements, notify Architect of locations and details of cutting and await directions from Architect before proceeding. Shore, brace, and support structural elements during

CCAC BOYCE ROOF REPLACEMENT

- 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.
 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.
 4. Visual Elements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch exposed construction in a manner that would, in Architect's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.
- B. Manufacturer's Installation Instructions: Obtain and maintain on-site manufacturer's written recommendations and instructions for installation of products and equipment.

PART 2 - PRODUCTS

2.1 MATERIALS

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

PART 3 - EXECUTION

3.1 EXAMINATION

- A. 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.

CCAC BOYCE ROOF REPLACEMENT

3. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
- B. Written Report: Where a written report listing conditions detrimental to performance of the Work is required by other Sections, include the following:
 1. Description of the Work.
 2. List of detrimental conditions, including substrates.
 3. List of unacceptable installation tolerances.
 4. Recommended corrections.
- C. 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: General Construction Contractor to furnish information to Owner 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 caused by differing field conditions outside the control of Contractor, submit a request for information to Architect according to requirements in Section 013100 "Project Management and Coordination."

3.3 INSTALLATION

- A. General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.
 1. Make vertical work plumb and make horizontal work level.
 2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
 3. Conceal pipes, ducts, and wiring in finished areas unless otherwise indicated.
- B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.
- C. Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Substantial Completion.

CCAC BOYCE ROOF REPLACEMENT

- D. Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.
- E. Sequence the Work and allow adequate clearances to accommodate movement of construction items on site and placement in permanent locations.
- F. Tools and Equipment: Where possible, 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.
 - 1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Architect.
 - 2. Allow for building movement, including thermal expansion and contraction.
 - 3. Coordinate installation of anchorages. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.
- I. Joints: Make joints of uniform width. Where joint locations in exposed work are not indicated, arrange joints for the best visual effect. Fit exposed connections together to form hairline joints.
- J. Repair or remove and replace damaged, defective, or nonconforming Work.
 - 1. Comply with Section 017700 "Closeout Procedures" for repairing or removing and replacing defective Work.

3.4 CUTTING AND PATCHING

- A. Cutting and Patching, General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.
 - 1. Cut in-place construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.
- B. 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.

CCAC BOYCE ROOF REPLACEMENT

- 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. 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. Proceed with patching after construction operations requiring cutting are complete.
- F. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other work. Patch with durable seams that are as invisible as practicable. Provide materials and comply with installation requirements specified in other Sections, where applicable.
 - 1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate physical integrity of installation.
 - 2. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will minimize evidence of patching and refinishing.
 - a. Clean piping, conduit, and similar features before applying paint or other finishing materials.
 - b. Restore damaged pipe covering to its original condition.
 - 3. Ceilings: Patch, repair, or rehang in-place ceilings as necessary to provide an even-plane surface of uniform appearance.
 - 4. Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weathertight condition and ensures thermal and moisture integrity of building enclosure.
- G. Cleaning: Clean areas and spaces where cutting and patching are performed. Remove paint, mortar, oils, putty, and similar materials from adjacent finished surfaces.

3.5 PROGRESS CLEANING

- A. General: General Construction Contractor to clean Project site and work areas daily. Enforce requirements strictly. Dispose of materials lawfully.

CCAC BOYCE ROOF REPLACEMENT

1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
 2. Do not hold waste materials more than seven days during normal weather or three days if the temperature is expected to rise above 80 deg F (27 deg C).
 3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.
 - a. Use containers intended for holding waste materials of type to be stored.
 4. Coordinate progress cleaning for joint-use areas where Contractor and other contractors are working concurrently.
- B. Site: Maintain Project site free of waste materials and debris.
- C. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.
1. Remove liquid spills promptly.
 2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.
- D. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.
- E. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.
- F. Exposed Surfaces in Finished Areas: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.
- G. Waste Disposal: Do not bury or burn waste materials on-site. Do not wash waste materials down sewers or into waterways. Comply with waste disposal requirements in 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.

CCAC BOYCE ROOF REPLACEMENT

3.6 STARTING AND ADJUSTING

- A. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.
- B. Adjust equipment for proper operation. Adjust operating components for proper operation without binding.
- C. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- D. Manufacturer's Field Service: Comply with qualification requirements in Section 014000 "Quality Requirements."

3.7 PROTECTION OF INSTALLED CONSTRUCTION

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

END OF SECTION 017300

CCAC BOYCE ROOF REPLACEMENT

SECTION 017700 - CLOSEOUT PROCEDURES

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 contract closeout, including, but not limited to, the following:
 - 1. Substantial Completion procedures.
 - 2. Final completion procedures.
 - 3. Warranties.
 - 4. Final cleaning.
 - 5. Repair of the Work.
- B. Related Requirements:
 - 1. Section 017823 "Operation and Maintenance Data" for additional operation and maintenance manual requirements.
 - 2. Section 017839 "Project Record Documents" for submitting Record Drawings, Record Specifications, and Record Product Data.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of cleaning agent.
- B. Contractor's List of Incomplete Items: Initial submittal at Substantial Completion.
- C. Certified List of Incomplete Items: Final submittal at final completion.

1.4 CLOSEOUT SUBMITTALS

- A. Certificates of Release: From authorities having jurisdiction.
- B. Certificate of Insurance: For continuing coverage.

1.5 MAINTENANCE MATERIAL SUBMITTALS

- A. Schedule of Maintenance Material Items: For maintenance material submittal items specified in other Sections.

CCAC BOYCE ROOF REPLACEMENT

1.6 SUBSTANTIAL COMPLETION PROCEDURES

- A. Contractor's List of Incomplete Items: Prepare and submit a list of items to be completed and corrected (Contractor's punch list), indicating the value of each item on the list and reasons why the Work is incomplete.
- B. Submittals Prior to Substantial Completion: Complete the following a minimum of 10 days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.
 - 1. Certificates of Release: Obtain and submit releases from authorities having jurisdiction permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
 - 2. Submit closeout submittals specified in other Division 01 Sections, including project record documents, operation and maintenance manuals, damage or settlement surveys, property surveys, and similar final record information.
 - 3. Submit closeout submittals specified in individual Sections, including specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
 - 4. Submit maintenance material submittals specified in individual Sections, including tools, spare parts, extra materials, and similar items, and deliver to location designated by Construction Manager. Label with manufacturer's name and model number.
 - a. Schedule of Maintenance Material Items: Prepare and submit schedule of maintenance material submittal items, including name and quantity of each item and name and number of related Specification Section. Obtain Construction Manager's signature for receipt of submittals.
 - 5. Submit testing, adjusting, and balancing records.
 - 6. Submit sustainable design submittals not previously submitted.
 - 7. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.
- C. Procedures Prior to Substantial Completion: Complete the following a minimum of 10 days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.
 - 1. Advise Owner of pending insurance changeover requirements.
 - 2. Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions.
 - 3. Complete startup and testing of systems and equipment.
 - 4. Perform preventive maintenance on equipment used prior to Substantial Completion.
 - 5. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems. Submit demonstration and training video recordings specified in Section 017900 "Demonstration and Training."
 - 6. Advise Owner of changeover in utility services.
 - 7. Participate with Owner in conducting inspection and walkthrough with local emergency responders.
 - 8. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
 - 9. Complete final cleaning requirements.

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10. Touch up paint and otherwise repair and restore marred exposed finishes to eliminate visual defects.

D. Inspection: Submit a written request for inspection to determine Substantial Completion a minimum of 10 days prior to date the Work will be completed and ready for final inspection and tests. On receipt of request, Architect and Construction Manager will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by Architect, that must be completed or corrected before certificate will be issued.

1. Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.
2. Results of completed inspection will form the basis of requirements for final completion.

1.7 FINAL COMPLETION PROCEDURES

A. Submittals Prior to Final Completion: Before requesting final inspection for determining final completion, complete the following:

1. Submit a final Application for Payment according to Section 012900 "Payment Procedures."
2. Certified List of Incomplete Items: Submit certified copy of Architect's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Architect. Certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
3. Certificate of Insurance: Submit evidence of final, continuing insurance coverage complying with insurance requirements.
4. Submit pest-control final inspection report.

B. Inspection: Submit a written request for final inspection to determine acceptance a minimum of 10 days prior to date the work will be completed and ready for final inspection and tests. On receipt of request, Architect and Construction Manager will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare a final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.

1. Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.

1.8 LIST OF INCOMPLETE ITEMS (PUNCH LIST)

A. Organization of List: Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction.

CCAC BOYCE ROOF REPLACEMENT

1. Organize list of spaces in sequential order, starting with exterior areas first and proceeding from lowest floor to highest floor.
2. Organize items applying to each space by major element, including categories for ceiling, individual walls, floors, equipment, and building systems.
3. Include the following information at the top of each page:
 - a. Project name.
 - b. Date.
 - c. Name of Architect and Construction Manager.
 - d. Name of Contractor.
 - e. Page number.
4. Submit list of incomplete items in the following format:
 - a. PDF electronic file. Upload to web-based project software upload. Utilize software feature for creating and updating list of incomplete items (punch list).

1.9 SUBMITTAL OF PROJECT WARRANTIES

- A. Time of Submittal: Submit written warranties on request of Architect for designated portions of the Work where warranties are indicated to commence on dates other than date of Substantial Completion, or when delay in submittal of warranties might limit Owner's rights under warranty.
- B. Partial Occupancy: Submit properly executed warranties within 15 days of completion of designated portions of the Work that are completed and occupied or used by Owner during construction period by separate agreement with Contractor.
- C. Organize warranty documents into an orderly sequence based on the table of contents of Project Manual.
- D. Warranty Electronic File: Provide warranties and bonds in PDF format. Assemble complete warranty and bond submittal package into a single electronic PDF file with bookmarks enabling navigation to each item. Provide bookmarked table of contents at beginning of document.
 1. Submit by uploading to web-based project software site.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.
 1. Use cleaning products that comply with Green Seal's GS-37, or if GS-37 is not applicable, use products that comply with the California Code of Regulations maximum allowable VOC levels.

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PART 3 - EXECUTION

3.1 FINAL CLEANING

- A. General: General Construction Contractor to perform final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.
- B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.
 - 1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a designated portion of Project:
 - a. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.
 - b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
 - c. Rake grounds that are not planted, mulched, or paved to a smooth, even-textured surface.
 - d. Remove tools, construction equipment, machinery, and surplus material from Project site.
 - e. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
 - f. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
 - g. Sweep concrete floors broom clean in unoccupied spaces.
 - h. Vacuum carpet and similar soft surfaces, removing debris and excess nap; clean according to manufacturer's recommendations if visible soil or stains remain.
 - i. Clean transparent materials, including glass in doors and windows impacted by the construction activities.
 - j. Remove labels that are not permanent.
 - k. Wipe surfaces of mechanical and electrical equipment and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
 - l. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.
 - m. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.
 - n. Clean ducts, blowers, and coils if units were operated without filters during construction or that display contamination with particulate matter on inspection.
 - o. Leave Project clean and ready for occupancy.

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3.2 REPAIR OF THE WORK

- A. Complete repair and restoration operations before requesting inspection for determination of Substantial Completion.
- B. Repair, or remove and replace, defective construction. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment. Where damaged or worn items cannot be repaired or restored, provide replacements. Remove and replace operating components that cannot be repaired. Restore damaged construction and permanent facilities used during construction to specified condition.
 - 1. Remove and replace chipped, scratched, and broken glass, reflective surfaces, and other damaged transparent materials.
 - 2. Touch up and otherwise repair and restore marred or exposed finishes and surfaces. Replace finishes and surfaces that already show evidence of repair or restoration.
 - a. Do not paint over "UL" and other required labels and identification, including mechanical and electrical nameplates. Remove paint applied to required labels and identification.
 - 3. Replace parts subject to operating conditions during construction that may impede operation or reduce longevity.
 - 4. Replace burned-out bulbs, bulbs noticeably dimmed by hours of use, and defective and noisy starters in fluorescent and mercury vapor fixtures to comply with requirements for new fixtures.

END OF SECTION 017700

CCAC BOYCE ROOF REPLACEMENT

SECTION 017823 - OPERATION AND MAINTENANCE DATA

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 preparing operation and maintenance manuals, including the following:
 - 1. Operation and maintenance documentation directory manuals.
 - 2. Systems and equipment operation manuals.
 - 3. Systems and equipment maintenance manuals.
 - 4. Product maintenance manuals.
- B. Related Requirements:
 - 1. Section 013300 "Submittal Procedures" for submitting copies of submittals for operation and maintenance manuals.

1.3 DEFINITIONS

- A. System: An organized collection of parts, equipment, or subsystems united by regular interaction.
- B. Subsystem: A portion of a system with characteristics similar to a system.

1.4 CLOSEOUT SUBMITTALS

- A. Submit operation and maintenance manuals indicated. Provide content for each manual as specified in individual Specification Sections, and as reviewed and approved at the time of Section submittals. Submit reviewed manual content formatted and organized as required by this Section.
 - 1. Architect will comment on whether content of operation and maintenance submittals is acceptable.
 - 2. Where applicable, clarify and update reviewed manual content to correspond to revisions and field conditions.
- B. Format: Submit operation and maintenance manuals in the following format:
 - 1. Submit by uploading to web-based project software site. Enable reviewer comments on draft submittals.

CCAC BOYCE ROOF REPLACEMENT

- C. Final Manual Submittal: Submit each manual in final form prior to requesting inspection for Substantial Completion and at least 15 days before commencing demonstration and training. Architect will return copy with comments.
 - 1. Correct or revise each manual to comply with Architect's comments. Submit copies of each corrected manual within 15 days of receipt of Architect's comments and prior to commencing demonstration and training.
- D. Comply with Section 017700 "Closeout Procedures" for schedule for submitting operation and maintenance documentation.

1.5 FORMAT OF OPERATION AND MAINTENANCE MANUALS

- A. Manuals, Electronic Files: Submit manuals in the form of a multiple file composite electronic PDF file for each manual type required.
 - 1. Electronic Files: Use electronic files prepared by manufacturer where available. Where scanning of paper documents is required, configure scanned file for minimum readable file size.
 - 2. File Names and Bookmarks: Bookmark individual documents based on file names. Name document files to correspond to system, subsystem, and equipment names used in manual directory and table of contents. Group documents for each system and subsystem into individual composite bookmarked files, then create composite manual, so that resulting bookmarks reflect the system, subsystem, and equipment names in a readily navigated file tree. Configure electronic manual to display bookmark panel on opening file.

1.6 REQUIREMENTS FOR EMERGENCY, OPERATION, AND MAINTENANCE MANUALS

- A. Organization of Manuals: Unless otherwise indicated, organize each manual into a separate section for each system and subsystem, and a separate section for each piece of equipment not part of a system. Each manual shall contain the following materials, in the order listed:
 - 1. Title page.
 - 2. Table of contents.
 - 3. Manual contents.
- B. Title Page: Include the following information:
 - 1. Subject matter included in manual.
 - 2. Name and address of Project.
 - 3. Name and address of Owner.
 - 4. Date of submittal.
 - 5. Name and contact information for Contractor.
 - 6. Name and contact information for Architect.
 - 7. Names and contact information for major consultants to the Architect that designed the systems contained in the manuals.
 - 8. Cross-reference to related systems in other operation and maintenance manuals.

CCAC BOYCE ROOF REPLACEMENT

- C. Table of Contents: List each product included in manual, identified by product name, indexed to the content of the volume, and cross-referenced to Specification Section number in Project Manual.
- D. Identification: In the documentation directory and in each operation and maintenance manual, identify each system, subsystem, and piece of equipment with same designation used in the Contract Documents. If no designation exists, assign a designation according to ASHRAE Guideline 4, "Preparation of Operating and Maintenance Documentation for Building Systems."

1.7 OPERATION AND MAINTENANCE DOCUMENTATION DIRECTORY MANUAL

- A. Operation and Maintenance Documentation Directory: Prepare a separate manual that provides an organized reference to emergency, operation, and maintenance manuals. List items and their location to facilitate ready access to desired information. Include the following:
 - 1. List of Systems and Subsystems: List systems alphabetically. Include references to operation and maintenance manuals that contain information about each system.
 - 2. List of Equipment: List equipment for each system, organized alphabetically by system. For pieces of equipment not part of system, list alphabetically in separate list.
 - 3. Tables of Contents: Include a table of contents for each emergency, operation, and maintenance manual.

1.8 SYSTEMS AND EQUIPMENT OPERATION MANUALS

- A. Systems and Equipment Operation Manual: Assemble a complete set of data indicating operation of each system, subsystem, and piece of equipment not part of a system. Include information required for daily operation and management, operating standards, and routine and special operating procedures.
 - 1. Engage a factory-authorized service representative to assemble and prepare information for each system, subsystem, and piece of equipment not part of a system.
 - 2. Prepare a separate manual for each system and subsystem, in the form of an instructional manual for use by Owner's operating personnel.
- B. Content: In addition to requirements in this Section, include operation data required in individual Specification Sections and the following information:
 - 1. System, subsystem, and equipment descriptions. Use designations for systems and equipment indicated on Contract Documents.
 - 2. Performance and design criteria if Contractor has delegated design responsibility.
 - 3. Operating standards.
 - 4. Operating procedures.
 - 5. Operating logs.
 - 6. Wiring diagrams.
 - 7. Control diagrams.
 - 8. Piped system diagrams.

CCAC BOYCE ROOF REPLACEMENT

9. Precautions against improper use.
10. License requirements including inspection and renewal dates.

C. Descriptions: Include the following:

1. Product name and model number. Use designations for products indicated on Contract Documents.
2. Manufacturer's name.
3. Equipment identification with serial number of each component.
4. Equipment function.
5. Operating characteristics.
6. Limiting conditions.
7. Performance curves.
8. Engineering data and tests.
9. Complete nomenclature and number of replacement parts.

D. Operating Procedures: Include the following, as applicable:

1. Startup procedures.
2. Equipment or system break-in procedures.
3. Routine and normal operating instructions.
4. Regulation and control procedures.
5. Instructions on stopping.
6. Normal shutdown instructions.
7. Seasonal and weekend operating instructions.
8. Required sequences for electric or electronic systems.
9. Special operating instructions and procedures.

E. Systems and Equipment Controls: Describe the sequence of operation, and diagram controls as installed.

F. Piped Systems: Diagram piping as installed, and identify color coding where required for identification.

1.9 SYSTEMS AND EQUIPMENT MAINTENANCE MANUALS

A. Systems and Equipment Maintenance Manuals: Assemble a complete set of data indicating maintenance of each system, subsystem, and piece of equipment not part of a system. Include manufacturers' maintenance documentation, preventive maintenance procedures and frequency, repair procedures, wiring and systems diagrams, lists of spare parts, and warranty information.

1. Engage a factory-authorized service representative to assemble and prepare information for each system, subsystem, and piece of equipment not part of a system.
2. Prepare a separate manual for each system and subsystem, in the form of an instructional manual for use by Owner's operating personnel.

B. Content: For each system, subsystem, and piece of equipment not part of a system, include source information, manufacturers' maintenance documentation, maintenance procedures, maintenance and service schedules, spare parts list and source information, maintenance service contracts, and warranties and bonds as described below.

CCAC BOYCE ROOF REPLACEMENT

- C. Source Information: List each system, subsystem, and piece of equipment included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual and drawing or schedule designation or identifier where applicable.
- D. Manufacturers' Maintenance Documentation: Include the following information for each component part or piece of equipment:
 - 1. Standard maintenance instructions and bulletins; include only sheets pertinent to product or component installed. Mark each sheet to identify each product or component incorporated into the Work. If data include more than one item in a tabular format, identify each item using appropriate references from the Contract Documents. Identify data applicable to the Work and delete references to information not applicable.
 - a. Prepare supplementary text if manufacturers' standard printed data are not available and where the information is necessary for proper operation and maintenance of equipment or systems.
 - 2. Drawings, diagrams, and instructions required for maintenance, including disassembly and component removal, replacement, and assembly.
 - 3. Identification and nomenclature of parts and components.
 - 4. List of items recommended to be stocked as spare parts.
- E. Maintenance Procedures: Include the following information and items that detail essential maintenance procedures:
 - 1. Test and inspection instructions.
 - 2. Troubleshooting guide.
 - 3. Precautions against improper maintenance.
 - 4. Disassembly; component removal, repair, and replacement; and reassembly instructions.
 - 5. Aligning, adjusting, and checking instructions.
 - 6. Demonstration and training video recording, if available.
- F. Maintenance and Service Schedules: Include service and lubrication requirements, list of required lubricants for equipment, and separate schedules for preventive and routine maintenance and service with standard time allotment.
 - 1. Scheduled Maintenance and Service: Tabulate actions for daily, weekly, monthly, quarterly, semiannual, and annual frequencies.
 - 2. Maintenance and Service Record: Include manufacturers' forms for recording maintenance.
- G. Spare Parts List and Source Information: Include lists of replacement and repair parts, with parts identified and cross-referenced to manufacturers' maintenance documentation and local sources of maintenance materials and related services.
- H. Maintenance Service Contracts: Include copies of maintenance agreements with name and telephone number of service agent.

CCAC BOYCE ROOF REPLACEMENT

- I. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.
 - 1. Include procedures to follow and required notifications for warranty claims.
- J. Drawings: Prepare drawings supplementing manufacturers' printed data to illustrate the relationship of component parts of equipment and systems and to illustrate control sequence and flow diagrams. Coordinate these drawings with information contained in record Drawings to ensure correct illustration of completed installation.
 - 1. Do not use original project record documents as part of maintenance manuals.

1.10 PRODUCT MAINTENANCE MANUALS

- A. Product Maintenance Manual: Assemble a complete set of maintenance data indicating care and maintenance of each product, material, and finish incorporated into the Work.
- B. Content: Organize manual into a separate section for each product, material, and finish. Include source information, product information, maintenance procedures, repair materials and sources, and warranties and bonds, as described below.
- C. Source Information: List each product included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual and drawing or schedule designation or identifier where applicable.
- D. Product Information: Include the following, as applicable:
 - 1. Product name and model number.
 - 2. Manufacturer's name.
 - 3. Color, pattern, and texture.
 - 4. Material and chemical composition.
 - 5. Reordering information for specially manufactured products.
- E. Maintenance Procedures: Include manufacturer's written recommendations and the following:
 - 1. Inspection procedures.
 - 2. Types of cleaning agents to be used and methods of cleaning.
 - 3. List of cleaning agents and methods of cleaning detrimental to product.
 - 4. Schedule for routine cleaning and maintenance.
 - 5. Repair instructions.
- F. Repair Materials and Sources: Include lists of materials and local sources of materials and related services.
- G. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.
 - 1. Include procedures to follow and required notifications for warranty claims.

CCAC BOYCE ROOF REPLACEMENT

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 017823

CCAC BOYCE ROOF REPLACEMENT

SECTION 017839 - PROJECT RECORD DOCUMENTS

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 project record documents, including the following:
 - 1. Record Drawings.
 - 2. Record Specifications.
 - 3. Record Product Data.
 - 4. Miscellaneous record submittals.
- B. Related Requirements:
 - 1. Section 011200 "Multiple Contract Summary" for coordinating project record documents covering the Work of multiple contracts.
 - 2. Section 017300 "Execution" for final property survey.
 - 3. Section 017700 "Closeout Procedures" for general closeout procedures.
 - 4. Section 017823 "Operation and Maintenance Data" for operation and maintenance manual requirements.

1.3 CLOSEOUT SUBMITTALS

- A. General Requirements: Submit by uploading to web-based project software site. Enable reviewer comments on draft submittals.
- B. Record Drawings: Comply with the following:
 - 1. Number of Copies: Submit copies of record Drawings as follows:
 - a. Initial Submittal:
 - 1) Submit PDF electronic files of scanned record prints.
 - 2) Architect will indicate whether general scope of changes, additional information recorded, and quality of drafting are acceptable.
 - a. Final Submittal:
 - 1) Submit PDF electronic files of scanned Record Prints..
 - 2) Print each drawing, whether or not changes and additional information were recorded.
- C. Record Specifications: Submit annotated PDF electronic files of Project's Specifications, including addenda and contract modifications.

CCAC BOYCE ROOF REPLACEMENT

- D. Record Product Data: Submit annotated PDF electronic files and directories of each submittal.
 - 1. Where record Product Data are required as part of operation and maintenance manuals, submit duplicate marked-up Product Data as a component of manual.
- E. Miscellaneous Record Submittals: See other Specification Sections for miscellaneous record-keeping requirements and submittals in connection with various construction activities. Submit annotated PDF electronic files and directories of each submittal.

1.4 RECORD DRAWINGS

- A. Record Prints: Maintain one set of marked-up paper copies of the Contract Drawings and Shop Drawings, incorporating new and revised drawings as modifications are issued.
 - 1. Preparation: Mark record prints to show the actual installation where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is Installer, subcontractor, or similar entity, to provide information for preparation of corresponding marked-up record prints.
 - a. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later.
 - b. Accurately record information in an acceptable drawing technique.
 - c. Record data as soon as possible after obtaining it.
 - d. Record and check the markup before enclosing concealed installations.
 - e. Cross-reference record prints to corresponding photographic documentation.
 - 2. Content: Types of items requiring marking include, but are not limited to, the following:
 - a. Dimensional changes to Drawings.
 - b. Revisions to details shown on Drawings.
 - c. Revisions to routing of piping and conduits.
 - d. Actual equipment locations.
 - e. Changes made by Change Order or Construction Change Directive.
 - f. Changes made following Architect's written orders.
 - g. Details not on the original Contract Drawings.
 - h. Field records for variable and concealed conditions.
 - i. Record information on the Work that is shown only schematically.
 - 3. Mark the Contract Drawings and Shop Drawings completely and accurately. Use personnel proficient at recording graphic information in production of marked-up record prints.
 - 4. Mark record sets with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at same location.
 - 5. Mark important additional information that was either shown schematically or omitted from original Drawings.

CCAC BOYCE ROOF REPLACEMENT

6. Note Construction Change Directive numbers, alternate numbers, Change Order numbers, and similar identification, where applicable.
- B. Format: Identify and date each record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location.
 1. Record Prints: Organize record prints into manageable sets. Bind each set with durable paper cover sheets. Include identification on cover sheets.
 2. Format: Annotated PDF electronic file with comment function enabled.
 3. Record Digital Data Files: Organize digital data information into separate electronic files that correspond to each sheet of the Contract Drawings. Name each file with the sheet identification. Include identification in each digital data file.
 4. Identification: As follows:
 - a. Project name.
 - b. Date.
 - c. Designation "PROJECT RECORD DRAWINGS."
 - d. Name of Architect.
 - e. Name of Contractor.

1.5 RECORD SPECIFICATIONS

- A. Preparation: Mark Specifications to indicate the actual product installation where installation varies from that indicated in Specifications, addenda, and contract modifications.
 1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
 2. Note related Change Orders, record Product Data, and record Drawings where applicable.
- B. Format: Submit record Specifications as annotated PDF electronic file.

1.6 RECORD PRODUCT DATA

- A. Recording: Maintain one copy of each submittal during the construction period for project record document purposes. Post changes and revisions to project record documents as they occur; do not wait until end of Project.
- B. Preparation: Mark Product Data to indicate the actual product installation where installation varies substantially from that indicated in Product Data submittal.
 1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
 2. Include significant changes in the product delivered to Project site and changes in manufacturer's written instructions for installation.
 3. Note related Change Orders, record Specifications, and record Drawings where applicable.
- C. Format: Submit record Product Data as annotated PDF electronic file.

CCAC BOYCE ROOF REPLACEMENT

1. Include record Product Data directory organized by Specification Section number and title, electronically linked to each item of record Product Data.

1.7 MISCELLANEOUS RECORD SUBMITTALS

- A. Assemble miscellaneous records required by other Specification Sections for miscellaneous record keeping and submittal in connection with actual performance of the Work. Bind or file miscellaneous records and identify each, ready for continued use and reference.
- B. Format: Submit miscellaneous record submittals as PDF electronic file.
 1. Include miscellaneous record submittals directory organized by Specification Section number and title, electronically linked to each item of miscellaneous record submittals.

1.8 MAINTENANCE OF RECORD DOCUMENTS

- A. Maintenance of Record Documents: Store record documents in the field office apart from the Contract Documents used for construction. Do not use project record documents for construction purposes. Maintain record documents in good order and in a clean, dry, legible condition, protected from deterioration and loss. Provide access to project record documents for Architect's reference during normal working hours.

PART 2 - PRODUCTS

PART 3 - EXECUTION

END OF SECTION 017839

CCAC BOYCE ROOF REPLACEMENT

SECTION 040120.64 - BRICK MASONRY REPOINTING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes repointing joints with mortar.

1.2 UNIT PRICES

- A. Work of this Section is affected by unit prices specified in Section 012200 "Unit Prices."

1.3 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Samples: For each exposed product and for each color and texture specified.

1.5 QUALITY ASSURANCE

- A. Brick Masonry Repointing Specialist Qualifications: Engage an experienced brick masonry repointing firm to perform work of this Section. Firm shall have completed work similar in material, design, and extent to that indicated for this Project with a record of successful in-service performance. Experience in only installing masonry is insufficient experience for masonry repointing work.
- B. Mockups: Prepare mockups of brick masonry repointing to demonstrate aesthetic effects and to set quality standards for materials and execution.
 - 1. Repointing: Rake out joints in two separate areas, each approximately 36 inches (900 mm) high by 48 inches (1200 mm) wide, unless otherwise indicated, for each type of repointing required, and repoint one of the areas.

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PART 2 - PRODUCTS

2.1 MORTAR MATERIALS

- A. Portland Cement: ASTM C150/C150M, Type I or Type II, except Type III may be used for cold-weather construction; white or gray, or both where required for color matching of mortar.
 - 1. Provide cement containing not more than 0.60 percent total alkali when tested according to ASTM C114.
- B. Hydrated Lime: ASTM C207, Type S.
- C. Masonry Cement: ASTM C91/C91M.
- D. Mortar Cement: ASTM C1329/C1329M.
- E. Mortar Sand: ASTM C144.
 - 1. Match size, texture, and gradation of existing mortar sand as closely as possible. Blend several sands if necessary to achieve suitable match.
 - 2. Color: Provide natural sand or ground marble, granite, or other sound stone of color necessary to produce required mortar color.
- F. Water: Potable.

2.2 MORTAR MIXES

- A. Measurement and Mixing: Measure cementitious materials and sand in a dry condition by volume or equivalent weight. Do not measure by shovel; use known measure. Mix materials in a clean, mechanical batch mixer.
 - 1. Mixing Pointing Mortar: Thoroughly mix cementitious materials and sand together before adding any water. Then mix again, adding only enough water to produce a damp, unworkable mix that retains its form when pressed into a ball. Maintain mortar in this dampened condition for 15 to 30 minutes. Add remaining water in small portions until mortar reaches desired consistency. Use mortar within one hour of final mixing; do not retemper or use partially hardened material.
- B. Colored Mortar: Produce mortar of color required by using specified ingredients. Do not alter specified proportions without Architect's approval.
 - 1. Mortar Pigments: Where mortar pigments are indicated, do not add pigment exceeding 10 percent by weight of the cementitious or binder materials, except for carbon black which is limited to 2 percent.
- C. Do not use admixtures in mortar unless otherwise indicated.

CCAC BOYCE ROOF REPLACEMENT

- D. Mixes: Mix mortar materials in the following proportions:
 - 1. Pointing Mortar by Type: ASTM C270, Proportion Specification, Type N unless otherwise indicated; with cementitious material limited to portland cement and lime masonry cement or mortar cement.

2.3 JOINT SEALANTS

- A. Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by joint-sealant manufacturer, based on testing and field experience.
- B. Colors of Exposed Joint Sealants: As selected by Architect from manufacturer's full range.
- C. Joint Sealant: Elastomeric joint sealant compatible with masonry materials, with movement capability appropriate for application.
 - 1. Urethane, S, NS, 100/50, T, NT: Single-component, nonsag, plus 100 percent and minus 50 percent movement capability, traffic- and nontraffic-use, urethane joint sealant; ASTM C920, Type S, Grade NS, Class 100/50, Uses T and NT.
 - 2. Urethane, S, P, 35, T, NT: Single-component, pourable, plus 35 percent and minus 35 percent movement capability, traffic- and nontraffic-use, urethane joint sealant; ASTM C920, Type S, Grade P, Class 35, Uses T and NT
- D. Sealant Backing Material, General: Nonstaining; compatible with joint substrates, sealants, primers, and other joint fillers; and approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.

PART 3 - EXECUTION

3.1 REPOINTING

- A. Rake out and repoint joints to the following extent:
 - 1. All joints in areas indicated.
 - 2. Joints indicated as sealant-filled joints.
 - 3. Joints at locations of the following defects:
 - a. Holes and missing mortar.
 - b. Cracks that can be penetrated **1/4 inch (6 mm)** or more by a knife blade **0.027 inch (0.7 mm)** thick.
 - c. Cracks **1/16 inch (1.6 mm)** or more in width and of any depth.
 - d. Hollow-sounding joints when tapped by metal object.
 - e. Eroded surfaces **1/4 inch (6 mm)** or more deep.
 - f. Deterioration to point that mortar can be easily removed by hand, without tools.
 - g. Joints filled with substances other than mortar.
- B. Do not rake out and repoint joints where not required.

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- C. Rake out joints as follows, according to procedures demonstrated in approved mockup:
1. Remove mortar from joints to depth of not less than **1/2 inch (13 mm)** and not less than that required to expose sound, unweathered mortar. Do not remove unsound mortar more than one-third the depth of the masonry unit above; consult Architect for direction.
 2. Remove mortar from brick and other masonry surfaces within raked-out joints to provide reveals with square backs and to expose masonry for contact with pointing mortar. Brush, vacuum, or flush joints to remove dirt and loose debris.
 3. Do not spall edges of brick or other masonry units or widen joints. Replace or patch damaged brick or other masonry units as directed by Architect.
- D. Notify Architect of unforeseen detrimental conditions including voids in mortar joints, cracks, loose masonry units, rotted wood, rusted metal, and other deteriorated items.
- E. Pointing with Mortar:
1. Rinse joint surfaces with water to remove dust and mortar particles. Time rinsing application so, at time of pointing, joint surfaces are damp but free of standing water. If rinse water dries, dampen joint surfaces before pointing.
 2. Apply pointing mortar first to areas where existing mortar was removed to depths greater than surrounding areas. Apply in layers not greater than 3/8 inch until a uniform depth is formed. Fully compact each layer, and allow it to become thumbprint hard before applying next layer.
 3. After deep areas have been filled to same depth as remaining joints, point joints by placing mortar in layers not greater than 1/4 inch. Fully compact each layer and allow to become thumbprint hard before applying next layer. Where existing masonry units have worn or rounded edges, slightly recess finished mortar surface below face of masonry to avoid widened joint faces. Take care not to spread mortar beyond joint edges onto exposed masonry surfaces or to feather edge the mortar.
 4. When mortar is thumbprint hard, tool joints to match original appearance of joints as demonstrated in approved mockup. Remove excess mortar from edge of joint by brushing.
 5. Cure mortar by maintaining in thoroughly damp condition for at least 72 consecutive hours, including weekends and holidays.
 6. Hairline cracking within mortar or mortar separation at edge of a joint is unacceptable. Completely remove such mortar and repoint.
- F. Where repointing work precedes cleaning of existing masonry, allow mortar to harden at least 30 days before beginning cleaning work.
- G. Installation of joint sealants:
1. General: Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.
 2. Sealant Installation Standard: Comply with recommendations in ASTM C1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.
 3. Install sealant backings of type indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of

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installed sealants relative to joint widths that allow optimum sealant movement capability.

4. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants in accordance with requirements specified in subparagraphs below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.
 - a. Remove excess sealant from surfaces adjacent to joints.
 - b. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
 - c. Provide concave joint profile in accordance with Figure 8A in ASTM C1193 unless otherwise indicated.
5. Clean off excess sealant or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.
6. Protect joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out, remove, and repair damaged or deteriorated joint sealants immediately so installations with repaired areas are indistinguishable from original work.

3.2 FINAL CLEANING

- A. After mortar has fully hardened, thoroughly clean exposed masonry surfaces of excess mortar and foreign matter; use wood scrapers, stiff-nylon or -fiber brushes, and clean water, applied by low pressure spray.
 1. Do not use metal scrapers or brushes.
 2. Do not use acidic or alkaline cleaners.

END OF SECTION 040120.64

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SECTION 040110 - MASONRY CLEANING

PART 1 GENERAL

1.1 SUMMARY

- A. This section includes cleaning of existing [masonry] [stone] as follows:
 - 1. Cleaning exposed, existing [masonry] [stone] surfaces.
 - 2. Protection of existing structure during cleaning operations.
- B. Related Sections:
 - 1. Section 01 25 00 - Substitution Procedures
 - 2. Section 01 33 00- Submittal Procedures

1.2 DEFINITIONS

- A. Masonry Cleaning: This Specification describes a cleaning system designed to effectively clean and restore the existing exterior masonry surfaces. The system combines the application of a specific restorative cleaner with efficient rinsing pressure.
- B. Rinsing-Pressure Spray: 400 to 1000 psi; 6 to 8 gpm.
- C. Low-Pressure Spray: 100 to 400 psi; 4 to 6 gpm.

1.3 SUBMITTALS

- A. General: Submit the following according to the Conditions of the Contract and Division 01 General Requirements specification sections.
- B. Product data for each product indicated including recommendations for their application and use. Include test reports and certifications substantiating that products comply with requirements.
- C. Material certificates for the following signed by manufacturer and Contractor certifying that each material complies with requirements.
 - 1. Each type of chemical cleaning material.
- D. Qualification data for firms and persons specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include list of completed projects with project names, addresses, telephone numbers, names of Architects and Owners, and other information specified.
- E. Restoration program: For each phase of the restoration process, including protection of surrounding materials on building and site during operations. Describe in detail the materials, methods, and equipment to be used for each phase of the restoration work.
 - 1. If alternative methods and materials to those indicated are proposed for any phase of restoration work, provide a written description, including evidence of successful use on other comparable projects, and a testing program to demonstrate their effectiveness for this Project.
- F. Cleaning Program: Describe cleaning process in detail; protection of surrounding materials on building and site; and control of runoff during operations. Describe in detail the materials, methods and equipment to be used.
 - 1. If alternative methods and materials to those indicated are proposed for any phase of cleaning work, provide a written description, including evidence of

CCAC BOYCE ROOF REPLACEMENT

successful use on other comparable projects, and a testing program to demonstrate their effectiveness for this Project.

- G. Cold-Weather Procedures: Detailed description of methods, materials, and equipment to be used to comply with cold-weather requirements.

1.4 QUALITY ASSURANCE

- A. Restoration Specialist: Engage an experienced masonry restoration and cleaning firm that has specialized in the types of work required for this Project for a minimum of five (5) years. At Contractor's option, the work may be divided between two specialist firms: one for cleaning work and one for repair work.
 - 1. Field Supervision: Require restoration specialist firm to maintain an experienced full-time supervisor on the job site during times that stone masonry restoration and cleaning are in progress.
 - 2. Restoration Worker Qualifications: Persons who are experienced in restoration work of types they will be performing. When stone units are being patched, assign at least one worker among those performing patching work who is trained and certified by manufacturer of patching compound to apply its products.
- B. Chemical Manufacturer Qualifications: A company regularly engaged in producing masonry cleaning compounds, which have been used on similar projects with successful results, and that retains factory-trained representatives who are available for consultation and job site inspection and assistance at no additional cost.
- C. Source of Materials: Obtain materials for masonry restoration from a single source for each type material required (stone, cement, sand, etc.) to ensure a match of quality, color, pattern, and texture.
- D. Field-Constructed Mockups:
 - 1. Schedule a Pre-Mockup conference to review brick and mortar removal and replacement procedures with the A/E . The A/E will select locations for any mockups.
 - 2. Restoration Mockup: Prior to starting general masonry restoration, Prepare mockups on existing walls under same weather conditions to be expected during remainder of the Work. Prepare mockups using same materials, equipment, and methods proposed for the Work. Obtain A/E's acceptance of visual qualities before proceeding with masonry restoration.
 - a. Notify A/E one week in advance of dates and times when samples will be prepared. Manufacturer's representative of cleaning materials to be present during testing.
 - b. Masonry Cleaning: Demonstrate the materials and methods to be used for cleaning each type of masonry surface and condition on sample location approximately 25 sq. ft. in area.
 - 1) Test materials and methods on samples of adjacent non-masonry materials for possible reaction with cleaning materials, except where materials and methods are known to have a deleterious effect on such materials.
 - 2) Allow a waiting period of the duration indicated, but not less than 3 calendar days, after completion of sample cleaning to permit a study of sample panels for negative reactions.

CCAC BOYCE ROOF REPLACEMENT

- c. Retain acceptable panels in an undisturbed condition, suitably marked, during construction as a standard for judging the completed Work. Areas may remain as part of the completed work.
 - d. Approval of sample panels is for degree of cleaning; relationship of mortar and sealant colors to masonry unit colors; aesthetic qualities of workmanship; and other material and construction qualities specifically approved by the Architect in writing.
3. Approval of sample panels does not constitute approval of deviations from the Contract Documents contained in sample panels, unless such deviations are specifically approved by the A/E in writing.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver masonry materials to Project in undamaged condition.
- B. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.

1.6 PROJECT CONDITIONS

- A. Clean masonry surfaces only when air temperature is 40 deg F and above and will remain so until masonry has thawed and dried out, but for not less than 7 days after completion of cleaning.
 - 1. Cold-Weather Cleaning: Use liquid cleaning methods only when air temperature is 40 deg F and above and will remain so until masonry has thawed and dried out, but not less than 7 days after completion of cleaning.
 - 2. Hot-Weather Requirements: Protect unit masonry work when temperature and humidity conditions produce excessive evaporation of water from masonry. Provide artificial shade and wind breaks and use cooled materials as required.
 - a. Refer to chemical cleaner manufacturer's recommendations for application techniques when application hot-weather conditions exist.

1.7 SEQUENCING AND SCHEDULING

- A. Order replacement materials at earliest possible date, to avoid delaying completion of the Work.
- B. Perform restoration work in the following sequence:
 - 1. Remove plant growth, if any.
 - 2. Inspect for open mortar joints and repair before cleaning to prevent intrusion of water and other cleaning materials into the wall.
 - 3. Clean masonry surfaces.
 - 4. Apply water repellent coating.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Substitutions: In accordance with Section 01 25 00 – Substitution Procedures.

2.2 CLEANING MATERIALS AND EQUIPMENT

- A. Water for Cleaning: Clean, potable, free of oils, acids, alkalis, salts, and organic matter.

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- B. Biological Soiling Remover: Manufacturer's standard cleaner designed to remove mold, mildew, and atmospheric staining from masonry.
 - 1. Basis-of-design Products:
 - a. "[Enviro Klean ReVive](#)": PROSOCO, Inc. (800-255-4255) (Basis of Design).
- C. Nonabrasive Brushes: Fiber bristles only.
- D. Spray Equipment: Provide equipment for controlled spray application of water and chemical cleaners, if any, at rates indicated for pressure, measured at spray tip, and for volume. Adjust pressure and volume, as required, to ensure that damage to masonry does not result from cleaning methods.
 - 1. For chemical cleaner spray application, provide a low-pressure tank or chemical pump suitable for the chemical cleaner indicated, equipped with a cone-shaped spray tip.

2.3 CHEMICAL CLEANING SOLUTIONS

- A. General: Unless otherwise indicated, dilute chemical cleaning materials with water to produce solutions of concentration indicated but not greater than that recommended by chemical cleaner manufacturer.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance.

3.2 PREPARATION

- A. General: Comply with the chemical cleaner manufacturer's recommendations for protecting adjacent building surfaces against damage from exposure to their products.
 - 1. Proceed with installation only after unsatisfactory conditions have been corrected.
- B. Protect persons, motor vehicles, surrounding surfaces of building whose masonry surfaces are being restored, building site, plants, and surrounding buildings from injury resulting from masonry restoration work.
 - 1. Comply with chemical cleaner manufacturer's and Owner's written instructions for protecting building and other surfaces against damage from exposure to its products. Prevent chemical cleaning solutions from coming into contact with pedestrians, motor vehicles, landscaping, buildings, and other surfaces that could be injured by such contact.
 - 2. Cover adjacent surfaces with materials that are proven to resist chemical cleaners used unless chemical cleaners being used will not damage adjacent surfaces. Use materials that contain only waterproof, UV-resistant adhesives. Apply masking agents to comply with manufacturer's written instructions. Do not apply liquid masking agent to painted or porous surfaces. When no longer needed, promptly remove masking to prevent adhesive staining.
 - 3. Keep wall wet below area being cleaned to prevent streaking from runoff.
 - 4. Do not clean masonry during winds of sufficient force to spread cleaning solutions to unprotected surfaces.

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5. Dispose of runoff from cleaning operations by legal means and in a manner that prevents soil erosion, undermining of paving and foundations, damage to landscaping, and water penetration into building interiors.
 6. Erect temporary protection covers over pedestrian walkways and at points of entrance and exit for persons and vehicles that must remain in operation during course of masonry restoration work.
- C. Protect adjacent surfaces from contact with chemical cleaners by covering them with a liquid strippable masking agent or polyethylene film and waterproof masking tape. Apply masking agent to comply with manufacturer's recommendations. Do not apply liquid masking agent to painted or porous surfaces.
1. Contractor must provide detailed information on materials and method plan to be used on these surfaces, prior to beginning of work, and as approved by A/E.
- D. Masonry surfaces that are not to be cleaned shall be protected from contact with the cleaning solution with sheets of polyethylene or other proven protective materials, firmly fixed and sealed to the surface. Non-masonry surfaces that are not protected shall be kept running-wet with clean water throughout the cleaning process of adjacent stone.
1. Contractor must provide detailed information on materials and method plan to be used on these surfaces, prior to beginning of work, and as approved by A/E.
- E. All surfaces not to be cleaned shall be tested for possible detrimental effect of the cleaning solutions and protected as determined necessary by test results.
- F. All open joints shall be temporarily caulked or otherwise protected to prevent intrusion of washing waters into the wall structure or building interior. Build up waterproof dams to divert flowing water to exterior.

3.3 UNUSED ANCHOR REMOVAL

- A. Remove masonry anchors, brackets, wood nailers, and other extraneous items no longer in use unless identified as historically significant or indicated to remain.
1. If item cannot be removed without damaging surrounding masonry, replace masonry unit.

3.4 BIOLOGICAL SOILING REMOVER

- A. Proceed with cleaning of biological soiling if specified mild cleaner was tested and ineffective to blackened area. Apply in an orderly manner; work from bottom to top.
- B. Use only those cleaning methods indicated for each masonry material and location in strict accordance with manufacturer's written instructions.
1. Scrub surface with nonabrasive brush or synthetic scrubbing pad. Do not use wire brushes.
 2. Use spray equipment that provides controlled application at volume and pressure indicated, measured at spray tip.
 3. For water spray application, use fan-shaped spray tip that disperses water at an angle of 15 to 45 degrees.
- C. Application Methods:
1. Dilute chemical cleaner based on testing and manufacturer's published recommendations.

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2. Apply diluted chemical cleaner to dry masonry surfaces. Comply with chemical cleaner manufacturer's written instructions until surface is thoroughly wet; use brush or spray application methods, at Contractor's option.
3. Do not spray apply at pressures exceeding 50 psi.
4. Let chemical cleaner dwell for 2 to 3 minutes. Reapply the cleaner to keep surface wet for allotted time period.
5. Mist treated surface with water and gently scrub with non-metallic, short-fibered scrub brush to loosen biological soiling.
6. Rinse thoroughly with clean water from bottom to the top.
7. Reapply, if necessary to achieve specified results. It may take several days for the full cleaning effect to be realized. When practical, allow two or more weeks for biological soiling to disappear.

3.5 PROTECTION

- A. Provide final protection and maintain conditions in a manner acceptable to Installer, which ensures unit masonry work being without damage and deterioration at time of substantial completion.
- B. Correct damage by cleaning, repairing or replacing, and repainting, as approved by A/E.

END OF SECTION 040110

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SECTION 055200 - METAL LADDERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Metal ladders.
 - 2. Safety cages.

1.3 COORDINATION

- A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' written instructions 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. Fasteners.
 - 2. Shop primers.
 - 3. Shrinkage-resisting grout.
 - 4. Manufactured metal ladders.
- B. Shop Drawings: Show fabrication and installation details. Include plans, elevations, sections, and details of metal fabrications and their connections. Show anchorage and accessory items.
- C. Delegated-Design Submittal: For ladders, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

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1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For professional engineer's experience with providing delegated-design engineering services of the kind indicated, including documentation that engineer is licensed in the jurisdiction in which Project is located.
- B. Welding certificates.
- C. Paint Compatibility Certificates: From manufacturers of topcoats applied over shop primers, certifying that shop primers are compatible with topcoats.
- D. Research Reports: For post-installed anchors.

1.6 QUALITY ASSURANCE

- A. Welding Qualifications: Qualify procedures and personnel in accordance with the following:
 - 1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."
 - 2. AWS D1.6/D1.6M, "Structural Welding Code - Stainless Steel."

1.7 FIELD CONDITIONS

- A. Field Measurements: Verify actual locations of walls, floor slabs, decks, 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. 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.

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- B. Steel Plates, Shapes, and Bars: ASTM A36/A36M.
- C. Steel Tubing: ASTM A500/A500M, cold-formed steel tubing.

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 B633 or ASTM F1941/F1941M, Class Fe/Zn 5, at exterior walls. Select fasteners for type, grade, and class required.
 - 1. Provide stainless steel fasteners for fastening aluminum and stainless steel.
- B. Steel Bolts and Nuts: Regular hexagon-head bolts, **ASTM A307, Grade A (ASTM F568M, Property Class 4.6)**; with hex nuts, **ASTM A563 (ASTM A563M)**; and, where indicated, flat washers.
- C. High-Strength Bolts, Nuts, and Washers: ASTM F3125/F3125M, **Grade A325 (Grade A325M)**, Type 3, heavy-hex steel structural bolts; **ASTM A563, Grade DH3, (ASTM A563M, Class 10S3)** heavy-hex carbon-steel nuts; and where indicated, flat washers.
- D. Stainless Steel Bolts and Nuts: Regular hexagon-head annealed stainless steel bolts, **ASTM F593 (ASTM F738M)**; with hex nuts, **ASTM F594 (ASTM F836M)**; and, where indicated, flat washers; Alloy Group **1 (A1)**.
- E. Anchor Bolts: ASTM F1554, Grade 36, of dimensions indicated; with nuts, **ASTM A563 (ASTM A563M)**; 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: 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 in accordance with ASTM E488/E488M, conducted by a qualified independent testing agency.
- G. Post-Installed Anchors: Torque-controlled expansion anchors or chemical anchors.
 - 1. Material for Interior Locations: Carbon-steel components zinc plated to comply with ASTM B633 or ASTM F1941/F1941M, 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 F593 (ASTM F738M)**, and nuts, **ASTM F594 (ASTM F836M)**.

2.4 MISCELLANEOUS MATERIALS

- A. Shop Primers: Provide primers that comply with Section 099113 "Exterior Painting" and Section 099123 "Interior Painting."

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- B. Shop Primer for Galvanized Steel: Primer formulated for exterior use over zinc-coated metal and compatible with finish paint systems indicated.
- C. Galvanizing Repair Paint: High-zinc-dust-content paint complying with SSPC-Paint 20 and compatible with paints specified to be used over it.
- D. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D1187/D1187M.
- E. Shrinkage-Resistant Grout: Factory-packaged, nonmetallic, nonstaining, noncorrosive, nongaseous grout complying with ASTM C1107/C1107M. Provide grout specifically recommended by manufacturer for interior and exterior applications.

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.

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- 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 METAL LADDERS

A. General:

1. Comply with ANSI A14.3.

B. Steel Ladders:

1. Space siderails **18 inches (457 mm)** apart for roof hatch ladder unless otherwise indicated.
2. Siderails: Continuous, **3/8-by-2-1/2-inch (9.5-by-64-mm)** steel flat bars, with eased edges.
3. Rungs: **3/4-inch- (19-mm-)** diameter, 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 safety cages of same material as ladders
 - a. Hoops: 2 inch x 1/4 inch flat bars, maximum 4 feet on center.
 - b. Vertical Bars: 1 inch x 1/4 inch flat bars.
 - c. Flare bottom hoop.
7. Source Limitations: Obtain nonslip surfaces from single source from single manufacturer.
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 and prime exterior ladders, including brackets.

2.7 STEEL AND IRON FINISHES

- A. Galvanizing: Hot-dip galvanize items to comply with ASTM A153/A153M for steel and iron hardware and with ASTM A123/A123M 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 galvanized surfaces of grease, dirt, oil, flux, and other foreign matter, and treat with metallic phosphate process.

- C. Preparation for Shop Priming: Prepare surfaces to comply with requirements indicated below:

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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 Steel Items: SSPC-SP 3, "Power Tool Cleaning."
 4. Galvanized-Steel Items: SSPC-SP 16, "Brush-off Blast Cleaning of Coated and Uncoated Galvanized Steel, Stainless Steels, and Non-Ferrous Metals."
- D. 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.
- E. Paint with exterior-grade DTM (Direct-to-Metal) acrylic enamel topcoat in color selected by architect.

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.

3.2 REPAIRS

- A. Touchup Painting:

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1. Immediately after erection, clean field welds, bolted connections, and abraded areas. Paint uncoated and abraded areas with same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.
 - a. 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 A780/A780M.

END OF SECTION 055000

CCAC BOYCE ROOF REPLACEMENT

SECTION 061053 - MISCELLANEOUS ROUGH CARPENTRY

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Rooftop equipment bases and support curbs.
2. Wood blocking, and nailers.

1.2 DEFINITIONS

- A. Boards or Strips: Lumber of less than 2 inches nominal (38 mm actual) size in least dimension.
- B. Dimension Lumber: Lumber of 2 inches nominal (38 mm actual) or greater size but less than 5 inches nominal (114 mm actual) size in least dimension.
- C. Board Foot: Unit of measure for volume of lumber, equal to 144 cubic inches.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.
 1. Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Indicate type of preservative used and net amount of preservative retained.

1.4 QUALITY ASSURANCE

- A. Testing Agency Qualifications: For testing agency providing classification marking for fire-retardant treated material, an inspection agency acceptable to authorities having jurisdiction that periodically performs inspections to verify that the material bearing the classification marking is representative of the material tested.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Stack lumber flat with spacers beneath and between each bundle to provide air circulation. Protect lumber from weather by covering with waterproof sheeting, securely anchored. Provide for air circulation around stacks and under coverings.

PART 2 - PRODUCTS

2.1 WOOD PRODUCTS, GENERAL

- A. Lumber: American Softwood Lumber Standard PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, provide lumber that complies with the applicable rules of any rules-writing agency certified by the ALSC Board of Review.

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Provide lumber graded by an agency certified by the ALSC Board of Review to inspect and grade lumber under the rules indicated.

1. Factory mark each piece of lumber with grade stamp of grading agency.
 2. Where nominal sizes are indicated, provide actual sizes required by American Softwood Lumber Standard PS 20 for moisture content specified. Where actual sizes are indicated, they are minimum dressed sizes for dry lumber.
 3. Provide dressed lumber, S4S, unless otherwise indicated.
- B. Maximum Moisture Content of Lumber: 19 percent unless otherwise indicated.

2.2 WOOD-PRESERVATIVE-TREATED MATERIALS

- A. Preservative Treatment by Pressure Process: AWPA Use Category, as follows:
1. U1 for dry interior use, where protected from weather and potential interior sources of water, such as plumbing or building envelope leaks.
 2. UC2 for interior construction, damp, subject to potential moisture, fungi, termites or other insects.
 3. UC3b for exterior construction, exposed to weather, not in contact with the ground.
 4. UC4a for items in contact with the ground, fresh water, or other situations favorable to deterioration.
 5. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium.
- B. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent. Do not use material that is warped or does not comply with requirements for untreated material.
- C. Mark lumber with treatment quality mark of an inspection agency approved by the ALSC Board of Review.

2.3 MISCELLANEOUS LUMBER

- A. General: Provide miscellaneous lumber indicated and lumber for support or attachment of other construction, including the following:
1. Blocking.
 2. Nailers.
 3. Rooftop equipment bases and support curbs.
 4. Cants.

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- B. For items of dimension lumber size, provide Construction or No. 2 grade lumber of any species.
- C. For blocking not used for attachment of other construction, Utility, Stud, or No. 3 grade lumber of any species may be used provided that it is cut and selected to eliminate defects that will interfere with its attachment and purpose.
- D. For blocking and nailers used for attachment of other construction, select and cut lumber to eliminate knots and other defects that will interfere with attachment of other work.

2.4 PARAPET CAP ENGINEERED FRAMING SYSTEM

- A. Parapet Cap Engineered Framing System, Basis of Design: PreBuck Engineered Framing Systems or approved comparable product, having the following characteristics:
 - 1. Materials: StrandGuard TimberStrand LSL 1.30E Engineered Lumber.
 - a. Treatment: Zinc borate through complete cross section.
 - b. Bending Strength: 1900 psi (13100 kPa).
 - c. Tensile Strength: 1075 psi (7412 kPa).
 - d. Shear Strength: 150 psi (1034 kPa).
 - e. Compression - Perpendicular to Grain: 670 psi (4620 kPa).
 - 2. Preservative Treatment: Meets AWWA U1-15 for Use Category 2 (UC2).
 - 3. MDI resin, 100 percent waterproof when cured.
 - 4. Typical material 1-1/2 inches (38 mm) thick; built-up as required.
 - 5. Round 1-1/4 inch (32 mm) counter sunk anchor openings at 24 inches (610 mm) oc.

2.5 FASTENERS

- A. General: Provide fasteners of size and type indicated that comply with requirements specified in this article for material and manufacture.
 - 1. Where carpentry is exposed to weather, in ground contact, pressure-preservative treated, or in areas of high relative humidity, provide fasteners of Type 304 Stainless Steel.
- B. Nails, Brads, and Staples: ASTM F1667.
- C. Power-Driven Fasteners: NES NER-272.
- D. Wood Screws: ASME B18.6.1.

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- E. Screws for Fastening to Metal Framing: ASTM C954, length as recommended by screw manufacturer for material being fastened.
- F. Lag Bolts: ASME B18.2.1 (ASME B18.2.3.8M).
- G. Bolts: Steel bolts complying with ASTM A307, Grade A (ASTM F568M, Property Class 4.6); with ASTM A563 (ASTM A563M) hex nuts and, where indicated, flat washers.
- H. Expansion Anchors: Anchor bolt and sleeve assembly of material indicated below with capability to sustain, without failure, a load equal to 6 times the load imposed when installed in unit masonry assemblies and equal to 4 times the load imposed when installed in concrete as determined by testing per ASTM E 488/E488M conducted by a qualified independent testing and inspecting agency.
 - 1. Material: Stainless steel with bolts and nuts complying with ASTM F593 and ASTM F594, Alloy Group 1 or 2 (ASTM F738M and ASTM F836M, Grade A1 or A4).

2.6 MISCELLANEOUS MATERIALS

- A. Flexible Flashing: Composite, self-adhesive, flashing product consisting of a pliable, butyl rubber or rubberized-asphalt compound, bonded to a high-density polyethylene film, aluminum foil, or spunbonded polyolefin to produce an overall thickness of not less than 0.025 inch (0.6 mm).

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Set carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit carpentry to other construction; scribe and cope as needed for accurate fit. Locate nailers, blocking, and similar supports to comply with requirements for attaching other construction.
- B. Where wood-preservative-treated lumber is installed adjacent to metal decking, install continuous flexible flashing separator between wood and metal decking.
- C. Framing Standard: Comply with AF&PA's WCD 1, "Details for Conventional Wood Frame Construction," unless otherwise indicated.
- D. Install plywood backing panels by fastening to studs; coordinate locations with utilities requiring backing panels. Install fire-retardant treated plywood backing panels with classification marking of testing agency exposed to view.
- E. Do not splice structural members between supports unless otherwise indicated.
- F. Provide blocking and framing as indicated and as required to support facing materials, fixtures, specialty items, and trim.
- G. Provide fire blocking in furred spaces, stud spaces, and other concealed cavities as indicated and as follows:
 - 1. Fire block concealed spaces behind combustible cornices and exterior trim at not more than 20 feet (6 m) o.c.

CCAC BOYCE ROOF REPLACEMENT

- H. Sort and select lumber so that natural characteristics will not interfere with installation or with fastening other materials to lumber. Do not use materials with defects that interfere with function of member or pieces that are too small to use with minimum number of joints or optimum joint arrangement.
- I. Comply with AWP A M4 for applying field treatment to cut surfaces of preservative-treated lumber.
 - 1. Use inorganic boron for items that are continuously protected from liquid water.
 - 2. Use copper naphthenate for items not continuously protected from liquid water.
- J. Securely attach carpentry work to substrate by anchoring and fastening as indicated, complying with the following:
 - 1. Applicable edition of ICC's International Building Code, Section 2304 "General Construction Requirements" including "Fastener Requirements" and "Fastening Schedule," or requirements of authorities having jurisdiction.
- K. Use steel common nails unless otherwise indicated. Select fasteners of size that will not fully penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections between members. Install fasteners without splitting wood. Drive nails snug but do not countersink nail heads unless otherwise indicated.

3.2 WOOD BLOCKING, AND NAILER INSTALLATION

- A. Install where indicated and where required for attaching other work. Form to shapes indicated and cut as required for true line and level of attached work. Coordinate locations with other work involved.
- B. Attach items to substrates to support applied loading. Recess bolts and nuts flush with surfaces unless otherwise indicated.

3.3 PARAPET CAP ENGINEERED FRAMING SYSTEM INSTALLATION

- A. Install materials in accordance with manufacturer's recommendations and in proper relationship with adjacent construction. Set members level, plumb, and true to line.
- B. Coordinate construction sequence with installation of flashings and adjacent materials provided by others to prevent exterior moisture from entering or passing through completed assemblies.

3.4 PROTECTION

- A. Protect miscellaneous rough carpentry from weather. If, despite protection, miscellaneous rough carpentry becomes wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.

END OF SECTION 061053

CCAC BOYCE ROOF REPLACEMENT

SECTION 061600 - SHEATHING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Parapet sheathing.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Resistance Ratings: As tested in accordance with ASTM E119; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - 1. Fire-Resistance Ratings: Indicated by design designations from UL's "Fire Resistance Directory" or from the listings of another qualified testing agency.

2.2 PARAPET SHEATHING

- A. Glass-Mat Gypsum Sheathing, Parapets: ASTM C1177/C1177M.
 - 1. Type and Thickness: Type X, 5/8 inch (15.9 mm) thick.

2.3 FASTENERS

- A. General: Provide fasteners of size and type indicated that comply with requirements specified in this article for material and manufacture.
 - 1. For parapet sheathing, provide fasteners with hot-dip zinc coating complying with ASTM A153/A153M.
 - 2. For parapet sheathing, provide fasteners with organic-polymer or other corrosion-protective coating having a salt-spray resistance of more than 800 hours in accordance with ASTM B117.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Do not use materials with defects that impair quality of sheathing or pieces that are too small to use with minimum number of joints or optimum joint arrangement.

CCAC BOYCE ROOF REPLACEMENT

Arrange joints so that pieces do not span between fewer than three support members.

- B. Cut panels at penetrations, edges, and other obstructions of work; fit tightly against abutting construction unless otherwise indicated.
- C. Securely attach to substrate by fastening as indicated, complying with the following:
 - 1. Table 2304.10.1, "Fastening Schedule," in the ICC's International Building Code.
 - 2. ICC-ES evaluation report for fastener.
- D. Coordinate parapet sheathing installation with flashing and joint-sealant installation so these materials are installed in sequence and manner that prevent exterior moisture from passing through completed assembly.
- E. Do not bridge building expansion joints; cut and space edges of panels to match spacing of structural support elements.

3.2 GYPSUM SHEATHING INSTALLATION

- A. Comply with GA-253 and with manufacturer's written instructions.
 - 1. Fasten gypsum sheathing to cold-formed metal framing with screws.
 - 2. Install panels with a **3/8-inch (9.5-mm)** gap where non-load-bearing construction abuts structural elements.
 - 3. Install panels with a **1/4-inch (6.4-mm)** gap where they abut masonry or similar materials that might retain moisture, to prevent wicking.

END OF SECTION 061600

CCAC BOYCE ROOF REPLACEMENT

SECTION 070150.19 - PREPARATION FOR RE-ROOFING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Roof replacement preparation consisting of full roof tear-off of entire building roof system.
2. Removal of flashings and counterflashings.
3. Removal and reinstallation of indicated components, accessories, and equipment.

B. Related Information:

1. Division 00 Document "Existing Condition Information" for related Project information not part of the Contract Documents.
2. Division 22 Section "Roof Drains" for new or replacement roof drains.

1.2 DESCRIPTION OF WORK

A. Re-roofing preparation Work consists of the following:

1. Preparation for Roof replacement:
 - a. Roof Area(s): All.
 - b. Existing Roof Type: Ballasted single ply.
 - c. Existing Deck Type: Metal deck and Concrete deck.
 - d. Roof tear-off.
2. Preparation for Roof replacement:
 - a. Roof Area(s): All.
 - b. Existing Roof Type: Aggregate surfaced BUR.
 - c. Existing Deck Type: Metal deck.
 - d. Roof tear-off.
 - e. Removal of base flashings.
 - f. Temporary roof membrane.

CCAC BOYCE ROOF REPLACEMENT

1.3 MATERIALS OWNERSHIP

- A. Except for items or materials indicated to be reused, reinstalled, or otherwise indicated to remain Owner's property, demolished materials shall become Contractor's property and shall be removed from Project site.

1.4 DEFINITIONS

- A. Roofing Terminology: Refer to ASTM D1079 "Standard Terminology Relating to Roofing and Waterproofing" and applicable edition of NRCA's "The NRCA Roofing Manual: Membrane Roof Systems" and NRCA's Glossary for definition of terms related to roofing work in this Section.
- B. Existing Roofing System: Roofing system identified above, including roof covering/membrane, roof insulation, surfacing, and components and accessories between deck and roof covering/membrane.
- C. Full Roof Tear-Off: Removal of existing membrane roofing system from deck.
- D. Remove: Detach items from existing construction and legally dispose of them off-site unless indicated to be removed and reinstalled.
- E. Existing to Remain: Existing items of construction that are not indicated to be removed.
- F. Construction Waste: Building and site improvement materials and other solid waste resulting from construction, remodeling, renovation, or repair operations. Construction waste includes packaging.
- G. Demolition Waste: Building and site improvement materials resulting from demolition or selective demolition operations.
- H. Disposal: Removal off-site of demolition and construction waste and subsequent sale, recycling, reuse, or deposit in landfill or incinerator acceptable to authorities having jurisdiction.

1.5 PREINSTALLATION MEETINGS

- A. Preliminary Roofing Conference: Before starting removal Work, conduct conference at Project site.
 - 1. Coordinate with roofing preinstallation meetings specified in Division 07 roofing section(s).
 - 2. Review methods and procedures related to roofing tear-off, 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.

CCAC BOYCE ROOF REPLACEMENT

- 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 and other conditions requiring Architect notification.
- 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. All materials that are to be removed must be tested for asbestos and meet Allegheny County Health Department requirements.
- m. Governing regulations and requirements for insurance and certificates if applicable.

1.6 ACTION SUBMITTALS

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

1.7 INFORMATIONAL SUBMITTALS

- A. Qualification Statements: For Installer.
 - 1. Include certificate that Installer is approved by warrantor of existing roofing system.
 - 2. Include certificate that Installer is licensed to perform asbestos abatement.
- B. Digital Images or Videos: Show existing conditions of adjoining construction and site improvements, including exterior and interior finish surfaces, which might be misconstrued as having been damaged by reroofing operations. Submit before Work begins.
- C. Proposed Protection Measures: Submit report, including Drawings, that indicates the measures proposed for protecting individuals and property for environmental protection, for dust control and for noise control. Indicate proposed locations and construction of barriers.

CCAC BOYCE ROOF REPLACEMENT

D. Schedule of Re-Roofing Preparation Activities: Indicate the following:

1. Detailed sequence of re-roofing preparation work, with starting and ending dates for each activity. Ensure occupants' on-site operations are uninterrupted.
2. Interruption of utility services. Indicate how long utility services will be interrupted.
3. Coordination for shutoff, capping, and continuation of utility services.
4. Use of elevator and stairs.
5. Coordination of Owner's continuing occupancy of portions of existing building.

E. 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.

F. Landfill Records: Indicate receipt and acceptance of hazardous wastes, such as asbestos-containing material, by a landfill facility licensed to accept hazardous wastes. All asbestos testing and removal must meet Allegheny County Health Department regulations.

1.8 CLOSEOUT SUBMITTALS

A. Certified statement from manufacturer of existing warranted roof system stating that existing roof warranty has not been affected by Work performed under this Section.

1.9 QUALITY ASSURANCE

A. Installer Qualifications: Installer of new membrane roofing system.

1. Approved by warrantor of existing roof system to work on existing roofing.
2. Licensed to perform asbestos abatement in the jurisdiction where Project is located.

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

C. Regulatory Requirements:

1. Comply with governing EPA notification regulations before beginning membrane roofing removal.
2. Comply with hauling and disposal regulations of authorities having jurisdiction.

1.10 PROJECT / FIELD CONDITIONS

A. Owner will occupy portions of building immediately below reroofing area.

1. Conduct reroofing so Owner's operations will not be disrupted.

CCAC BOYCE ROOF REPLACEMENT

2. Provide Owner with not less than 72 hours' written notice of activities that may affect Owner's operations.
3. Coordinate work activities daily with Owner so Owner can place protective dust or water leakage covers over sensitive equipment or furnishings, shut down HVAC and fire-alarm or -detection equipment if needed, and evacuate occupants from below the work area.
4. Before working over structurally impaired areas of deck, notify Owner to evacuate occupants from below the affected area.
 - a. Verify that occupants below the work area have been evacuated before proceeding with work over the 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. Conditions existing at time of inspection for bidding will be maintained by Owner as far as practical.
 1. The results of an analysis of test cores from existing roofing system are available for Contractor's reference.
 2. Construction / Record Drawings and Specifications for existing roofing system are provided for Contractor's convenience and information, but they are not a warranty of existing conditions. They are intended to supplement rather than serve in lieu of Contractor's own investigations. Contractor is responsible for conclusions derived from existing documents.
- E. Limit construction loads on roof to rooftop equipment wheel loads and uniformly distributed loads not exceeding recommendations of Contractor's professional engineer based upon site inspection and analysis.
- F. 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.
- G. Daily Protection: Coordinate installation of roofing so insulation and other components of roofing system not permanently exposed are not subjected to precipitation or left uncovered at the end of the workday or when rain is forecast.
- H. Hazardous Materials: It is not expected that hazardous materials such as asbestos-containing materials will be encountered in the Work, however, an asbestos survey on all materials must be conducted to meet Allegheny County Health Department requirements.

CCAC BOYCE ROOF REPLACEMENT

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.
 - a. Obtain direction from Architect before proceeding with work in the affected area.
- I. Hazardous Materials: Present in building to be reroofed. 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 hazardous material remediation work.
- J. Fire-Test-Response Characteristics: For assemblies with fire-resistance ratings, provide materials and construction identical to those of assemblies tested for fire resistance per ASTM E119 by a testing and inspecting agency acceptable to authorities having jurisdiction.

PART 2 - PRODUCTS

2.1 TEMPORARY PROTECTION MATERIALS

- A. EPS Insulation: Molded (expanded) polystyrene, ASTM C578.
- B. Plywood: NIST DOC PS 1, Grade CD, Exposure 1.
- C. Oriented Strand Board (OSB): NIST DOC PS 2, Exposure 1.

2.2 DECK REPAIR/REPLACEMENT MATERIALS

- A. Metal Deck Repair Materials:
 1. 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:
 - a. Gage, rib depth, rib configuration to match existing; three span; lapped and stitched joints.
 - b. Sheet Steel: ASTM A653/A653M, Grade A structural quality; with G90 coating (galvanized).
 2. Fasteners:

CCAC BOYCE ROOF REPLACEMENT

- a. Mechanical Fasteners: Corrosion-resistant, low-velocity, power-actuated or pneumatically driven carbon-steel fasteners; or self-drilling, self-threading screws.
 - b. Side-Lap Fasteners: Corrosion-resistant, hexagonal washer head; self-drilling, carbon-steel screws, No. 10 (4.8 mm) minimum diameter.
 3. Accessories: Provide manufacturer's standard accessory materials for deck that comply with requirements indicated.
- B. Concrete Deck Repair Materials:
1. Bonding Agent: Epoxy-modified, cementitious bonding and anticorrosion agent consisting of water-insensitive epoxy adhesive, Portland cement, and water-based solution of corrosion-inhibiting chemicals that forms a protective film on steel reinforcement.
 2. Patching Mortar: Trowelable cementitious repair mortar for vertical and overhead, repairs up to 2 inches (50 mm) per lift, one component, fiber reinforced, polymer modified repair mortar containing corrosion inhibitor.
 - a. Compressive Strength: Not less than 6,000 psi (41,400 kPa) at 28 days when tested according to ASTM C 109/C 109M, modified 2-inch (50-mm) cubes.

PART 3 - EXECUTION

3.1 PREPARATION, GENERAL

- A. Seal or isolate windows that may be exposed to airborne substances created in removal of existing materials.
- B. Shut off rooftop utilities and service piping before beginning the Work.
- C. Test existing roof drains and conductors to verify that they are not blocked or restricted.
 1. Immediately notify Architect of any blockages or restrictions.
- D. Coordinate with Owner to shut down air-intake equipment in the vicinity of the Work.
 1. Cover air-intake louvers before proceeding with reroofing work that could affect indoor air quality or activate smoke detectors in the ductwork.
- E. Pollution Control: Comply with environmental regulations of authorities having jurisdiction. Limit spread of dust and debris.
 1. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
 2. Remove debris from building roof by chute, hoist, or other device that will convey debris to grade level.

CCAC BOYCE ROOF REPLACEMENT

- F. Refrigerant: Before starting re-roofing preparation, remove refrigerant from mechanical equipment to be removed and reinstalled, according to 40 CFR 82 and regulations of authorities having jurisdiction.
- G. Temporary Weather Protection: During removal operations, have sufficient and suitable materials on-site to facilitate rapid installation of temporary protection in the event of unexpected rain.
- H. Roof Drainage Protection: Maintain roof drainage in functioning condition to ensure roof drainage at end of each workday.
 - 1. Prevent debris from entering or blocking roof drainage and conductors.
 - a. Use plugs specifically designed for this purpose.
 - b. Remove plugs at end of each workday, when no work is taking place, or when rain is forecast.
 - 2. If roof drainage components are temporarily blocked or unserviceable due to roofing system removal or partial installation of new membrane roofing system, provide alternative drainage method to remove water and eliminate ponding.
 - a. Do not permit water to enter into or under existing membrane roofing system components that are to remain.

3.2 ROOF TEAR-OFF

- A. Notify Owner each day of extent of roof tear-off proposed for that day.
- B. Lower removed roofing materials to ground and onto lower roof levels, using dust-tight chutes or other acceptable means of removing materials from roof areas.
- C. Remove aggregate ballast from roofing membrane.
- D. Remove loose aggregate from aggregate-surfaced built-up bituminous roofing using a dry vacuum.
- E. Remove walkways, pavers and accessories from roofing membrane.
- F. Roof Drainage: Remove roof drainage items indicated for removal.
- G. Remove Flashings: Remove roof flashings indicated for removal.
 - 1. Remove base flashings and counter flashings.
 - 2. Remove perimeter edge flashings and gravel stops.
 - 3. Remove copings where outlined in drawings.
 - 4. Remove expansion-joint covers.
 - 5. Remove flashings at pipes, curbs, mechanical equipment, and other penetrations.

CCAC BOYCE ROOF REPLACEMENT

- H. Full Roof Tear-Off: Remove existing roofing membrane and other membrane roofing system components down to the deck.
 - 1. Remove cover boards, roof insulation, vapor retarders, substrate boards and base sheets.
 - 2. Remove fasteners from deck or cut fasteners off slightly above deck surface.
- I. Roof Edge Specialties: Reuse existing perimeter metal systems, except where indicated otherwise; refasten and repair existing fascia and coping covers to remain.
 - 1. New perimeter metal systems (fascia and coping) are specified in Division 07 Section "Sheet Metal Flashing and Trim."
- J. Inspect wood blocking, curbs, and nailers for deterioration and damage.
 - 1. Remove deteriorated or unsuitable wood blocking, curbs, and nailers.
 - 2. Replace existing wood components that exhibit signs of deterioration or other conditions detrimental to securement of roofing system components, including roof edge flashings.

3.3 DECK PREPARATION

- A. Inspect deck after tear-off of membrane roofing system.
- B. Verify that deck is sound and dry.
- 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. Unsuitable Deck: If deck surface is not suitable for receiving new roofing or if structural integrity of deck is suspect, immediately notify Architect.
 - 1. Do not proceed with installation until directed by Architect.

3.4 DECK REPAIR/REPLACEMENT

- A. Repair existing deck to provide smooth working surface for installation of roof system.
 - 1. Replace deck that cannot be repaired to sound condition.
- B. Metal Deck Reattachment:
 - 1. Mechanically reattach loose sections of deck to steel support members 12 inches (300 mm) on center (at every other rib) and 6 inches (150 mm) on center (at every rib) in roof corner and roof perimeter areas.
 - 2. Side Laps: Mechanically fasten 18 inches (450 mm) on center.
 - 3. Mechanically fasten steel deck to supporting member at each deck side lap, regardless of spacing.

CCAC BOYCE ROOF REPLACEMENT

4. Overlap steel deck end laps minimum 2 inches (50 mm); mechanically attach at the above listed factors.

C. Metal Deck Replacement:

1. Remove defective metal decking and examine supports; if supports are unsound, notify Architect and obtain direction before proceeding with deck replacement.
2. Install new metal decking in accordance with SDI, Design Manual for Composite Decks, Form Decks, Roof Decks

D. Concrete Deck Repair:

1. Remove spalled or deteriorated deck areas until sound base is reached.
2. Apply bonding agent and install patching mortar in accordance with manufacturer's instructions.
3. Allow patching mortar to fully set.

3.5 EQUIPMENT REMOVAL AND REINSTALLATION

A. General: Remove, store, protect and reinstall rooftop equipment as required to accommodate roof tear-off and subsequent roofing work.

1. Refer to Division 23 Sections for HVAC equipment removal and reinstallation.
2. Refer to Division 26 Sections for electrical equipment disconnection and reconnection.
3. Raise roof curbs, equipment mountings and other roof penetration flashings as required to accommodate additional insulation thickness and maintain base flashing height of not less than 8 inches (200 mm), unless otherwise indicated.
 - a. Provide wood assemblies and additional support with miscellaneous galvanized steel angles, as required to rebuild or raise existing roof curbs.
 - b. Extend vent and soil stacks and other roof penetrations, using matching materials, as required to accommodate additional insulation thickness.
4. Extend existing ductwork inside existing roof curbs to accommodate extension of curb.
 - a. Use materials matching existing ductwork; minimum of 20 ga. (0.9 mm) galvanized duct with Pittsburgh folded seam slip joints-typical.

B. Rooftop Equipment, Electrical: Engage a qualified electrician to perform electrical disconnection and reconnection.

1. Disconnect, reroute, extend and reconnect existing power feeders and control circuits (conduit and wiring) feeding the existing roof mounted equipment which

CCAC BOYCE ROOF REPLACEMENT

is indicated to be raised and/or relocated to a new elevation/location and as required by the Contract.

2. Provide weatherproof exterior junction boxes, when required.
 3. Make connections to mechanical equipment by using a maximum 18-inch (450 mm) length of liquid-tight flexible steel conduit.
 - a. Rigid connections to mechanical equipment are not permitted.
 4. Relocate and reconnect existing disconnect switches presently installed on existing roof mounted equipment indicated to be raised and/or relocated.
- C. Prevent discharge of refrigerant. Verify that refrigerant has been properly recovered from equipment to be removed.
- D. Reinstall designated equipment.
1. Make electrical reconnections in accordance with applicable code and authorities having jurisdiction.
 2. Recharge HVAC equipment with refrigerant required by equipment manufacturer.
 3. Coordinate with Owner to test equipment and verify proper operation.
- E. Remove and dispose of designated abandoned equipment. Infill openings in deck with matching materials. Infill roofing system with materials of same type as existing, adjacent roofing system.
- 3.6 BASE FLASHING REMOVAL
- A. Remove existing base flashings around parapets, curbs, walls, and penetrations.
1. Clean substrates of contaminants, such as asphalt, sheet materials, dirt, and debris.
- B. Do not damage metal counterflashings that are to remain.
1. Replace metal counterflashings damaged during removal with counterflashings of same metal, weight or thickness, and finish.
- 3.7 PARAPET AND WALL SHEATHING AND CLADDING
- A. Wall Cladding: Remove cladding and weather resistant and replace with new metal wall panels.
1. Provide new metal cladding panels as specified in Division 07 Section "Metal Wall Panels."

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3.8 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.

3.9 CLEANING

- A. Clean adjacent structures and improvements of dust, dirt, and debris caused by preparation for re-roofing operations. Return adjacent areas to condition existing before operations began.

END OF SECTION

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SECTION 072713 - MODIFIED SELF-ADHERING SHEET AIR BARRIERS

PART 1 - GENERAL

1.01 GENERAL REQUIREMENTS

- A. Surface preparation.
- B. Application of self-adhering, vapor-retarding sheet air barrier.
- C. Application of air barrier materials to bridge and seal air leakage pathways in the following conditions:
 - 1. Wall-to-roof connections and penetrations.
 - 2. All other penetrations through the wall assembly.

1.02 RELATED SECTIONS

- A. Section 061000 - Sheathing.
- B. Section 074000 - Preformed Metal Wall Panels.
- C. Section 075000 - Membrane Roofing.
- D. Section 076000 - Flashing and Sheet Metal.

1.03 1.03 REFERENCES

- A. ASTM D412 - Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers-Tension.
- B. ASTM D1970 - Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection.
- C. ASTM D4541 - Standard Test Method for Pull-Off Strength of Coatings Using Portable Adhesion Testers.
- D. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
- E. ASTM E96 (Method B) - Standard Test Methods for Water Vapor Transmission of Materials.
- F. ASTM E2178 - Standard Test Method for Air Permeance of Building Materials.
- G. ASTM E2357 - Standard Test Method for Determining Air Leakage of Air Barrier Assemblies.
- H. ASTM C1280 - Standard Specification for Application of Exterior Gypsum Panel Products for Use as Sheathing.
- I. GA-253-2018 - Application of Gypsum Sheathing.

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1.04 SUBMITTALS

- A. Comply with Section 01 33 00 – Submittal Procedures.
- B. Submit manufacturer's product data and application instructions.

1.05 QUALITY ASSURANCE

- A. Installer Qualifications:
 - 1. Use an experienced installer and an adequate number of skilled personnel who are thoroughly trained and experienced in the application of the air barrier.
- B. Obtain air barrier materials from a single manufacturer regularly engaged in manufacturing the product.
- C. Provide products which comply with all state and local regulations controlling use of volatile organic compounds (VOCs).

1.08 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying product name and manufacturer.
- B. Store materials in a clean and dry area in accordance with manufacturers' instructions.
- C. Store at temperatures at or above 40 degrees F (4 degrees C) but less than 90 degrees F (32.2 degrees C), free from contact with cold or frozen surfaces.
- D. Protect materials during handling and application to prevent damage or contamination.

1.09 ENVIRONMENTAL REQUIREMENTS

- A. Air barrier products are not intended for conditions subject to abuse or permanent exposure to the elements.
- B. Do not proceed with product application if rainfall is forecast or imminent within 12 hours.
- C. Do not apply membrane when air or substrate temperatures are below 20 degrees F (-6.7 degrees C) or within 24 hours after completed installation.

1.10 WARRANTY

- A. Provide manufacturers' standard ten (10) year material warranty.

PART 2 PRODUCTS

2.01 MANUFACTURER

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- A. Basis-of-Design Manufacturer: W. R. MEADOWS®, INC., 300 Industrial Drive / PO Box 338, Hampshire, Illinois 60140-0338. (800) 342-5976, Website: www.wrmeadows.com.

2.02 MATERIALS

- A. Vapor-retarding, SBS rubberized asphalt-backed self-adhering sheet air barrier with the following physical properties:
1. Color: White with green print.
 2. Thickness: 40 mils (1 mm).
 3. Air Permeability, ASTM E2178: 0.004 cfm/ft.² at 1.57 lb./ft.² (0.04 L/S/M² at 75 Pa).
 4. Air Barrier Assembly, ASTM E2357: <0.04 cfm/ft.² at 1.57 lb./ft.² (0.2 L/S/M² at 75 Pa).
 5. Water Vapor Permeance, ASTM E96 (Procedure B): < 0.035 perms.
 6. Water Absorption, Percent by Weight, ASTM D1970: 0.25 percent, maximum.
 7. Water Absorption, Percent by Weight, ASTM D570: 0.1 percent, maximum.
 8. Water Penetration, ASTM E331: Pass.
 9. Elongation-Compound, ASTM D412-modified: 400 % (Typical).
 10. Elongation-Compound, ASTM D882: 400%, minimum.
 11. Tensile Strength-Film-MD, ASTM D412-modified: 4000 psi (27.6 MPa).
 12. Tensile Strength-Film-MD, ASTM D882: 23.5 lb./in. (4.1 N/mm).
 13. Puncture Resistance, ASTM E154: 40 lbf (178 N), minimum.
 14. Nail Sealability, ASTM D1970: Pass.
 15. Service Temperature: -40 degrees F (-40 degrees C) to 158 degrees F (70 degrees C).
 16. Lap Peel Strength at 39 degrees F (4 degrees F), ASTM D903: 10lbf/in. Width (1.75 N/mm).
 17. Low Temperature Flexibility at -22 degrees F (-30 degrees C), CGSB 37-gp-56m: Pass.
 18. Adhesion to Exterior Gypsum Sheathing, CMU, Concrete or Exterior Grade Plywood, ASTM D4541-modified per ABAA Requirements: >16 psi (0.11 MPa).
- B. Basis of Design Product: AIR-SHIELD by W. R. MEADOWS.

2.03 ACCESSORIES

- A. Transition Membrane and Flashing: Narrow width, self-adhesive membranes for the reinforcement of joints, dissimilar structural connections, flashing of rough openings, inside and outside corners and penetrations.
1. AIR-SHIELD by W. R. MEADOWS.
 2. AIR-SHIELD HT by W. R. MEADOWS.
 3. AIR-SHIELD BUTYL FLASHING by W. R. MEADOWS.
- B. Through-Wall Flashing: 40-mil self-adhesive polymeric sheet membrane.
1. AIR-SHIELD THRU-WALL FLASHING by W. R. MEADOWS.
- C. Liquid Flashing: Liquid-applied flashing and detail sealant.
1. AIR-SHIELD LIQUID FLASHING by W. R. MEADOWS.

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- D. Alternate Flashing: 40-mil, self-adhering, SBS rubberized asphalt-backed membrane with aluminum facer for the flashing of rough openings.
 - 1. AIR-SHIELD ALUMINUM FLASHING.
- E. Adhesive-Primer for Self-Adhesive Membranes:
 - 1. MEL-PRIME[™] Solvent-Based VOC Adhesive by W. R. MEADOWS.
 - 2. MEL-PRIME[™] W/B Water-Based Adhesive by W. R. MEADOWS.
- F. Termination Sealant: Non-slump sealant for penetrations and termination of self-adhering membranes.
 - 1. BEM by W. R. MEADOWS.
- G. Concrete Repair Materials: General purpose patching materials.
 - 1. MEADOW-PATCH[™] 5 and MEADOW-PATCH 20 Concrete Repair Mortars by W. R. MEADOWS.
- H. Termination Bar: Optional termination for self-adhesive through-wall flashing membrane.
 - 1. TERMINATION BAR by W. R. MEADOWS.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Examine surfaces to receive membrane are deemed appropriate in accordance with air barrier manufacturer's current technical literature.
- B. Notify Contractor if surfaces are not acceptable. Do not begin surface preparation or application until unacceptable conditions have been corrected.
- C. Start of the Work shall construe installer acceptance of substrates and conditions.

3.02 SURFACE PREPARATION

- A. Protect adjacent surfaces not designated to receive the air barrier.
- B. Clean and prepare surfaces to receive the sheet air barrier system in accordance with manufacturer's instructions.
- C. Do not apply the sheet air barrier system onto surfaces unacceptable to the manufacturer.
- D. All surfaces to receive sheet air barrier system must be clean, dry, frost-free and smooth. Ensure surfaces are free from oil, dust and excess mortar.
 - 1. Cast-in-place concrete and masonry shall be cured a minimum of 14 days and free from wax, pigments, release agents and curing compounds.
- E. Repair spalled areas, fill all voids and remove all sharp protrusions. Strike masonry joints flush.

Specifier Notes: Use manufacturer's high temperature self-adhering membrane and flashings for projects where elevated in-service ambient conditions are anticipated.

3.03 INSTALLATION

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- A. Prime all surfaces to receive self-adhering membranes within one working day with applicable primer. Areas not covered within one day shall be reprimed. Ensure primer extends a minimum of 2 inches (51 mm) beyond area to receive self-adhering membranes.
- B. Seal all edges of self-adhering membrane with termination sealant or liquid flashing at the end of each day if not covered with fluid-applied air barrier. Tool sealant or flashing smooth.
- C. Dissimilar Structural Material Connections:
 - 1. Apply a 6 (152.4 mm)-inch section of self-adhering transition membrane, centered over joints of dissimilar material constructions. Roll press to ensure full contact with substrate.
- D. Detailing of Exterior Sheathing Panels
 - 2. Install exterior gypsum sheathing panels in accordance with the manufacturer, engineer of record and ASTM C1280.
 - a. Coat exposed, raw edges of exterior gypsum sheathing with adhesive primer prior to application of self-adhering or liquid flashings.
 - 3. Prefill nonmoving 1/16 inch to 1/4-inch (1.6 mm to 3.2 mm) sheathing joints with termination sealant or liquid flashing and tool smooth. Allow sealants to fully cure.
 - 4. Prefill nonmoving 1/4 inch to 1/2-inch (6.4 mm to 12.7 mm) sheathing joints with termination sealant or liquid flashing and allow to cure.
 - a. Apply a 4-inch-wide (101.6 mm) section of self-adhering transition membrane, centered over the sealed crack or joint. Roll press to ensure full contact with primed substrate.

3.04 INSIDE AND OUTSIDE CORNERS

- A. Apply a 6-inch-wide (152.4 mm) section of self-adhering transition membrane flashing onto properly prepared substrates at the center of inside and outside corners. Ensure a 2-inch (50.8 mm) overlap of successive sections. Roll press to ensure full contact with primed substrate.
 - 1. Alternative to pre-detailing inside and outside corners with 6-inch (152.4 mm) transition membrane flashings, ensure full-width sheet laps occur not less than 6 inches from corner conditions.

3.05 THROUGH-WALL FLASHING

- A. Apply self-adhering through-wall flashing a minimum of 8 inches (203.2 mm) onto primed backup wall substrates. Ensure through-wall flashing is recessed 1/2-inch (12.7 mm) from exterior face of brick and masonry claddings.
- B. Overlap successive sections of through-wall flashing 4 inches (101.6 mm). Seal vertical and horizontal overlapped membrane edges with termination sealant.
- C. Firmly roll press through-wall flashing to ensure complete adhesion.
- D. Apply a bead of termination sealant onto to leading edges horizontal leading edges and tool smooth to permit water shedding.

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3.06 SELF-ADHERING SHEET AIR BARRIER INSTALLATION

- A. Apply air barrier membrane over primed substrates and in accordance with manufacturer's technical data, technical bulletins and standard details.
- B. Beginning from the lowest point, apply membrane in a shingle fashion.
- C. Overlap all side and end laps 2 inches (50.8 mm) onto successive sheets.

3.07 PROTECTION

- 1. Cover air barrier as soon as possible after application. Air barrier is not intended for permanent exposure.

END OF SECTION 072713

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SECTION 074213.13 - PREFORMED METAL WALL PANELS

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

- A. This section covers the pre-finished, pre-fabricated Architectural metal wall panel system. All metal trim, accessories, fasteners, insulation and sealants indicated on the drawings as part of this section.
- B. Drawings and general provisions of the Contract, including general and Supplementary Conditions and Division 01 Specifications, apply to this section.

1.2 SUMMARY

- A. Section Includes
 - 1. Factory formed metal wall panels
- B. Related work specified elsewhere (Note: select from the below or add appropriate sections)
 - 1. Flashing and Trim: Division 7- Flashing and Sheet Metal
 - 2. Coping and Gravel Stops: Division 7 Roof Specialties and Accessories

1.3 Definitions

- A. Metal Wall Panel Assembly: Metal wall panels, attachment system components, miscellaneous metal framing, thermal, and accessories necessary for a complete weathertight system.

1.4 QUALITY ASSURANCE

- A. Basis-of-Design Product: Petersen Aluminum Corp, Annapolis Junction, MD, 800-344-1400 Petersen Aluminum Corp, Phoenix, AZ, 833-750-1935 products establish a minimum of quality required.
- B. Manufacturer and erector shall demonstrate experience of a minimum of five (5) years in this type of project.
- C. Sheet Metal Industry Standard: Comply with Sheet Metal and Air Conditioning Contractors National Association (SMACNA) *Architectural Sheet Metal Manual*.
- D. Panels shall be factory-produced only. No portable, installer-owned or installer-rented machines will be permitted.

1.5 SUBSTITUTIONS

- A. The material, products and equipment specified in this section establish a standard for required function, dimension, appearance and quality to be met by any proposed substitution.

1.6 SYSTEM DESCRIPTION

- A. Material to comply with:
 - 1. ASTM B209 Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate

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1.7 WALL PANEL SYSTEM PERFORMANCE TESTING

- A. General Performance: Metal wall panels shall comply with performance requirements without failure due to defective manufacture, fabrication, installation or other defects in construction.
- B. Panels to meet:
 - 1. Metal Wall or Metal Soffit System shall be designed to meet applicable Local Building Code and the Soffit System shall have been tested by the Manufacturer per ASTM E-330 and have the applicable Load Tables published from this Air Bag testing for negative loads.

1.8 WARRANTIES

- A. Finish warranty: Manufacturer's standard form in which manufacturer agrees to repair finish or replace metal wall panels that show evidence of deterioration of factory-applied finish within specified warranty period.
 - 1. Exposed Panels Finish – deterioration includes the following:
 - a. Color fading more than 5 hunter units when tested according to ASTM D 2244
 - b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214
 - c. Cracking, checking, peeling or failure of a paint to adhere to a bare metal.
 - 2. Warranty Period: 20 Years from the date of substantial completion
- B. Applicator shall furnish written warranty for a two (2) year period from date of substantial completion of building covering repairs required to maintain roof and flashings in watertight condition

1.9 SUBMITTALS

- A. Furnish detailed drawings showing profile and gauge of exterior sheets, location and type of fasteners, location, gauges, shape and method of attachment of all trim locations and types of sealants, and any other details as may be required for a weather-tight installation.
- B. Provide finish samples of all colors specified.
- C. Shop drawings: Show fabrication and installation layouts of metal wall panels or metal soffit panels, details of edge conditions, panel profiles, corners, anchorages, trim, flashings, closures and accessories, and special details. Distinguish between factory and field-assembled work
- D. Coordination Drawings: Plans, drawn to scale, on which the following are shown and coordinated with each other, based on input from installer of the items involved.

1.10 DELIVERY, STORAGE AND HANDLING

- A. Ordering: Comply with manufacturer's ordering instruction and lead time requirements to avoid construction delays.
- B. Deliver components, sheets, metal wall panels and other manufactured items so as not to be damaged or deformed. Package metal wall panels for protection during transportation and handling.
- C. Unload, store and erect metal wall panels in a manner to prevent bending, warping, twisting and surface damage.

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- D. Stack metal wall panels on platforms or pallets, covered with suitable weathertight and ventilated covering. Store metal wall panels to ensure dryness. Do not store metal wall panels in contact with other materials that might cause staining, denting or other surface damage.
- E. Protect strippable protective coating on any metal coated product from exposure to sunlight and high humidity, except to the extent necessary for material installation.

1.11 PROJECT CONDITIONS

- A. Weather Limitations: proceed with installation only when existing and forecasted weather conditions permit metal wall panel work to be performed.
- B. Field Measurements: Verify actual dimensions of construction contiguous with metal roof panels by field measurements before fabrication.

PART 2 - PRODUCTS

2.1 PANEL DESIGN

- A. General: Provide factory-formed metal wall panels designed for wall, soffit and fascia applications where a flush or flat appearance is desired. A round interlock leg and concealed fastening system act to improve the flush appearance while providing additional strength.
- B. Wall panels shall be Flush Wall 12" widths with 1" height.
- C. Panels to be produced Smooth - Factory Standard. Specifier note: Factory standard is smooth unless specified. Specifier Note: Depending on producing factory, panels may be specified with venting strips or perforated, aluminum panels only, for soffit applications. Check with local factory for capabilities.
- D. Forming: Use continuous end rolling method. No end laps on panels. No portable roll forming machines will be permitted on this project, no installer-owned or installer-rented machines will be permitted. It is the intent of the Architect to provide Factory-Manufactured panel systems only for this project.

2.2 MANUFACTURERS

- A. Basis-of-Design Manufacturer: Petersen Aluminum Corp, Annapolis Junction, MD, 800-344-1400 Petersen Aluminum Corp, Phoenix, AZ, 833-750-1935 Flush Wall
- B. Substitutions: Approved equal product.

2.3 MATERIALS AND FINISHES

- A. Preformed metal panels shall be fabricated of .032 Aluminum and shall be Herr-Voss corrective leveled for flat appearance.
- B. Color: As selected by architect from manufacturer's full range.
- C. Finish shall be Kynar 500 or Hylar 5000 Fluorocarbon coating with a top side film thickness of 0.70 to 0.90 mil over a 0.25 to 0.3 mil prime coat to provide a total dry film thickness of 0.95 to 1.25 mil, to meet AAMA 621. Bottom side shall be coated with a primer with a dry film thickness of 0.25 mil. Finish shall conform to all tests for adhesions, flexibility and longevity as specified by Kynar 500 or Hylar 5000 finish supplier.
- D. If Strippable coating to be applied on the pre-finished panels to the top side to protect the finish during fabrication, shipping and handling, film shall be removed before installation.

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- E. Trim: Trim shall be fabricated of the same material and finish to match the profile, and will be press broken in lengths of 10 to 12 feet. Trim shall be formed only by the manufacturer of their approved dealer. Trim to be erected in overlapped condition. Use lap strips only as indicated on drawings. Miter conditions shall be factory welded material to match the sheeting.
- F. Accessories/Fasteners: Fasteners shall be of type, material, size, corrosion resistance, holding power and other properties required to fasten miscellaneous framing members to substrates. Accessories and their fasteners shall be capable of resisting the specified design wind uplift forces and shall allow for thermal movement of the wall panel system. Exposed fasteners shall not restrict free movement of the roof panel system resulting from thermal forces, except at designed points of roof panel fixity
- G. Substructure to be Z-girts.
- H. Underlayment
 - 1. 1. On all surfaces to be covered with metal wall panels, furnish and install a 40 mil "Peel & Stick membrane", required as outlined by metal panel manufacturer. Membrane to be a minimum of 40 mil thickness, smooth, non-granular, by one of the following manufacturers:
 - a. W.R Grace "Ice & Water Shield"
 - b. Cetco Strongseal
 - c. Carlisle CCW WIP 300HT
 - d. Interwrap Titanium PSU
 - e. MFM Corp "Wind & Water Shield"
 - f. Polyguard Deck Guard HT or Polyglas HT
 - g. Tamko TW Tile and Metal Underlayment
- I. Sealants
 - 1. Provide two-part polysulfide class B non-sag type for vertical and horizontal joints or one-part polysulfide not containing pitch or phenolic extenders or
 - 2. Exterior grade silicone sealant recommended by roofing manufacturer or one-part non-sag, gun grade exterior type polyurethane recommended by the roofing manufacturer.

2.4 FABRICATION

- A. Comply with dimensions, profile limitations, gauges and fabrication details shown and if not shown, provide manufacturer's standard product fabrication.
 - 1. Max panel length is 55'.
- B. Fabricate components of the system in factory, ready for field assembly.
- C. Fabricate components and assemble units to comply with fire performance requirements specified.
- D. Apply specified finishes in conformance with manufacturer's standard, and according to manufacturer's instructions.

PART 3 - EXECUTION

3.1 INSPECTION

- A. Examine alignment of structural steel and related supports, primary and secondary roof framing, solid roof sheathing, prior to installation.
- B. For the record, prepare written report, endorsed by installer, listing conditions detrimental to performance of the Work.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

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3.2 FASTENERS

- A. Secure units to supports.
- B. Place fasteners as indicated in manufacturer's standards.

3.3 INSTALLATION

- A. Compliance: Comply with manufacturer's product data, recommendations and installation instructions for substrate verification, preparation requirements and installation.
- B. Panels shall be installed plumb and true in a proper alignment and in relation to the structural framing. The erector must have at least five years successful experience with similar applications.
- C. Install metal panels, fasteners, trim and related sealants in accordance with approved shop drawings and as may be required for a weather-tight installation.
- D. Provide uniform, neat seams.
- E. Fasteners: Conceal fasteners where possible in exposed work. Cover and seal fasteners and anchors for watertight and leakproof installation.
- F. Remove all strippable coating and provide a dry-wipe down cleaning of the panels as they are erected.

3.4 DAMAGED MATERIAL

- A. Upon determination of responsibility, repair or replace damaged metal panels and trim to the satisfaction of the Architect and Owner.

3.5 CLEANING

- A. Cleaning: Remove temporary coverings and protection of adjacent work areas. Repair or replace damage installed products. Clean installed products in accordance with manufacturer's instruction prior to owner's acceptance. Remove construction debris from project site and legally dispose of debris.

END OF SECTION

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SECTION 075416 - KETONE ETHYLENE ESTER (KEE) ROOFING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Adhered thermoplastic KEE roofing system on metal deck and concrete deck, including:
2. Roof insulation.
3. Roof insulation cover board.
4. Walkways.

B. Related Sections:

1. Division 06 Section "Miscellaneous Rough Carpentry" for wood nailers and blocking.
2. Division 07 Section "Preparation for Re-Roofing" for removal of existing roofing; inspection, repair and replacement of existing deck/substrate, if required to receive new roofing.
3. Division 07 Section "Sheet Metal Flashing and Trim" for shop-formed sheet metal items including roof drainage system items, roof penetration flashings, base and counterflashings and reglets, and formed copings and roof edge metal items.
4. Division 22 Section "Roof Drains" for roof drains.

1.2 DEFINITIONS

- ##### A. Roofing Terminology:
- Refer to ASTM D1079 "Standard Terminology Relating to Roofing and Waterproofing" and applicable edition of NRCA's "The NRCA Roofing Manual: Membrane Roof Systems" and NRCA's Glossary for definition of terms related to roofing work in this Section.

1.3 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, and installers whose work interfaces with or affects roofing, including installers of roof accessories and roof-mounted equipment.
2. Review drawings and specifications.
3. Review methods and procedures related to roofing installation, including manufacturer's written instructions.

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4. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
5. Examine substrate conditions and finishes for compliance with requirements, including flatness and fastening.
6. Review structural loading limitations of roof deck during and after roofing.
7. Review base flashings, special roofing details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that will affect roofing system.
8. Review governing regulations and requirements for insurance and certificates if applicable.
9. Review temporary protection requirements for roofing system during and after installation.
10. Review roof observation and repair procedures after roofing installation.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: For roofing system. Include plans, elevations, sections, details, and attachments to other work.
 1. Provide roof plan showing orientation and types of roof deck, orientation of membrane roofing, and fastener spacings and patterns for mechanically fastened components.
 2. Base flashings and membrane terminations.
 - a. Indicate details meet requirements of NRCA required by this Section.
 3. Layout and thickness of insulation.
 4. Tapered insulation layout, including slopes.
 5. Crickets, saddles, and tapered edge strips, including slopes.
 6. Insulation fastening patterns for corner, perimeter, and field-of-roof locations.
 7. Membrane securement, fastening or adhesion requirements.
- C. Samples for Verification: For the following products:
 1. Sheet roofing materials and base flashing, of type and color specified, including T-shaped side and end lap seam.
 2. Roof insulation and cover board.

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3. Walkway materials.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Statements: For Installer.
 1. Letter written for this Project indicating manufacturer approval of Installer.
- B. Contractor's Product Certificate: Submit signed certification, on company letterhead, indicating products intended for Work of this Section, including product names and numbers and manufacturers' names, with statement indicating that products to be provided meet the requirements of the Contract Documents.
- C. Manufacturer Certificates:
 1. Submit evidence of compliance with specified requirements in "Performance Requirements" Article.
 - a. Include: External fire resistance submittal and Wind uplift resistance submittal.
 2. Product Compatibility: Indicate manufacturer has verified compatibility of roofing system components, including but not limited to: Roofing membrane, flashing sheets, adhesives, and sealants.
- D. Warranties: Unexecuted sample copies of special warranties.
- E. Field Quality Control Reports:
 1. Inspection Reports: Reports of Roofing Inspector. Include weather conditions, description of work performed, tests performed, defective work observed, and corrective actions taken to correct defective work.
 - a. Submit reports within 48 hours after inspection.
- F. Manufacturer's Instructions: Submit copy of manufacturer's written installation instructions for specified roofing system.

1.6 CLOSEOUT SUBMITTALS

- A. Maintenance Data: To include in maintenance manuals.
- B. Executed copies of warranties.

1.7 QUALITY ASSURANCE

- A. Installer Qualifications: An employer of workers trained and certified by manufacturer, including a full-time on-site supervisor with a minimum of five years' experience installing products comparable to those specified, able to communicate verbally with Contractor, Architect, and employees, and qualified by the manufacturer to install manufacturer's product and furnish warranty of type specified.

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- B. Manufacturer Qualifications: Approved manufacturer with roofing systems comparable to that specified for this Project, with minimum five years' experience in manufacture of thermoplastic roof membrane products in successful use in similar applications.
- C. Roofing Inspector Qualifications: A technical representative of manufacturer not engaged in the sale of products and experienced in the installation and maintenance of the specified roofing system, qualified to perform roofing observation and inspection specified in Field Quality Control Article, to determine Installer's compliance with the requirements of this Project, and approved by the manufacturer to issue warranty certification. The Roofing Inspector shall be:
 - 1. An authorized full-time technical employee of the manufacturer.
- D. Manufacturer's Installation Instructions: Obtain and maintain on-site access to manufacturer's written recommendations and instructions for installation of products.

1.8 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.
 - 1. Protect stored liquid material from direct sunlight.
 - 2. 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.
 - 1. Store in a dry location.
 - 2. 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.

1.9 PROJECT / FIELD CONDITIONS

- A. Protect building, adjacent buildings, walkways, site improvements, exterior plantings, and landscaping from damage or soiling from roofing operations.
- B. Maintain access to existing walkways, corridors, and other adjacent occupied or used facilities.

CCAC BOYCE ROOF REPLACEMENT

- C. 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.
- D. Daily Protection: Coordinate installation of roofing so insulation and other components of roofing system not permanently exposed are not subjected to precipitation or left uncovered at the end of the workday or when rain is forecast.
 - 1. Provide tie-offs at end of each day's work to cover exposed roofing and insulation with a course of roofing sheet securely in place with joints and edges sealed, weathertight.
 - 2. Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing.
 - 3. Remove temporary plugs from roof drains at end of each day.
 - 4. Remove and discard temporary seals before beginning work on adjoining roofing.
- E. Owner will occupy portions of building immediately below roofing area. Conduct roofing so Owner's operations will not be disrupted. Provide Owner with not less than 72 hours' notice of activities that may affect Owner's operations.

1.10 WARRANTY

- A. Manufacturer's Warranty: Roof System Manufacturer's standard form in which Manufacturer agrees to repair or replace components of roofing system that fail in materials or workmanship within warranty period, as follows.
 - 1. Form of Warranty: Manufacturer's standard warranty form.
 - 2. Scope of Warranty: Work of this Section and including sheet metal details and termination details installed by the roof system Installer and approved by the Roof System Manufacturer.
 - 3. Warranty Period: 30 years from date of completion.
- B. Manufacturer Inspection Services: By manufacturer's technical representative, to report maintenance responsibilities to Owner necessary for preservation of Owner's warranty rights. The cost of manufacturer's inspections is included in the Contract Sum.
 - 1. Inspections to occur in following years: 2, 5, 10, 15, 20 and 25 following completion.
- C. Installer Warranty: Installer's warranty signed by Installer, as follows.
 - 1. Form of Warranty: Form acceptable to Roofing Manufacturer and Owner.
 - 2. Scope of Warranty: Work of this Section.
 - 3. Warranty Period: 2 years from date of completion.

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PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Basis of Design: The roof system specified in this Section is based upon products of Tremco CPG Inc, Beachwood, OH, (800) 562-2728, www.tremcoroofing.com that are named in other Part 2 articles. Provide specified products.
- B. Source Limitations: Obtain components for roofing system from same manufacturer as membrane roofing or manufacturer approved by membrane roofing manufacturer.

2.2 PERFORMANCE REQUIREMENTS

- A. General Performance: Installed membrane 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. Membrane roofing and base flashings shall remain watertight.
 - 1. Accelerated Weathering: Roofing system shall withstand 10,000 hours of exposure when tested according to ASTM G152, ASTM G154, or ASTM G155.
 - 2. Impact Resistance: Roof membrane shall resist impact damage when tested according to ASTM D3746/D3746M, ASTM D4272/D4272M, or the "Resistance to Foot Traffic Test" in FM Approvals 4470.
- B. Material Compatibility: Roofing system materials to be compatible with one another and adjacent materials under conditions of service and installation required, as demonstrated by roofing membrane manufacturer based on testing and field experience.
- C. Roofing System Design: Provide membrane roofing system that is identical to systems that have been successfully tested by a qualified testing and inspecting agency in accordance with ANSI/FM 4474, UL 580, or UL 1897, and to resist uplift pressures calculated in accordance with ASCE-7 and applicable code.
 - 1. Calculate pressures for Allowable Stress Design, including a safety factor multiplier of 2.
 - 2. Minimum Design Uplift Pressure Resistance: Provide a roof system tested to minimum 1-105, including a minimum 2X safety factor, unless greater uplift pressure resistance is required according to ASCE-7 and applicable code.
 - a. Mechanically-fastened Roofing System Components: Provide not less than 1 fastener per 2.0 sq. ft. (0.19 m²), increase fastener density as necessary to comply with wind uplift resistance pressure requirements.
 - b. Prescriptive Enhancements: Comply with requirements and limitation of FM DS 1-29, for Zone 2 (Perimeter) and Zone 3 Corners, as required to achieve uplift resistance for each Zone according to applicable code, but not less than 90 psf.

CCAC BOYCE ROOF REPLACEMENT

- D. SPRI Wind Design Standard: Manufacture and install copings and roof edge flashings tested according to ANSI/SPRI/FM 4435 ES-1, capable of resisting design pressures calculated in accordance with ASCE-7 and applicable code.
- E. Flashings and Fastening: Provide base flashings, perimeter flashings, detail flashings and component materials and installation techniques that comply with requirements and recommendations of the following:
 - 1. Roofing system manufacturer's details and recommendations.
 - 2. NRCA Roofing Manual for construction details and recommendations.
 - 3. SMACNA Architectural Sheet Metal Manual for construction details.
 - 4. Comply with requirements of Division 07 Section "Sheet Metal Flashing and Trim" and Roof Specialties".
- F. Exterior Fire-Test Exposure: ASTM E108 or UL 790, Class A; for application and roof slopes indicated, as determined by testing identical membrane roofing materials by a qualified testing agency. Materials shall be identified with appropriate markings of applicable testing agency.

2.3 MATERIALS, GENERAL

- A. Material Compatibility: Roofing materials shall be compatible with one another and adjacent materials under conditions of service and application required, as demonstrated by roof membrane manufacturer based on testing and field experience.

2.4 THERMOPLASTIC MEMBRANE MATERIALS

- A. KEE Roof Membrane:
 - 1. Thermoplastic Ketone Ethylene Ester (KEE) coated polyester fabric-reinforced sheet, that meets and exceeds ASTM D6754.
 - a. Basis of design product: Tremco, TremPly KEE Single Ply Roof Membrane.
 - b. Breaking Strength, minimum, ASTM D751: Machine direction, 500 lbf/in (87 kN/m); Cross machine direction, 400 lbf/in (70 kN/m).
 - c. Tear Strength, minimum, ASTM D751: Machine direction, 120 lbf (162 N/m); Cross machine direction, 140 lbf (190 N/m).
 - d. Elongation at Break, ASTM D751: 20 percent.
 - e. Dynamic Impact/Puncture Resistance, ASTM D5635: 30 J, minimum.
 - f. Minimum Membrane Thickness, nominal, less backing, ASTM D751: 60 mils (1.5 mm).
 - g. Accelerated Weathering, ASTM G155 and ASTM G154: Not greater than 15,000 hr., no cracking or crazing.

CCAC BOYCE ROOF REPLACEMENT

- h. Abrasion Resistance, ASTM D3389: Not greater than 2,000 cycles, H-18 wheel, 1,000 g load.
- i. Color: White.
- j. Solar Reflectance Index (SRI), ASTM E1980: 110 (White, initial), 86 (White, 3-yr aged).

2.5 BASE FLASHING MATERIALS

- A. Sheet Flashing: Manufacturer's standard, smooth-backed, sheet flashing of same material, type, reinforcement, thickness and color as KEE roof membrane.

2.6 ADHESIVE MATERIALS

- A. General: Adhesive and sealant materials recommended by roofing system manufacturer for intended use and compatible with roofing membrane.

- 1. Liquid-type auxiliary materials shall comply with VOC limits of authorities having jurisdiction.
- 2. Adhesives and sealants that are not on the exterior side of weather barrier shall comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):
 - a. Plastic Foam Adhesives: 50 g/L.
 - b. Single-Ply Roof Membrane Sealants: 450 g/L.
 - c. Nonmembrane Roof Sealants: 300 g/L.
 - d. Sealant Primers for Nonporous Substrates: 250 g/L.
 - e. Sealant Primers for Porous Substrates: 775 g/L.
- 3. Membrane Bonding Adhesive:
 - a. Bonding adhesive, solvent based fast drying, VOC-compliant, for bonding KEE smooth-backed single ply membranes and flashings to substrates.
 - 1) Basis of design product: Tremco, TremPly KEE LV Bonding Adhesive.
 - 2) VOC, maximum, ASTM D 3960: 200 g/L.
- 4. Flashing Membrane Adhesive:
 - a. Same product as membrane adhesive.
 - b. Bonding adhesive, solvent based fast drying, VOC-compliant, for bonding KEE smooth-backed single ply membranes and flashings to substrates.
 - 1) Basis of design product: Tremco, TremPly KEE LV Bonding Adhesive.

CCAC BOYCE ROOF REPLACEMENT

- 2) VOC, maximum, ASTM D 3960: 200 g/L.

2.7 AUXILIARY ROOFING MATERIALS

- A. General: Auxiliary membrane roofing materials recommended by roofing system manufacturer for intended use, and compatible with membrane roofing.
- B. Prefabricated Flashings: As recommended by roof membrane manufacturer, for pipe, penetration and miscellaneous flashings.
- C. Fasteners, General: Factory-coated steel fasteners and metal plates meeting corrosion-resistance provisions in FM 4470, designed for fastening roofing components to substrate, tested by manufacturer for required pullout strength, and acceptable to roofing system manufacturer.
 1. Use fasteners of type listed in manufacturer's tested assembly for required wind uplift resistance.
- D. Metal Termination Bars: Manufacturer's standard, predrilled stainless-steel or aluminum bars, approximately 1 by 1/8 inch (25 mm by 3 mm) thick; with anchors.
- E. Joint Sealant: Elastomeric joint sealant compatible with roofing materials, with movement capability appropriate for application.
 1. Joint Sealant, Polyurethane: ASTM C920, Type S, Grade NS, Class 50 single-component moisture curing sealant, formulated for compatibility and use in dynamic and static joints; paintable.
 - a. Basis of design product: Tremco, TremSEAL Pro.
 - b. Volatile Organic Compounds (VOC), maximum, ASTM D3960: 40 g/L.
 - c. Hardness, Shore A, ASTM C661: 40.
 - d. Adhesion to Concrete, ASTM C794: 35 pli.
 - e. Tensile Strength, ASTM D412: 350 psi (2410 kPa).
 - f. Color: Limestone.
- F. Prefabricated Pipe Flashings: As recommended by roof membrane manufacturer.
- G. 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, as recommended by roofing system manufacturer.

2.8 ROOF INSULATION AND INSULATION ACCESSORIES

- A. Roof Insulation, General: Preformed roof insulation boards manufactured or approved by roofing manufacturer, selected from insulation manufacturer's standard sizes, suitable for application, and of thicknesses indicated. Provide roof insulation

CCAC BOYCE ROOF REPLACEMENT

accessories recommended by insulation manufacturer for intended use and compatible with roofing.

1. Tapered Insulation: Provide factory-tapered insulation boards fabricated to slope of 1/8 inch per 12 inches (1:96) unless otherwise indicated.
2. Provide preformed saddles, crickets, tapered edge strips, and other insulation shapes where indicated for sloping to drain. Fabricate to slopes indicated, not less than two times the roof slope.

B. Roof Insulation:

1. Board Insulation, Polyisocyanurate: CFC- and HCFC- free, with recycled content glass-fiber mat facer on both major surfaces, ASTM C1289 Type II Class 1.
 - a. Basis of design product: Tremco, Trisotech Insulation.
 - b. Compressive Strength, ASTM D1621: Grade 2: 20 psi (138 kPa).
 - c. Conditioned Thermal Resistance at 75 deg. F (24 deg. C): 14.4 at 2.5 inches (50.8 mm) thick.

C. Insulation Cover Board:

1. Gypsum panel, glass-mat-faced, primed, ASTM C1177/C1177M.
 - a. Basis of design product: GP Gypsum DensDeck Prime.
 - b. Thickness: 1/2 inch (12 mm).

D. Roof Insulation and Cover Board Adhesive:

1. Urethane adhesive, bead-applied, low-rise two-component solvent-free low odor, formulated to adhere roof insulation to substrate.
 - a. Basis of design product: Tremco, Low Rise Foam Insulation Adhesive.
 - b. Flame Spread Index, ASTM E84: 10.
 - c. Smoke Developed Index, ASTM E84: 30.
 - d. Volatile Organic Compounds (VOC), maximum, ASTM D3960: 0 g/L.
 - e. Tensile Strength, minimum, ASTM D412: 250 psi (1720 kPa).
 - f. Peel Adhesion, minimum, ASTM D903: 17 lbf/in (2.50 kN/m).
 - g. Flexibility, 70 deg. F (39 deg. C), ASTM D816: Pass.

E. Tapered Edge Strips: ASTM C208, Type II, Grade 1, cellulosic-fiber insulation board.

CCAC BOYCE ROOF REPLACEMENT

2.9 WALKWAY MATERIALS

A. Walkway Material:

1. Protection walkway roll, reinforced KEE membrane roll with diamond-tread, slip-resistant surface, fabricated for heat welding to compatible KEE membrane surface.
 - a. Basis of design product: Tremco, TremPly KEE Protection Walkway Roll.
 - b. Roll Size: 30 inches by 100 ft (760 mm by 25.4 m).
 - c. Thickness: 0.060 inch (1.5 mm).
 - d. Breaking strength: 450 lbs (77 kN/m).
 - e. Color: Yellow.

PART 3 - EXECUTION

3.1 EXAMINATION

- #### A. Examine substrates, areas, and conditions, with Installer present, for compliance with the following requirements and other conditions affecting performance of roofing system:
1. Verify that roof openings and penetrations are in place and curbs are set and braced and that roof drain bodies are securely clamped in place.
 2. Verify that wood cants, blocking, curbs, and nailers are securely anchored to roof deck at penetrations and terminations and that nailers match thicknesses of insulation.
 - a. Verify that perimeter nailers for copings and roof edge flashings are securely fastened according to ANSI/SPRI/FM 4435 ES-1, and applicable code, to resist uplift pressures.
 3. Verify that substrate is sound and dry.
 4. Steel Roof Deck: Refer to Division 05 "Steel Decking" Section.
 - a. Verify that deck is securely fastened and properly supported with no projecting fasteners and with no adjacent units in excess of 1/16 inch (1.6 mm) out of plane relative to adjoining deck.
 5. Existing Concrete Roof Deck:
 - a. Verify that concrete substrate is visibly dry and free of moisture. Test for moisture according to ASTM F2659 or other recognized test method utilizing non-destructive, electronic moisture meter.
 - b. Verify adhesion of new roofing components to concrete.

CCAC BOYCE ROOF REPLACEMENT

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

3.2 PREPARATION

- A. Remove existing roofing and protect existing building in accordance with requirements of Division 07 Section "Preparation for Re-Roofing."
- B. Clean substrate of dust, debris, moisture, and other substances detrimental to roofing installation according to roofing system manufacturer's written instructions. Remove sharp projections.
- C. 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.
- D. Protect existing roofing system that is indicated to remain, and adjacent portions of building and building equipment.
 - 1. Limit traffic and material storage to areas of existing roofing membrane that have been protected.
 - 2. Maintain temporary protection and leave in place until replacement roofing has been completed.
- E. Verify that rooftop utilities and service piping affected by the Work have been shut off before commencing Work.
- F. Shut down air intake equipment in the vicinity of the Work in coordination with the Owner. Cover air intake louvers before proceeding with roofing work that could affect indoor air quality or activate smoke detectors in the ductwork.
- G. Concrete Surface Priming: Prime surface of concrete deck with manufacturer's recommended primer at manufacturer's recommended application rate.

3.3 INSTALLATION, GENERAL

- A. Install roofing system in accordance with manufacturer's written instructions and approved details.
- B. Install wood cants, blocking, curbs, and nailers in accordance with requirements of Division 06 Section "Miscellaneous Rough Carpentry."
- C. Cooperate with testing agencies engaged or required to perform services for installing roofing system.

3.4 ROOFING INSTALLATION DETAILS

- A. Install roofing system in accordance with the following NRCA Manual Plates and NRCA recommendations; modify as required to comply with requirements of FM references indicated:
 - 1. Base Flashing at Parapet Wall: Plates TP-1 and TP-1S.

CCAC BOYCE ROOF REPLACEMENT

2. Base Flashing and Counterflashing at Parapet Wall: Plates TP-5 and TP-5S.
3. Base Flashing and Counterflashing at Parapet Wall, Movement Joint: Plates TP-6 and TP-6S.
4. Base and Surface-mounted Counterflashing: Plates TP-4 and TP-4S.
5. Perimeter Edge, Raised: Plates TP-2 and TP-2S.
6. Perimeter Edge, Embedded Edge: Plates TP-3 and TP-3S.
7. Perimeter Edge, Draining: Plates TP-3A and TP-3AS.
8. Options for Perimeter Base Securement (Roof-to-Wall and Roof-to-Curb Intersections): Single Ply Table 7.1.
9. Options for Perimeter Base Securement (Roof-to-Wall and Roof-to-Curb Intersections): Single Ply Table 7.2.
10. Guide for Sheet Metal Fascia Edges for Thermoset and Thermoplastic Membrane: Single-Ply – Table 1.
11. Scupper, Raised: Plates TP-21 and TP-21S.
12. Gutter at Draining Edge: Plates TP-22 and TP-22S.
13. Expansion Joint, with metal cover: Plates TP-7 and TP-7S.
14. Expansion Joint, with premanufactured cover: Plates TP-7A and TP-7AS.
15. Curb Detail at Rooftop HVAC Units, Premanufactured: Plates TP-12 and TP-12S.
16. Curb Detail at Rooftop HVAC Units, Job-Built, Wood: Plates TP-13 and TP-13S.
17. Curb Detail at Skylight, Roof Hatch, and Smoke Vents: Plates TP-14 and TP-14S.
18. Penetration, Structural Member: Plates TP-15 and TP-15S.
19. Penetration, Sheet Metal Enclosure: Plates TP-16 and TP-16S.
20. Penetration, Stack Flashing: Plates TP-17 and TP-17S.
21. Penetration, Plumbing Vent: Plates TP-18 and TP-18S.
22. Penetration, Plumbing Vent, Premanufactured Boot: Plates TP-18A and TP-18AS.
23. Penetration, Pocket: Plates TP-19 and TP-19S.
24. Roof Drain: Plates TP-20 and TP-20S.
25. Guide for Clearances between Pipes / Walls / Curbs – Table 4.
26. Guide for Crickets and Saddles – Table 5.

CCAC BOYCE ROOF REPLACEMENT

27. Guide for Edge Scuppers with Tapered Saddles - Table 6.

3.5 INSULATION AND INSULATION ACCESSORIES INSTALLATION

- A. Comply with roofing manufacturer's and insulation manufacturer's written instructions for installing roof insulation.
- B. Coordinate installing membrane roofing system components so insulation is not exposed to precipitation or left exposed at the end of the workday.
- C. Tapered Insulation and Crickets: Install tapered insulation under area of roofing to conform to slopes indicated.
 - 1. Where crickets are indicated or required to provide positive slope to drain, make slope of crickets minimum of two times the roof slope, not less than 1/4 inch in 12 inches (1:48).
- D. 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.
- E. Install insulation under area of roofing to achieve required thickness. Where overall insulation thickness is 2.7 inches (70 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. Install insulation at thickness indicated on drawings.
 - 2. Flat Insulation System on Sloped Roof Deck: Install insulation at minimum thickness as follows:
 - a. Minimum total thickness of Continuous Insulation: 5.2 inches.
 - 1) Minimum thickness of base layer: 2.6 inches.
 - 2) Minimum thickness of each subsequent layer: 2.6 inches.
 - b. Minimum Continuous Insulation R-value: Not less than: Not less than 30.
 - 3. Tapered Insulation System for Flat Roof Deck: Install insulation as follows:
 - a. Minimum total thickness of Continuous Insulation: 4.5 inches.
 - 1) Minimum thickness of base layer: 4.5 inches.
 - b. Average Insulation R-value: Not less than Insert R-value required 30.
 - 4. Insulation Drain Sumps: Tapered insulation sumps, not less than 4 by 4 ft. (1,200 by 1,200 mm), sloped to roof drain.

CCAC BOYCE ROOF REPLACEMENT

- a. Sump to maximum depth of not more than 1 inch (25 mm) less than the Project-stipulated continuous insulation thickness based upon code requirements.
 - 1) Where Average Insulation R-value is permitted, maintain minimum 1 inch (25 mm) insulation thickness at low point.
 - F. Trim surface of insulation where necessary at roof drains so completed surface is flush and does not restrict flow of water.
 - G. Install tapered edge strips at perimeter edges of roof that do not terminate at vertical surfaces.
 - H. Insulation Installation Method:
 - 1. Mechanically Fastened Insulation Application Method: Install each layer of insulation and secure to deck using mechanical fasteners specifically designed and sized for fastening specified board-type roof insulation to deck type.
 - a. Fasten insulation to resist uplift pressure at corners, perimeter, and field of roof.
 - I. Cover Board Installation:
 - 1. Comply with roofing system and cover board manufacturer's written installation instructions.
 - 2. 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. Tape joints if required by roofing manufacturer.
 - a. Trim cover board neatly to fit around penetrations and projections, and to fit tight to intersecting sloping roof decks.
 - b. At internal roof drains, conform to slope of drain sump.
 - c. Trim cover board, so that water flow is unrestricted.
 - d. Cut and fit cover board tight to nailers, projections, and penetrations.
 - 3. Adhere cover boards to resist uplift pressure at corners, perimeter, and field of roof.
 - a. Set cover boards in ribbons of bead-applied insulation adhesive, firmly pressing and maintaining cover in place.
- 3.6 ADHERED MEMBRANE ROOFING INSTALLATION
- A. Adhere membrane roofing over area to receive roofing and install according to membrane roofing system manufacturer's written instructions.

CCAC BOYCE ROOF REPLACEMENT

- B. Start installation of membrane roofing in presence of membrane roofing system manufacturer's technical personnel.
- C. Accurately align membrane roofing and maintain uniform side and end laps of minimum dimensions required by manufacturer. Stagger end laps.
- D. Solvent-Based Bonding Adhesive: Apply to substrate and underside of membrane roofing at rate required by manufacturer and allow adhesive to become tacky before installing membrane roofing; do not allow adhesive to fully dry. Roll membrane into adhesive. Do not apply adhesive to splice area of membrane.
- E. In addition to adhering, mechanically fasten membrane roofing securely at terminations, penetrations, and perimeter of roofing.
- F. Apply membrane roofing with side laps shingled with slope of roof deck where possible.
- G. Welded Seams: Clean seam areas, overlap membrane roofing, and hot-air weld side and end laps of membrane 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 membrane.
 - 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 does not comply with requirements.
- H. Spread sealant bed over deck drain flange at roof drains and securely seal membrane roofing in place with clamping ring.
- I. Install membrane roofing and auxiliary materials to tie in to existing roofing to maintain weathertightness of transition.

3.7 BASE FLASHING INSTALLATION

- A. Membrane Flashings: Install sheet flashings and preformed flashing accessories and adhere to substrates according to membrane roofing system manufacturer's written instructions.
 - 1. 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.
 - 2. Flash penetrations and field-formed inside and outside corners with cured or uncured sheet flashing.
 - 3. 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.
 - 4. Seal top termination of base flashing with a metal termination bar and a continuous bead of joint sealant.

CCAC BOYCE ROOF REPLACEMENT

- B. Extend base flashing up walls or parapets a distance of 8-12 inches (200-300 mm) above roofing and 6 inches (150 mm) onto field of roofing, unless otherwise recommended by roofing manufacturer.

- 1. Comply with roofing manufacturer's details.

3.8 WALKWAY INSTALLATION

- A. Walkways, General: Install walkways according to roofing manufacturer's written instructions.

- 1. Install walkways at following locations:
 - a. Where indicated on Drawings.
 - b. Top and bottom of each roof access ladder.

- B. 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.

3.9 FIELD QUALITY CONTROL

- A. Roofing Inspector: Contractor shall engage a qualified roofing inspector to perform roof tests and inspections and to prepare test reports.

- 1. Engage a qualified roofing inspector for a minimum of 15 full-time days on site to perform roof tests and inspections and to prepare start up, interim, and final reports. Roofing Inspector's quality assurance inspections shall comply with applicable criteria established in NRCA's "Quality Control and Quality-assurance Guidelines for the Application of Membrane Roofing Systems."

- B. Final Roof Inspection: Arrange for roofing system manufacturer's technical personnel to inspect roofing installation on completion.

- 1. Notify Architect 48 hours in advance of date and time of inspection.

- C. Repair or remove and replace components of roofing system where inspections indicate that they do not comply with specified requirements.

- 1. Additional inspections, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.10 PROTECTING AND CLEANING

- A. Protect membrane roofing system from damage and wear during remainder of construction period. When remaining construction will not affect or endanger roofing, inspect roofing for deterioration and damage, describing its nature and extent in a written report, with copies to Architect.

- B. Correct deficiencies in or remove membrane roofing system that does not comply with requirements; repair substrates; and repair or reinstall membrane roofing system to a

CCAC BOYCE ROOF REPLACEMENT

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 075416

CCAC BOYCE ROOF REPLACEMENT

SECTION 076200 - SHEET METAL FLASHING AND TRIM

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:

1. Miscellaneous sheet metal flashing and trim.
 - a. Roof drainage sheet metal fabrications.
 - b. Low-slope roof sheet metal fabrications.

B. Related Requirements:

1. Division 07 roofing section for installing sheet metal flashing and trim integral with roofing and for related warranty requirements.
2. Division 22 Section "Roof Drains" for roof drains incorporated in roof system.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each manufactured product and accessory.

B. Shop Drawings: For sheet metal flashing and trim.

1. Include plans, elevations, sections, and attachment details.
2. Include identification of material, thickness, weight, and finish for each item and location in Project.
3. Indicate details meet requirements of SMACNA and NRCA required by this Section.
4. Detail formed flashing and trim at scale of not less than 1-1/2 inches per 12 inches (1:10).

C. Samples for Verification: For each type of exposed finish.

1.3 INFORMATIONAL SUBMITTALS

- A. Contractor's Product Certificates: For each type of coping and roof edge flashing that is ANSI/SPRI/FM 4435 ES-1 tested.

CCAC BOYCE ROOF REPLACEMENT

1.4 CLOSEOUT SUBMITTALS

- A. Warranties: Manufacturer's executed warranty documents. Submit prior to acceptance of Work.

1.5 QUALITY ASSURANCE

- A. Fabricator Qualifications: Employs skilled workers who custom fabricate sheet metal flashing and trim similar to that required for this Project and whose products have a record of successful in-service performance.
 - 1. For copings and roof edge flashings that are ANSI/SPRI/FM 4435 ES-1 tested; fabrication shop shall be listed as able to fabricate required details as tested and approved.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Do not store sheet metal flashing and trim materials in contact with other materials that might cause staining, denting, or other surface damage. Store sheet metal flashing and trim materials away from uncured concrete and masonry.
- B. Protect strippable protective covering on sheet metal flashing and trim from exposure to sunlight and high humidity, except to extent necessary for period of sheet metal flashing and trim installation.

1.7 WARRANTY

- A. Refer to warranty requirements of Division 07 roofing section for terms and conditions of warranties covering work of this Section.
- B. Special Warranty on Finishes: Manufacturer agrees to repair finish or replace sheet metal flashing and trim that shows evidence of deterioration of factory-applied finishes within specified warranty period.
 - 1. Exposed Panel Finish: Deterioration includes, but is not limited to, the following:
 - a. Color fading more than 5 Hunter units when tested according to ASTM D2244.
 - b. Chalking in excess of a No. 8 rating when tested according to ASTM D4214.
 - c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
 - 2. Finish Warranty Period: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. General: Sheet metal flashing and trim assemblies shall withstand wind loads, structural movement, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in

CCAC BOYCE ROOF REPLACEMENT

construction. Completed sheet metal flashing and trim shall not rattle, leak, or loosen, and shall remain watertight.

- B. Sheet Metal Standard for Flashing and Trim: Comply with NRCA's "The NRCA Roofing Manual" and SMACNA's "Architectural Sheet Metal Manual" requirements for dimensions and profiles shown unless more stringent requirements are indicated.
- C. Flashings and Fastening: Comply with requirements of Division 07 roofing sections. Provide base flashings, perimeter flashings, detail flashings and component materials and installation techniques that comply with requirements and recommendations of the following:
 - 1. NRCA: "The NRCA Roofing Manual" for construction details and recommendations.
- D. SPRI Wind Design Standard: Manufacture and install copings and roof edge flashings tested in accordance with ANSI/SPRI/FM 4435 ES-1, to resist pressures calculated according to ASCE-7 and applicable code.
 - 1. Manufacturer and install gutters that are used to secure perimeter edges of roof membrane on low-slope roof (less than 2:12 slope) built-up, modified bitumen, and single ply roofs tested in accordance with ANSI/SPRI GT-1, to resist wind loads.
- E. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes to prevent buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects.

2.2 SHEET METALS

- A. General: Protect mechanical and other finishes on exposed surfaces from damage by applying strippable, temporary protective film before shipping.
- B. Aluminum Sheet: ASTM B209/B209M, alloy as standard with manufacturer for finish required, with temper as required to suit forming operations and performance required; with smooth, flat surface.
 - 1. Basis of Design Product: Tremco, TremLock Sheet.
 - 2. Exposed Coil-Coated Finish:
 - a. Two-Coat Fluoropolymer: AAMA 2605. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
 - b. Color: As selected from manufacturer's full range.
 - 3. Concealed Finish: Pretreat with manufacturer's standard white or light-colored acrylic or polyester backer finish, consisting of prime coat and wash coat with minimum total dry film thickness of 0.5 mil (0.013 mm).

CCAC BOYCE ROOF REPLACEMENT

- C. PVC/KEE-Coated Steel Sheet: Provide zinc-coated (galvanized) steel sheet according to ASTM A653/A653M, G90 (Z275) coating designation; prefinished with non-reinforced PVC/KEE membrane; for formed flashings to receive heat-weldable, compatible, single-ply membrane roofing specified in Division 07 Section "Ketone Ethylene Ester (KEE) Roofing".
 - 1. Basis-of-Design Product: Tremco, TremPly KEE Coated Metal.
 - 2. Sheet Metal Thickness: Zinc-coated steel, nominal 0.034-inch/22 ga (0.85-mm) thickness.
 - 3. Finish: Laminated with 0.020 inch/20 mil (0.50 mm) thick, unreinforced PVC/KEE membrane on exposed side and finished with clear acrylic coating on non-exposed side.
 - a. Color: Match color of roof membrane specified in Division 07 Section "Ketone Ethylene Ester (KEE) Roofing."
- D. Stainless-Steel Sheet: ASTM A240/A240M or ASTM A666, Type 304, dead soft, fully annealed; with smooth, flat surface.
 - 1. Finish: ASTM A480/A480M, No. 2B (bright, cold rolled).
- E. Lead Sheet: ASTM B749 lead sheet.

2.3 UNDERLAYMENT MATERIALS

- A. Self-Adhering, High-Temperature Underlayment: Self-adhering, cold-applied, sheet underlayment, minimum 30 mils (0.76 mm) thick, consisting of slip-resistant, polyethylene-film top surface laminated to a layer of SBS-modified asphalt adhesive, with release-paper backing. Provide primer when recommended by underlayment manufacturer.
 - 1. Basis of design product: Self-Adhering, High-Temperature Underlayment.
 - 2. Permeance, maximum, ASTM E 96: 0.05 perms.
 - 3. Thermal Stability, ASTM D 1970: Stable after testing at 240 deg F (116 deg C).
 - 4. Low Temperature Flexibility, ASTM D 1970: Unaffected, -20 deg. F (29 deg C).

2.4 MISCELLANEOUS MATERIALS

- A. General: Provide materials and types of fasteners, solder, protective coatings, sealants, and other miscellaneous items as required for complete sheet metal flashing and trim installation and as recommended by manufacturer of primary sheet metal or manufactured item unless otherwise indicated.
- B. Fasteners: Wood screws, annular threaded nails, self-tapping screws, self-locking rivets and bolts, and other suitable fasteners designed to withstand design loads and recommended by manufacturer of primary sheet metal or manufactured item.

CCAC BOYCE ROOF REPLACEMENT

1. General: Blind fasteners or self-drilling screws, gasketed, with hex-washer head.
 - a. Exposed Fasteners: Heads matching color of sheet metal using plastic caps or factory-applied coating. Provide metal-backed EPDM or PVC sealing washers under heads of exposed fasteners bearing on weather side of metal.
 - b. Blind Fasteners: High-strength aluminum or stainless-steel rivets suitable for metal being fastened.
 - c. Spikes and Ferrules: Same material as gutter; with spike with ferrule matching internal gutter width.
 2. Fasteners for Aluminum Sheet: Aluminum or Series 300 stainless steel.
 3. Fasteners for Zinc-Coated (Galvanized) and Aluminum-Zinc Alloy-Coated Steel Sheet: Series 300 stainless steel or hot-dip galvanized steel according to ASTM A153/A153M or ASTM F2329.
 4. Fasteners for Stainless-Steel Sheet: Series 300 stainless steel.
- C. Solder:
1. For Stainless Steel: ASTM B32, Grade Sn60 or Grade Sn96, with acid flux of type recommended by stainless steel sheet manufacturer.
- D. Sealant Tape: Pressure-sensitive, 100 percent solids, polyisobutylene compound sealant tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape 1/2 inch (13 mm) wide and 1/8 inch (3 mm) thick.
- E. Joint Sealant: Elastomeric joint sealant compatible with roofing materials and sheet metal fabrications, with movement capability appropriate for application.
1. Joint Sealant, Polyurethane: ASTM C920, Type S, Grade NS, Class 50 single-component moisture curing sealant, formulated for compatibility and use in dynamic and static joints; paintable.
 - a. Basis of design product: Tremco, TremSEAL Pro.
 - b. Volatile Organic Compounds (VOC), maximum, ASTM D3960: 40 g/L.
 - c. Hardness, Shore A, ASTM C661: 40.
 - d. Adhesion to Concrete, ASTM C794: 35 pli.
 - e. Tensile Strength, ASTM D412: 350 psi (2410 kPa).
 - f. Color: Limestone.
- F. Sealant Tape: Flexible, butyl based sealant tape used to provide a gasket between surfaces to be joined by mechanical attachment, and for lap sealing between panels between similar and dissimilar materials.

CCAC BOYCE ROOF REPLACEMENT

- G. Butyl Sealant: Single-component, low VOC, permanently flexible butyl rubber mastic.
- H. Bituminous Coating: Cold-applied asphalt emulsion according to ASTM D1187.
- I. Asphalt Roofing Cement: ASTM D4586, asbestos free, of consistency required for application.
 - 1. As specified in Division 07 roofing section.
 - 2. Roof Cement, Asphalt-Based: ASTM D4586, Type II, Class I, fibrated roof cement formulated for use in installation and repair of asphalt ply and modified bitumen roofing plies and flashings; UL-classified for fire resistance.
 - a. Basis of design product: Tremco, ELS.
 - b. Volatile Organic Compounds (VOC), maximum, ASTM D3960: 190 g/L.
 - c. Non-Volatile Matter, ASTM D4586: 85 percent.
 - d. Resistance to sag ASTM D4586: 1/8 in. (3 mm).
- J. Reglets: Units of type, material, and profile required, formed to provide secure interlocking of separate reglet and counterflashing pieces, and compatible with flashing indicated [with factory-mitered and -welded corners and junctions] [and] [with interlocking counterflashing on exterior face, of same metal as reglet].
 - 1. Material: Aluminum, 0.032 inch (0.81 mm) thick.
 - 2. Surface-Mounted Type: Provide with slotted holes for fastening to substrate, with neoprene or other suitable weatherproofing washers, and with channel for sealant at top edge.
 - 3. Concrete Type: Provide temporary closure tape to keep reglet free of concrete materials, special fasteners for attaching reglet to concrete forms, and guides to ensure alignment of reglet section ends.
 - 4. Masonry Type: Provide with offset top flange for embedment in masonry mortar joint.
 - 5. Accessories:
 - a. Flexible-Flashing Retainer: Provide resilient plastic or rubber accessory to secure flexible flashing in reglet where clearance does not permit use of standard metal counterflashing or where Drawings show reglet without metal counterflashing.
 - b. Counterflashing Wind-Restraint Clips: Provide clips to be installed before counterflashing to prevent wind uplift of counterflashing's lower edge.
 - 6. Finish: With manufacturer's standard color coating.

CCAC BOYCE ROOF REPLACEMENT

2.5 FABRICATION, GENERAL

- A. General: Custom fabricate sheet metal flashing and trim to comply with details shown and recommendations in cited sheet metal standard that apply to design, dimensions, geometry, metal thickness, and other characteristics of item required. Fabricate sheet metal flashing and trim in shop to greatest extent possible.
 - 1. Fabricate sheet metal flashing and trim in thickness or weight needed to comply with performance requirements, but not less than that specified for each application and metal.
 - 2. Obtain field measurements for accurate fit before shop fabrication.
 - 3. Form sheet metal flashing and trim to fit substrates without excessive oil canning, buckling, and tool marks; true to line, levels, and slopes; and with exposed edges folded back to form hems.
 - 4. Conceal fasteners and expansion provisions where possible. Do not use exposed fasteners on faces exposed to view.
- B. Fabrication Tolerances: Fabricate sheet metal flashing and trim that is capable of installation to a tolerance of 1/4 inch in 20 feet (6 mm in 6 m) on slope and location lines indicated on Drawings and within 1/8-inch (3-mm) offset of adjoining faces and of alignment of matching profiles.
- C. Expansion Provisions: Form metal for thermal expansion of exposed flashing and trim.
 - 1. Form expansion joints of intermeshing hooked flanges, not less than 1 inch (25 mm) deep, filled with butyl sealant concealed within joints.
 - 2. Use lapped expansion joints only where indicated on Drawings.
- D. Sealant Joints: Where movable, nonexpansion-type joints are required, form metal to provide for proper installation of elastomeric sealant according to cited sheet metal standard.
- E. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal.
- F. Fabricate cleats and attachment devices of sizes as recommended by cited sheet metal standard for application, but not less than thickness of metal being secured.
- G. Seams, Soldered: Fabricate nonmoving seams with flat-lock seams. Tin edges to be seamed, form seams, and solder.
- H. Seams: Fabricate nonmoving seams with flat-lock seams. Form seams and seal with elastomeric sealant unless otherwise recommended by sealant manufacturer for intended use. Rivet joints where necessary for strength.
- I. Seams for Uncoated Aluminum: Fabricate nonmoving seams with flat-lock seams. Form seams and seal with epoxy seam sealer. Rivet joints where necessary for strength.

CCAC BOYCE ROOF REPLACEMENT

- J. Do not use graphite pencils to mark metal surfaces.

2.6 ROOF-DRAINAGE SHEET METAL FABRICATIONS

- A. Downspouts: Closed-face rectangular complete with elbows, manufactured from the following exposed metal. Furnish with metal hangers, from same material as downspouts, and anchors.
 - 1. Material: Formed aluminum sheet, nominal 0.063-inch (1.60-mm) thick.
 - a. Finish: High-performance organic (PVDF) coating.
 - b. Color: As selected by Architect from manufacturer's full range.
- B. Conductor Heads: Manufactured conductor heads, each with flanged back and stiffened top edge, and of dimensions and shape indicated, complete with outlet tube that nests into upper end of downspout with exterior flange trim.
 - 1. Material: Formed aluminum sheet, nominal 0.063-inch (1.60-mm) thick.
 - a. Finish: High-performance organic (PVDF) coating.
 - b. Color: As selected by Architect from manufacturer's full range.
- C. Parapet Scuppers: Fabricated with closure flange trim to exterior, 4-inch- (100-mm-) wide wall flanges to interior, and base extending 4 inches (100 mm) beyond cant or tapered strip into field of roof.
 - 1. Material: Formed aluminum sheet, nominal 0.050-inch (1.27-mm) thick.

2.7 LOW-SLOPE ROOF SHEET METAL FABRICATIONS

- A. Roof Edge Flashing (Gravel Stop) and Fascia Cap: Fabricate in minimum 96-inch- (2.4-m-) long, but not exceeding 12-feet- (3.6-m-) long sections. Shop fabricate interior and exterior corners.
 - 1. Joint Style: Butted with expansion space and 6-inch- (150-mm-) wide, concealed splice plate.
 - 2. Fabricate from the Following Materials:
 - a. Aluminum: 0.050 inch (1.27 mm) thick.
- B. Roof Edge Flashing (Drip Edge): Fabricate in minimum 96-inch- (2.4-m-) long, but not exceeding 12-feet- (3.6-m-) long sections. Shop fabricate interior and exterior corners.
 - 1. Joint Style: Butted with expansion space and 6-inch- (150-mm-) wide, concealed splice plate.
 - 2. Fabricate from the Following Materials:
 - a. Aluminum: 0.050 inch (1.27 mm) thick.

CCAC BOYCE ROOF REPLACEMENT

- b. PVC/KEE Coated Galvanized Steel or Aluminum-Zinc Alloy-Coated Steel: 0.028 inch/24 ga. (0.71 mm) thick.
- C. Copings: Fabricate in minimum 96-inch- (2.4-m-) long, but not exceeding 12-feet- (3.6-m-) long, sections. Fabricate joint plates of same thickness as copings. Furnish with continuous cleats to support edge of external leg and drill elongated holes for fasteners on interior leg. Miter corners, fasten and seal watertight. Shop fabricate interior and exterior corners.
 - 1. Coping Profile: As indicated, or if not indicated, as selected from SMACNA Manual profiles.
 - 2. Joint Style: Butted with expansion space and 6-inch- (150-mm-) wide, concealed splice plate.
 - 3. Fabricate from the Following Materials:
 - a. Aluminum: 0.050 inch (1.27 mm) thick.
- D. Cleats for Roof Edge Flashing and Copings:
 - 1. Aluminum: 0.050 inch (1.27 mm) thick.
 - 2. Galvanized Steel or Aluminum-Zinc Alloy-Coated Steel: 0.034 inch/22 ga. (0.85 mm) thick.
- E. Expansion Joint Cover: Fabricate from the following materials:
 - 1. Aluminum: 0.050 inch (1.27 mm) thick.
 - 2. Stainless Steel: 0.025 inch/24 ga. (0.63 mm) thick.
- F. Counterflashing: Shop fabricate interior and exterior corners. Fabricate from the following materials:
 - 1. Aluminum: 0.040 inch (1.02 mm) thick.
- G. Slip Flashing: Fabricate from the following materials:
 - 1. Aluminum: 0.040 inch (1.02 mm) thick.
- H. Pitch Pocket: Fabricate from the following material:
 - 1. PVC/KEE Coated Galvanized Steel or Aluminum-Zinc Alloy-Coated Steel: (0.71 mm) 0.028 inch/24 ga. thick.
 - 2. Stainless Steel: 0.025 inch/24 ga. (0.63 mm) thick.
- I. Roof-Drain Flashing: Fabricate from the following materials:
 - 1. Lead: 4 lb/sq. ft. (19.53 kg/m²); (1.6 mm) 0.0625 inch thick.

CCAC BOYCE ROOF REPLACEMENT

PART 3 - EXECUTION

3.1 UNDERLAYMENT INSTALLATION

- A. Self-Adhering Sheet Underlayment: Install self-adhering sheet underlayment, wrinkle free. Prime substrate if recommended by underlayment manufacturer. Comply with temperature restrictions of underlayment manufacturer for installation; use primer for installing underlayment at low temperatures. Apply in shingle fashion to shed water, with end laps of not less than 6 inches (150 mm) staggered 24 inches (600 mm) between courses. Overlap side edges not less than 3-1/2 inches (90 mm). Roll laps and edges with roller. Cover underlayment within 14 days.
- B. Install slip sheet, wrinkle free, over underlayment before installing sheet metal flashing and trim.

3.2 INSTALLATION, GENERAL

- A. Install sheet metal flashing and trim to comply with details indicated and recommendations of cited sheet metal standard that apply to installation characteristics required unless otherwise indicated on Drawings.
 - 1. Space cleats not more than 12 inches (300 mm) apart. Attach each cleat with at least two fasteners. Bend tabs over fasteners.
 - 2. Do not use graphite pencils to mark metal surfaces.
- B. Metal Protection: Where dissimilar metals contact each other, or where metal contacts pressure-treated wood or other corrosive substrates, protect against galvanic action or corrosion by painting contact surfaces with bituminous coating or by other permanent separation as recommended by sheet metal manufacturer or cited sheet metal standard.
 - 1. Coat concealed side of uncoated-aluminum and stainless-steel sheet metal flashing and trim with bituminous coating where flashing and trim contact wood, ferrous metal, or cementitious construction.
 - 2. Underlayment: Where installing sheet metal flashing and trim directly on cementitious or wood substrates, install underlayment and cover with slip sheet.
- C. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at maximum of 10 feet (3 m) with no joints within 24 inches (600 mm) of corner or intersection.
 - 1. Form expansion joints of intermeshing hooked flanges, not less than 1 inch (25 mm) deep, filled with sealant concealed within joints.
 - 2. Use lapped expansion joints only where indicated on Drawings.
- D. Fasteners: Use fastener sizes that penetrate wood blocking or sheathing not less than 1-1/4 inches (32 mm) for nails and not less than 3/4 inch (19 mm) for wood screws.

CCAC BOYCE ROOF REPLACEMENT

- E. Conceal fasteners and expansion provisions where possible in exposed work and locate to minimize possibility of leakage. Cover and seal fasteners and anchors as required for a tight installation.
- F. Seal joints as required for watertight construction.
 - 1. Use sealant-filled joints unless otherwise indicated. Embed hooked flanges of joint members not less than 1 inch (25 mm) into sealant. Form joints to completely conceal sealant. When ambient temperature at time of installation is between 40 and 70 deg. F (4 and 21 deg. C), set joint members for 50 percent movement each way. Adjust setting proportionately for installation at higher ambient temperatures. Do not install sealant-type joints at temperatures below 40 deg. F (4 deg. C).
 - 2. Prepare joints and apply sealants to comply with
- G. Soldered Joints: Clean surfaces to be soldered, removing oils and foreign matter. Pre-tin edges of sheets with solder to width of 1-1/2 inches (38 mm); however, reduce pre-tinning where pre-tinned surface would show in completed Work.
 - 1. Do not solder metallic-coated steel and aluminum sheet.
 - 2. Do not use torches for soldering.

3.3 INSTALLATION OF ROOF-DRAINAGE SHEET METAL FABRICATIONS

- A. General: Install sheet metal roof-drainage items to produce complete roof-drainage system according to cited sheet metal standard unless otherwise indicated. Coordinate installation of roof perimeter flashing with installation of roof-drainage system.
- B. Downspouts: Join sections with 1-1/2-inch (38-mm) telescoping joints.
 - 1. Provide hangers with fasteners designed to hold downspouts securely to walls. Locate hangers at top and bottom and at approximately 60 inches (1500 mm) o.c.
 - 2. Provide elbows at base of downspout to direct water away from building.
- C. Parapet Scuppers: Continuously support scupper, set to correct elevation, and seal flanges to interior wall face, over cants or tapered edge strips, and under roofing membrane.
 - 1. Anchor scupper closure trim flange to exterior wall and solder or seal with elastomeric sealant to scupper.
- D. Conductor Heads: Anchor securely to wall, with elevation of conductor head rim at minimum of 1 inch (25 mm) below scupper or gutter discharge.
- E. Expansion-Joint Covers: Install expansion-joint covers at locations and of configuration indicated. Lap joints minimum of 4 inches (100 mm) in direction of water flow.

CCAC BOYCE ROOF REPLACEMENT

3.4 INSTALLATION OF LOW-SLOPE ROOF SHEET METAL FABRICATIONS

- A. Install sheet metal flashing and trim to comply with performance requirements and cited sheet metal standard.
 - 1. Provide concealed fasteners where possible, and set units true to line, levels, and slopes.
 - 2. Install work with laps, joints, and seams that are permanently watertight and weather resistant.
- B. Roof Edge Flashing:
 - 1. Install roof edge flashings in accordance with ANSI/SPRI/FM 4435 ES-1.
- C. Copings:
 - 1. Install copings in accordance with ANSI/SPRI/FM 4435 ES-1.
- D. Pipe or Post Counterflashing: Install counterflashing umbrella with close-fitting collar with top edge flared for elastomeric sealant, extending minimum of 4 inches (100 mm) over base flashing. Install stainless-steel draw band and tighten.
- E. Counterflashing: Coordinate installation of counterflashing with installation of base flashing.
 - 1. Insert counterflashing in reglets or receivers and fit tightly to base flashing.
 - 2. Extend counterflashing 4 inches (100 mm) over base flashing.
 - 3. Lap counterflashing joints minimum of 4 inches (100 mm).
- F. Roof-Penetration Flashing: Coordinate installation of roof-penetration flashing with installation of roofing and other items penetrating roof. Seal with sealant and clamp flashing to pipes that penetrate roof.
- G. Roof Drain Flashing: Install roof drain flashing and stripping in accordance with roofing manufacturer's instructions and as specified in applicable Division 07 roofing section.

3.5 ERECTION TOLERANCES

- A. Installation Tolerances: Shim and align sheet metal flashing and trim within installed tolerance of 1/4 inch in 20 feet (6 mm in 6 m) on slope and location lines indicated on Drawings and within 1/8-inch (3-mm) offset of adjoining faces and of alignment of matching profiles.

3.6 CLEANING AND PROTECTION

- A. Clean exposed metal surfaces of substances that interfere with uniform oxidation and weathering.
- B. Clean and neutralize flux materials. Clean off excess solder.

CCAC BOYCE ROOF REPLACEMENT

- C. Clean off excess sealants.
- D. Remove temporary protective coverings and strippable films as sheet metal flashing and trim are installed unless otherwise indicated in manufacturer's written installation instructions. On completion of sheet metal flashing and trim installation, remove unused materials and clean finished surfaces as recommended by sheet metal flashing and trim manufacturer. Maintain sheet metal flashing and trim in clean condition during construction.
- E. Replace sheet metal flashing and trim that have been damaged or that have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION 076200

CCAC BOYCE ROOF REPLACEMENT

SECTION 077233 -ROOF EDGE PROTECTION SYSTEM

PART 1 GENERAL

1.1 SUMMARY

Provide and install freestanding Roof Edge Protection System, including pipe railings, uprights, bases, counterweights, fittings and delivery to site.

RELATED SECTIONS

A. Section 07400 - Membrane Roofing: Coordination of roof edge protection installation.

1.2 REFERENCES

A. American National Standards Institute (ANSI) - A21.1 Safety Requirements for Floor and Wall Openings, Railings and Toe Boards.

B. American National Standards Institute (ANSI) - A58.1 Minimum Design Loads in Buildings and Other Structures.

C. American National Standards Institute (ANSI) - A17.1 Accessible and Usable Buildings and Facilities.

D. American Society of Testing and Materials (ASTM) A47 - Standard Specification for Ferrite Malleable Iron Castings.

E. American Society of Testing and Materials (ASTM) A53 - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.

F. American Society of Testing and Materials (ASTM) A153 - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.

G. American Society of Testing and Materials (ASTM) A500 - Standard Specification for cold-formed welded and seamless carbon steel structural tubing.

H. Occupational Safety & Health Administration (OSHA): 1910.23 - Guarding Floor and

1.3 SUBMITTALS

A. Manufacturer's data sheets on each product to be used, including:

1. Preparation instructions and recommendations.

CCAC BOYCE ROOF REPLACEMENT

2. Shop Drawings: Indicate profiles, sizes, connections, size and type of fasteners and accessories.
3. Field Measurements: Verify field measurements prior to assembly and/or ordering.
4. Storage and handling requirements and recommendations.
5. Installation Instruction.

B. Shop Drawings: Drawings showing fabrication and installation of handrails and guardrails including plans, elevations, sections, details of components, anchor details, and attachment to adjoining units of work.

C. Selection Samples: For each finish product specified, two complete sets of color chips representing manufacturer's full range of available colors and patterns.

1.4 QUALITY ASSURANCE

A. Railings Structural Requirements:

1. Handrail, wall rail and guardrail assemblies and attachments shall withstand a minimum concentrated load of 200 pounds (90719 g) applied in any direction on the top rail.
2. Infill area of guardrail system capable of withstanding a horizontal concentrated load of 200 pounds (90719 g) applied to one square foot (8165 g/sm) at any point in the system. Load not to act concurrently with loads on top rail of system in determining stress on guardrail.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Materials to be delivered to the job site in good condition and adequately protected against damage as handrails are a finished product.
- B. Store products in manufacturer's unopened packaging until ready for installation.

1.6 PROJECT CONDITIONS

- A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products

CCAC BOYCE ROOF REPLACEMENT

under environmental conditions outside manufacturer's absolute limits.

B. Field Measurements: Where handrails and railings are indicated to fit to other construction, check actual dimensions of other construction by accurate field measurements before fabrication; show recorded measurements on final shop drawings.

1. Where field measurements cannot be made without delaying the railing fabrication and delivery, obtain guaranteed dimensions in writing by the Contractor and proceed with fabrication of products to not delay fabrication, delivery and installation.

C. Coordinate fabrication and delivery schedule of handrails with construction progress and sequence to avoid delay of railing installation.

2.1 MANUFACTURERS

A. Basis-of-Design Manufacturer: Kee Safety, Inc., which is located at: 100 Stradtman St. ; Buffalo, NY 14206; Toll Free Tel: 800-851-5181; Tel: 716-896-4949; Fax: 716-896-5696;

Email: info@keesafety.com; Web: www.keesafety.com

B. Substitutions: Approved equal product.

2.2 SYSTEMS

A. Provide pipe or tubing, fittings, and accessories as indicated or required to match design indicated on the Drawings.

1. Fittings: Cast iron.

2. Handrail Tubing, 12 gauge, Size

a. 1-1/2 inches - 1.90 inches O D.

B. Roof Edge Protection: Provide freestanding KeeGuard Roof Edge Protection System, including pipe railings, uprights, bases, counterweights and fittings.

1. Freestanding counterweighted guardrail system with 42 inch (1067 mm) minimum height to provide a pedestrian egress barrier on the roof to withstand a minimum load of 200 lb (90719 g) in any direction to the top rail per OSHA Regulation 29 CFR 1910.23.

CCAC BOYCE ROOF REPLACEMENT

2. Tube: Galvanized tube, 12 gauge, 1-1/2 inches, 1.90 inches (48 mm) OD.
3. Rails and Posts: Galvanized Tube, 12 gauge, 1-1/2 inches 1.90 inches (38 mm) diameter.
4. Counterweight Levers: Galvanized Tube, 12 gauge, 1-1/4 inches 1.660 inches (38 mm) diameter.
5. Mounting Bases: Steel bases are galvanized and are supplied with a rubber pad on underside of the component.
6. Counterweights: Molded recycled PVC with one fixing collar per counterbalance.
7. Fasteners: stainless steel or galvanized.

2.3 MATERIALS

A. Pipe:

1. Tube: Galvanized tube, 12 gauge, 1-1/2 inches, 1.90 inches (48 mm) OD.

B. Fittings, Including Elbows, Crossovers, Wall flanges, Tees, Couplings:

1. Galvanized Malleable Cast Iron: Kee Klamp structural pipe fittings, ASTM

C. Fasteners: Type 304 or 305 stainless steel or galvanized.

2.4 FABRICATION

- A. Fit and shop assemble components in largest practical sizes for delivery to site.
- B. Upright tops shall be plugged with weather and light resistant material.
- C. Assemble components with joints tightly fitted and secured. Accurately form components to suit installation.

PART 3 EXECUTION

3.1 PREPARATION

- A. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result.

3.2 INSTALLATION

- A. Install in accordance with manufacturer's instructions.

CCAC BOYCE ROOF REPLACEMENT

B. Fit exposed connections accurately together to form tight joints. For all connections with Kee Klamp fittings, each set screw is to be tightened to 29 foot pounds (39 N-m) of torque.

C. Perform cutting, and fitting required for installation of handrails. Set handrails and accurately in location, alignment, and elevation, measured from established lines and levels.

3.3 PROTECTION

A. Protect installed products until completion of project.

B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION 077200

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SECTION 077233 ROOF HATCHES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Provide factory-fabricated roof hatches for ladder access.
 - 2. Hatch rail system.
 - 3. Ladder safety post.

1.2 SUBMITTALS

- A. Product Data: Submit manufacturer's product data.
- B. Shop Drawings: Submit shop drawings including profiles, accessories, location, adjacent construction interface, and dimensions.
- C. Warranty: Submit executed copy of manufacturer's standard warranty.

1.3 QUALITY ASSURANCE

- A. Manufacturer: A minimum of 5 years experience manufacturing similar products.
- B. Installer: A minimum of 2 years experience installing similar products.
- C. Manufacturer's Quality System: Registered to ISO 9001 Quality Standards including in-house engineering for product design activities.

1.4 DELIVERY, STORAGE AND HANDLING

- A. Deliver products in manufacturer's original packaging. Store materials in a dry, protected, well-vented area. Inspect product upon receipt and report damaged material immediately to delivering carrier and note such damage on the carrier's freight bill of lading.

1.5 WARRANTY

- A. Manufacturer's Warranty: Provide manufacturer's standard warranty. Materials shall be free of defects in material and workmanship for a period of five years from the date of purchase. Should a part fail to function in normal use within this period, manufacturer shall furnish a new part at no charge.

PART 2 - PRODUCTS

2.1 MANUFACTURER

- A. Basis-of-Design Manufacturer: The BILCO Company, P.O. Box 1203, New Haven, CT 06505, 1-800-366-6530, Fax: 1-203-535-1582, Web: www.BILCO.com.

CCAC BOYCE ROOF REPLACEMENT

- B. Substitutions: Approved equal product

2.2 ROOF HATCH

- A. Furnish and install where indicated on plans metal roof hatch Type S-50TB, size width: 36" (914mm) x length: 30" (762mm). Length denotes hinge side. The roof hatch shall be single leaf. The roof hatch shall be pre-assembled from the manufacturer.
- B. Performance characteristics:
 - 1. Cover and curb shall be thermally broken to prevent heat transfer between interior and exterior surfaces.
 - 2. Cover shall be reinforced to support a minimum live load of 40 psf (195kg/m²) with a maximum deflection of 1/150th of the span or 20 psf (97 kg/m²) wind uplift.
 - 3. Operation of the cover shall be smooth and easy with controlled operation throughout the entire arc of opening and closing.
 - 4. Operation of the cover shall not be affected by temperature.
 - 5. Entire hatch shall be weather tight with fully welded corner joints on cover and curb.
- C. Cover: Shall be 11 gauge (2.3mm) aluminum with a 5" (127mm) beaded flange with formed reinforcing members. Interior and exterior surfaces shall be thermally broken to minimize heat transfer and to resist condensation. Cover shall have a heavy extruded EPDM rubber gasket bonded to the cover interior to assure a continuous seal when compressed to the top surface of the curb.
- D. Cover insulation: Shall be 3" (75mm) thick polyisocyanurate with an R-value = 20.3 (U=0.279 W/m²K), fully covered and protected by an 18 gauge (1mm) aluminum liner.
- E. Curb: Shall be 12" (305mm) in height and of 11 gauge (2.3mm) aluminum. Interior and exterior surfaces shall be thermally broken to minimize heat transfer and to resist condensation. The curb shall be formed with a 5-1/2" (140mm) flange with 7/16" (11mm) holes provided for securing to the roof deck. The curb shall be equipped with an integral metal capflashing of the same gauge and material as the curb, fully welded at the corners, that features the Bil-Clip® flashing system, including stamped tabs, 6" (153mm) on center, to be bent inward to hold single ply roofing membrane securely in place.
- F. Curb insulation: Shall be 3" (75mm) thick polyisocyanurate with an R-value = 20.3 (U=0.279 W/m²K).
- G. Lifting mechanisms: Manufacturer shall provide compression spring operators enclosed in telescopic tubes to provide, smooth, easy, and controlled cover operation throughout the entire arc of opening and closing. The upper tube shall be the outer tube to prevent accumulation of moisture, grit, and debris inside the lower tube assembly. The lower tube shall interlock with a flanged support shoe welded to the curb assembly.
- H. Hardware
 - 1. Heavy stainless steel pintle hinges shall be provided

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2. Cover shall be equipped with a spring latch with interior and exterior turn handles
3. Roof hatch shall be equipped with interior and exterior padlock hasps.
4. The latch strike shall be a stamped component bolted to the curb assembly.
5. Cover shall automatically lock in the open position with a rigid hold open arm equipped with a 1" (25mm) diameter red vinyl grip handle to permit easy release for closing.
6. All hardware shall be zinc plated and chromate sealed. [For installation in highly corrosive environments or when prolonged exposure to hot water or steam is anticipated, specify Type 316 stainless steel hardware].
7. Cover hardware shall be bolted into heavy gauge channel reinforcing welded to the underside of the cover and concealed within the insulation space.

- I. Finishes: Factory finish shall be mill finish aluminum.

2.3 HATCH RAIL SYSTEM

- A. Furnish and install where indicated on plans hatch rail system Model [insert RL2-STB. The hatch rail system shall be field assembled and installed (by others) per the manufacturer's instructions.
- B. Performance characteristics:
 1. High visibility safety yellow powder coat paint finish.
 2. Hatch rail system shall attach to the cap flashing of the roof hatch and shall not penetrate any roofing material.
 3. Hatch rail system shall satisfy the requirements of OSHA 29 CFR 1910.29 and shall meet OSHA strength requirements with a factor of safety of two.
 4. Corrosion resistant construction with a five-year warranty.
 5. Hinged gate shall ensure continuous barrier around the roof hatch.
 6. Self-closing gate hinge and positive latching system provided with hatch rail system.
- C. Posts and Rails: 1-1/4" (32mm) 6061 T6 schedule 40 aluminum pipe
- D. Hardware: Mounting brackets shall be 3/8" (9mm) thick extruded aluminum. Pivoting post guides with compression fittings and latching mechanism shall be cast aluminum. Self-closing hinges and all fasteners shall be type 316 stainless steel.

2.4 LADDER SAFETY POST

- A. Furnish and install where indicated on plans ladder safety post Model LU-1. The ladder safety post shall be pre-assembled from the manufacturer.
- B. Performance characteristics:
 1. Tubular post shall lock automatically when fully extended.
 2. Safety post shall have controlled upward and downward movement.
 3. Release lever shall disengage the post to allow it to be returned to its lowered position.
 4. Post shall have adjustable mounting brackets to fit ladder rung spacing up to 14" (356mm) on center and clamp brackets to accommodate ladder rungs up to 1-3/4" (44mm) in diameter.

CCAC BOYCE ROOF REPLACEMENT

- C. Post: Shall be manufactured of high strength square tubing. A pull up loop shall be provided at the upper end of the post to facilitate raising the post.
- D. Material of construction: Shall be steel.
- E. Balancing spring: A stainless steel spring balancing mechanism shall be provided to provide smooth, easy, controlled operation when raising and lowering the safety post. [For installation in highly corrosive atmospheres, Model LU-3 incorporates a special alloy spring mechanism].
- F. Hardware: All mounting hardware shall be Type 316 stainless steel.
- G. Finishes: Factory finish shall be yellow powder coat steel.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and openings for compliance with requirements for installation tolerances and other conditions affecting performance. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install products in strict accordance with manufacturer's instructions and approved submittals. Locate units level, plumb, and in proper alignment with adjacent work.
 - 1. Test units for proper function and adjust until proper operation is achieved.
 - 2. Repair finishes damaged during installation.
 - 3. Restore finishes so no evidence remains of corrective work.

3.3 ADJUSTING AND CLEANING

- A. Clean exposed surfaces using methods acceptable to the manufacturer which will not damage finish.

END OF SECTION

CCAC BOYCE ROOF REPLACEMENT

SECTION 220500 - COMMON WORK RESULTS FOR PLUMBING

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. DRAWINGS AND GENERAL PROVISIONS OF THE CONTRACT, INCLUDING GENERAL AND SUPPLEMENTARY CONDITIONS AND DIVISION 01 SPECIFICATION SECTIONS, APPLY TO THIS SECTION.

1.2 SUMMARY

- A. THIS SECTION INCLUDES THE FOLLOWING:
 - 1. PIPING MATERIALS AND INSTALLATION INSTRUCTIONS COMMON TO MOST PIPING SYSTEMS.
 - 2. ESCUTCHEONS.
 - 3. GROUT.
 - 4. PLUMBING DEMOLITION (WHEN INDICATED ON THE DRAWINGS).
 - 5. EQUIPMENT INSTALLATION REQUIREMENTS COMMON TO EQUIPMENT SECTIONS.
 - 6. CONCRETE BASES.
 - 7. SUPPORTS AND ANCHORAGES.

1.3 DEFINITIONS

- A. FINISHED SPACES: SPACES OTHER THAN MECHANICAL AND ELECTRICAL EQUIPMENT ROOMS, FURRED SPACES, PIPE AND DUCT CHASES, UNHEATED SPACES IMMEDIATELY BELOW ROOF, SPACES ABOVE CEILINGS, UNEXCAVATED SPACES, CRAWLSPACES, AND TUNNELS.
- B. EXPOSED, INTERIOR INSTALLATIONS: EXPOSED TO VIEW INDOORS. EXAMPLES INCLUDE FINISHED OCCUPIED SPACES AND MECHANICAL EQUIPMENT ROOMS.
- C. EXPOSED, EXTERIOR INSTALLATIONS: EXPOSED TO VIEW OUTDOORS OR SUBJECT TO OUTDOOR AMBIENT TEMPERATURES AND WEATHER CONDITIONS. EXAMPLES INCLUDE ROOFTOP LOCATIONS.
- D. CONCEALED, INTERIOR INSTALLATIONS: CONCEALED FROM VIEW AND PROTECTED FROM PHYSICAL CONTACT BY BUILDING OCCUPANTS. EXAMPLES INCLUDE ABOVE CEILINGS AND CHASES.
- E. CONCEALED, EXTERIOR INSTALLATIONS: CONCEALED FROM VIEW AND PROTECTED FROM WEATHER CONDITIONS AND PHYSICAL CONTACT BY BUILDING OCCUPANTS BUT SUBJECT TO OUTDOOR AMBIENT TEMPERATURES. EXAMPLES INCLUDE INSTALLATIONS WITHIN UNHEATED SHELTERS.
- F. THE FOLLOWING ARE INDUSTRY ABBREVIATIONS FOR RUBBER MATERIALS:
 - 1. EPDM: ETHYLENE-PROPYLENE-DIENE MONOMER RUBBER.
 - 2. NBR: ACRYLONITRILE-BUTADIENE RUBBER.

CCAC BOYCE ROOF REPLACEMENT

1.4 GENERAL SUBMITTAL REQUIREMENTS

- A. IDENTIFY EACH SUBMITTAL IN DETAIL. NOTE WHAT DIFFERENCES, IF ANY, EXIST BETWEEN THE SUBMITTED ITEM AND THE SPECIFIED ITEM. FAILURE TO IDENTIFY THE DIFFERENCES WILL BE CONSIDERED CAUSE FOR DISAPPROVAL. IF DIFFERENCES ARE NOT IDENTIFIED AND ARE NOT DISCOVERED DURING THE SUBMITTAL REVIEW PROCESS, THE CONTRACTOR REMAINS RESPONSIBLE FOR PROVIDING EQUIPMENT AND MATERIALS THAT MEET THE SPECIFICATIONS AND DRAWINGS.
- B. SUBMITTALS PROCESSED BY THE ARCHITECT/ENGINEER DO NOT BECOME CONTRACT DOCUMENTS.
- C. THE PURPOSE OF SUBMITTALS IS TO ESTABLISH A REPORTING PROCEDURE FOR THE ARCHITECT/ENGINEER TO MONITOR THE CONTRACTOR'S COMPLIANCE WITH THE CONTRACT DOCUMENTS.
- D. IF DEVIATIONS, DISCREPANCIES, OR CONFLICTS BETWEEN SUBMITTALS AND THE CONTRACT DOCUMENTS ARE DISCOVERED (BEFORE OR AFTER PROCESSING BY THE ARCHITECT/ENGINEER), THE CONTRACT DOCUMENTS SHALL CONTROL.

1.5 REFERENCES AND STANDARDS:

- A. THE LATEST EDITIONS OF THE FOLLOWING ARE HEREBY INCLUDED IN AND MADE A PART OF DIVISION 22:
 - 1. NFPA NATIONAL FIRE PROTECTION ASSOCIATION
 - 2. UL UNDERWRITERS' LABORATORIES, INC.
 - 3. NEMA NATIONAL ELECTRICAL MANUFACTURER'S ASSOCIATION
 - 4. NEC NATIONAL ELECTRIC CODE
 - 5. ASME AMERICAN SOCIETY OF MECHANICAL ENGINEERS
 - 6. AWS AMERICAN WELDING SOCIETY
 - 7. ANSI AMERICAN NATIONAL STANDARDS INSTITUTE
 - 8. HI HYDRONICS INSTITUTE
 - 9. OSHA OCCUPATIONAL SAFETY AND HEALTH ACT
 - 10. AWWA AMERICAN WATER WORKS ASSOCIATION
 - 11. CISPI CAST IRON SOIL PIPE INSTITUTE

1.6 QUALITY ASSURANCE

- A. STEEL SUPPORT WELDING: QUALIFY PROCESSES AND OPERATORS ACCORDING TO AWS D1.1, "STRUCTURAL WELDING CODE--STEEL."
- B. STEEL PIPE WELDING: QUALIFY PROCESSES AND OPERATORS ACCORDING TO ASME BOILER AND PRESSURE VESSEL CODE: SECTION IX, "WELDING AND BRAZING QUALIFICATIONS."
 - 1. COMPLY WITH PROVISIONS IN ASME B31 SERIES, "CODE FOR PRESSURE PIPING."
 - 2. CERTIFY THAT EACH WELDER HAS PASSED AWS QUALIFICATION TESTS FOR WELDING PROCESSES INVOLVED AND THAT CERTIFICATION IS CURRENT.
- C. ELECTRICAL CHARACTERISTICS FOR EQUIPMENT: EQUIPMENT OF HIGHER ELECTRICAL CHARACTERISTICS MAY BE FURNISHED PROVIDED SUCH PROPOSED EQUIPMENT IS APPROVED IN WRITING AND CONNECTING ELECTRICAL SERVICES, CIRCUIT BREAKERS, AND CONDUIT SIZES ARE APPROPRIATELY MODIFIED. IF MINIMUM ENERGY RATINGS OR EFFICIENCIES ARE SPECIFIED, EQUIPMENT SHALL COMPLY WITH REQUIREMENTS.

CCAC BOYCE ROOF REPLACEMENT

1.7 DELIVERY, STORAGE, AND HANDLING

- A. PIPING AND EQUIPMENT, AND ASSOCIATED ACCESSORIES KEPT ON-SITE SHOULD BE STORED OFF THE GROUND ON SKIDS, ENDS SHOULD BE CAPPED OR SEALED, AND THESE ITEMS SHOULD BE COVERED WITH PLASTIC TO PREVENT FOULING OR CONTACT WITH EXCESSIVE MOISTURE. PIPING AND EQUIPMENT SHOULD BE CLEANED OF DEBRIS INSIDE AND OUT BEFORE INSTALLATION AND SHOULD BE KEPT CLEAN AND PROTECTED THROUGHOUT CONSTRUCTION.
- B. STORE PLASTIC PIPES PROTECTED FROM DIRECT SUNLIGHT. SUPPORT TO PREVENT SAGGING AND BENDING.

1.8 COORDINATION

- A. CONTRACTOR SHALL COORDINATE THE WORK OF THE DIFFERENT TRADES SO THAT INTERFERENCE BETWEEN PIPING, EQUIPMENT, STRUCTURAL, AND ELECTRICAL WORK WILL BE AVOIDED. ALL NECESSARY OFFSETS IN PIPING AND ALL FITTINGS, AND OTHER COMPONENTS, REQUIRED TO INSTALL THE WORK PROPERLY SHALL BE FURNISHED COMPLETE IN PLACE AT NO ADDITIONAL COST.
- B. COORDINATE INSTALLATION OF REQUIRED SUPPORTING DEVICES AND SET SLEEVES IN POURED-IN-PLACE CONCRETE AND OTHER STRUCTURAL COMPONENTS AS THEY ARE CONSTRUCTED.
- C. IT IS REQUIRED THAT CONTRACTORS VISIT THE SITE OF THE WORK AND BECOME FAMILIAR WITH THE CONDITIONS AFFECTING THE INSTALLATION PRIOR TO BIDDING. SUBMISSION OF A BID SHALL PRESUPPOSE KNOWLEDGE OF SUCH CONDITIONS AND NO ADDITIONAL COMPENSATION SHALL BE ALLOWED WHERE EXTRA LABOR OR MATERIALS ARE REQUIRED BECAUSE OF THE LACK OF KNOWLEDGE OF THESE CONDITIONS.
- D. THE CONTRACTOR SHALL PRODUCE FULL COORDINATION DRAWINGS BETWEEN ALL TRADES IDENTIFYING ANY AREAS OF INTERFERENCE OR CLASHES PRIOR TO THE START OF CONSTRUCTION. MODIFICATIONS SHALL BE MADE TO THE ASSOCIATED SYSTEMS TO RESOLVE THE ISSUE IN COORDINATION WITH AND APPROVAL OF THE ARCHITECT AND ENGINEER.
- E. UNLESS OTHERWISE STIPULATED UNDER A PARTICULAR HEADING, THE FOLLOWING RULES RELATIVE TO RESPONSIBILITIES OF THE CONTRACTORS AND SUBCONTRACTORS WILL APPLY:
 - 1. MAKE-UP WATER PIPING CONNECTIONS SHALL BE PROVIDED BY THE PLUMBING CONTRACTOR TO WITHIN FIVE (5) FEET OF THE REQUIRED POINT OF CONNECTION TO THE EQUIPMENT AND THERE TERMINATED WITH A SHUT-OFF VALVE. EACH TRADE SHALL MAKE THE FINAL CONNECTION TO THE EQUIPMENT IT INSTALLS.
 - 2. CEILING ACCESS PANELS WILL BE INSTALLED BY THE GENERAL CONTRACTOR AT LOCATIONS DETERMINED BY THE PLUMBING CONTRACTOR.
 - 3. THE PLUMBING CONTRACTOR OR SUBCONTRACTOR SHALL INSTALL ALL ROUGHING-IN PERTAINING TO HIS TRADE FOR EACH ITEM OF EQUIPMENT FURNISHED UNDER ANOTHER SECTION OF THE SPECIFICATIONS OR BY THE OWNER.
 - 4. THE PLUMBING CONTRACTOR SHALL MAKE FINAL CONNECTIONS OF EQUIPMENT TO ROUGH-INS.

CCAC BOYCE ROOF REPLACEMENT

1.9 DESIGN DRAWINGS

- A. THE CONTRACT DRAWINGS ARE DIAGRAMMATIC AND ARE NOT INTENDED TO SHOW EXACT LOCATION OF EQUIPMENT, PIPING AND DUCTWORK UNLESS DIMENSIONS ARE GIVEN. SYSTEMS AND DISTRIBUTION ARE TO BE INSTALLED ALONG THE GENERAL PLANS SHOWN ON THE DRAWINGS, BUT IN COORDINATION WITH ACTUAL FIELD CONDITIONS.
- B. EXTRA COSTS WHICH MIGHT RESULT FROM DEVIATIONS FROM THE DRAWINGS, SO AS TO AVOID INTERFERENCES, SHALL BE CONSIDERED A "JOB CONDITION", AND NO ADDITIONAL COMPENSATION WILL BE CONSIDERED APPLICABLE. IN THE EVENT THAT SUCH INTERFERENCES OCCUR IN THE COURSE OF THE WORK, DUE TO AN ERROR, OMISSION, OR OVERSIGHT BY THE CONTRACTOR, NO ADDITIONAL COMPENSATION SHALL BE ALLOWED. INTERFERENCES WHICH MAY OCCUR DURING THE COURSE OF CONSTRUCTION SHALL BE BROUGHT TO THE IMMEDIATE ATTENTION OF THE ARCHITECT/ENGINEER, AND HIS/HER DECISION, CONFIRMED IN WRITING, SHALL BE FINAL.

1.10 EQUIPMENT START-UP

- A. START-UP OF ALL PLUMBING EQUIPMENT SHALL BE VIDEO-RECORDED BY THE PLUMBING CONTRACTOR. TWO DVD COPIES SHALL BE TURNED OVER TO THE OWNER'S MAINTENANCE STAFF.

1.11 TESTING AND REPAIR

- A. ALL PIPING SYSTEMS SHALL BE THOROUGHLY CLEANED AND FLUSHED PRIOR TO FINAL TESTING.
- B. PRESSURE TESTING SHALL BE COMPLETED FOR THE FOLLOWING PIPING SYSTEMS:
 - 1. DOMESTIC WATER, SANITARY AND VENT, STORM AND GAS PIPING SYSTEMS, AND OTHER SYSTEMS AS NOTED ON THE PLANS.
- C. ALL TESTING MUST BE WITNESSED AND ACCURATELY RECORDED NOTING METHODS OF TESTING, TIMES, DATES, AND RESULTS.
- D. ANY DAMAGE AS A RESULT OF TESTS SHALL BE REPAIRED OR DAMAGED MATERIALS REPLACED AT NO COST TO THE OWNER.

1.12 FINAL COMPLETION

- A. ALL WORK SHALL BE CLEANED PRIOR TO ISSUANCE OF SUBSTANTIAL COMPLETION.
- B. RETOUCH OR REPAINT FACTORY PAINTED PRIME AND FINISH COATS WHERE SCRATCHED OR DAMAGED.
- C. DELIVER ANY EQUIPMENT AS REQUIRED BY THIS SPECIFICATION TO OWNER AND OBTAINED SIGNED RECEIPTS OF DELIVERY.
- D. CLEAN EQUIPMENT, RESTORE DAMAGED MATERIALS, AND LEAVE THE WORK IN ACCEPTABLE CONDITION.
- E. REMOVE ALL SITE TOOLS, EQUIPMENT, SURPLUS MATERIALS AND RUBBISH CONTINUOUSLY AT NO ADDITIONAL COST TO THE OWNER.
- F. CONTRACTOR SHALL SUBMIT WRITTEN CERTIFICATES WARRANTING EACH ITEM OF EQUIPMENT.

CCAC BOYCE ROOF REPLACEMENT

PART 2 PRODUCTS

2.1 EQUIPMENT AND MATERIALS:

- A. ALL EQUIPMENT AND MATERIALS SHALL BE FURNISHED IN STRICT ACCORDANCE WITH THE EQUIPMENT NAMED AND ACCORDING TO SPECIFICATION REQUIREMENTS. EACH BID SHALL BE BASED UPON ONE OF THE MATERIALS OR MANUFACTURERS SPECIFIED.
- B. EQUIPMENT AND MATERIALS SPECIFIED SHALL BE CONSIDERED TO HAVE PRIOR APPROVAL, BUT SUBMITTAL FOR APPROVAL IS REQUIRED. FURNISH CONSTRUCTION DRAWINGS TO OTHER CONTRACTORS WHEN REQUIRED TO COORDINATE CONSTRUCTION.
- C. WHERE MULTIPLE MANUFACTURERS ARE NAMED THE DRAWINGS AND SPECIFICATIONS ARE BASED ON THE REQUIREMENTS AND LAYOUTS FOR THE EQUIPMENT OF THE FIRST NAMED MANUFACTURER. ANY CHANGE REQUIRED BY THE USE OF OTHER NAMED MANUFACTURERS SUCH AS REVISIONS TO FOUNDATIONS, BASES, PIPING, CONTROLS, WIRING, OPENINGS, AND APPURTENANCES SHALL BE MADE BY THE CONTRACTOR AT NO ADDITIONAL COST TO THE OWNER.

2.2 PIPE, TUBE, AND FITTINGS

- A. REFER TO INDIVIDUAL DIVISION 22 PIPING SECTIONS FOR PIPE, TUBE, AND FITTING MATERIALS AND JOINING METHODS.
- B. PIPE THREADS: ASME B1.20.1 FOR FACTORY-THREADED PIPE AND PIPE FITTINGS.

2.3 JOINING MATERIALS

- A. REFER TO INDIVIDUAL PIPING SECTIONS FOR SPECIAL JOINING MATERIALS NOT LISTED BELOW.
- B. PIPE-FLANGE GASKET MATERIALS: SUITABLE FOR CHEMICAL AND THERMAL CONDITIONS OF PIPING SYSTEM CONTENTS.
 - 1. ASME B16.21, NONMETALLIC, FLAT, ASBESTOS-FREE, 1/8-INCH (3.2-MM) MAXIMUM THICKNESS UNLESS THICKNESS OR SPECIFIC MATERIAL IS INDICATED.
 - a. FULL-FACE TYPE: FOR FLAT-FACE, CLASS 125, CAST-IRON AND CAST-BRONZE FLANGES.
 - b. NARROW-FACE TYPE: FOR RAISED-FACE, CLASS 250, CAST-IRON AND STEEL FLANGES.
 - 2. AWWA C110, RUBBER, FLAT FACE, 1/8 INCH THICK, UNLESS OTHERWISE INDICATED; AND FULL-FACE OR RING TYPE, UNLESS OTHERWISE INDICATED.
- C. PLASTIC, PIPE-FLANGE GASKET, BOLTS, AND NUTS: TYPE AND MATERIAL RECOMMENDED BY PIPING SYSTEM MANUFACTURER, UNLESS OTHERWISE INDICATED.
- D. FLANGE BOLTS AND NUTS: ASME B18.2.1, CARBON STEEL, UNLESS OTHERWISE INDICATED.
- E. SOLDER FILLER METALS: ASTM B 32, 95/5 LEAD-FREE ALLOYS. INCLUDE WATER-FLUSHABLE FLUX ACCORDING TO ASTM B 813.

CCAC BOYCE ROOF REPLACEMENT

- F. BRAZING FILLER METALS: AWS A5.8, BCUP SERIES, COPPER-PHOSPHORUS ALLOYS FOR GENERAL-DUTY BRAZING, UNLESS OTHERWISE INDICATED; AND AWS A5.8, BAG1, SILVER ALLOY FOR REFRIGERANT PIPING, UNLESS OTHERWISE INDICATED.
- G. WELDING FILLER METALS: COMPLY WITH AWS D10.12 FOR WELDING MATERIALS APPROPRIATE FOR WALL THICKNESS AND CHEMICAL ANALYSIS OF STEEL PIPE BEING WELDED.
- H. SOLVENT CEMENTS FOR JOINING PLASTIC PIPING:
 - 1. CPVC PIPING: ASTM F 493.
 - 2. PVC PIPING: ASTM D 2564. INCLUDE PRIMER ACCORDING TO ASTM F 656.

2.4 ESCUTCHEONS

- A. DESCRIPTION: MANUFACTURED WALL AND CEILING ESCUTCHEONS AND FLOOR PLATES, WITH AN ID TO CLOSELY FIT AROUND PIPE, TUBE, AND INSULATION OF INSULATED PIPING AND AN OD THAT COMPLETELY COVERS OPENING.
- B. ONE-PIECE, DEEP-PATTERN TYPE: DEEP-DRAWN, BOX-SHAPED BRASS WITH POLISHED CHROME-PLATED FINISH.
- C. ONE-PIECE, STAMPED-STEEL TYPE: WITH SET SCREW OR SPRING CLIPS AND CHROME-PLATED FINISH.
- D. ONE-PIECE, CAST-BRASS TYPE: WITH SET SCREW AND POLISHED CHROME-PLATED FINISH
- E. SPLIT-PLATE, STAMPED-STEEL TYPE: WITH CONCEALED HINGE, SET SCREW OR SPRING CLIPS, AND CHROME-PLATED FINISH.
- F. ONE-PIECE, FLOOR-PLATE TYPE: CAST-IRON FLOOR PLATE.
- G. SPLIT-CASTING, FLOOR-PLATE TYPE: CAST BRASS WITH CONCEALED HINGE AND SET SCREW.

2.5 GROUT

- A. DESCRIPTION: ASTM C 1107, GRADE B, NON-SHRINK AND NONMETALLIC, DRY HYDRAULIC-CEMENT GROUT.
 - 1. CHARACTERISTICS: POST-HARDENING, VOLUME-ADJUSTING, NON-STAINING, NONCORROSIVE, NONGASEOUS, AND RECOMMENDED FOR INTERIOR AND EXTERIOR APPLICATIONS.
 - 2. DESIGN MIX: 5000-PSI (34.5-MPA), 28-DAY COMPRESSIVE STRENGTH.
 - 3. PACKAGING: PREMIXED AND FACTORY PACKAGED.

PART 3 EXECUTION

3.1 PLUMBING DEMOLITION (WHEN INDICATED ON THE DRAWINGS)

- A. REFER TO DIVISION 01 SECTION "CUTTING AND PATCHING" AND DIVISION 02 SECTION "SELECTIVE STRUCTURE DEMOLITION" FOR GENERAL DEMOLITION REQUIREMENTS AND PROCEDURES.
- B. DISCONNECT, DEMOLISH, AND REMOVE PLUMBING SYSTEMS, EQUIPMENT, AND COMPONENTS INDICATED TO BE REMOVED.

CCAC BOYCE ROOF REPLACEMENT

1. PIPING TO BE REMOVED: REMOVE PORTION OF PIPING INDICATED TO BE REMOVED AND CAP OR PLUG REMAINING PIPING WITH SAME OR COMPATIBLE PIPING MATERIAL.
 2. PIPING TO BE ABANDONED IN PLACE: DRAIN PIPING AND CAP OR PLUG PIPING WITH SAME OR COMPATIBLE PIPING MATERIAL.
 3. EQUIPMENT TO BE REMOVED: DISCONNECT AND CAP SERVICES AND REMOVE EQUIPMENT.
 4. EQUIPMENT TO BE REMOVED AND REINSTALLED: DISCONNECT AND CAP SERVICES AND REMOVE, CLEAN, AND STORE EQUIPMENT; WHEN APPROPRIATE, REINSTALL, RECONNECT, AND MAKE EQUIPMENT OPERATIONAL.
 5. EQUIPMENT TO BE REMOVED AND SALVAGED: DISCONNECT AND CAP SERVICES AND REMOVE EQUIPMENT AND DELIVER TO OWNER.
- C. IF PIPE, INSULATION, OR EQUIPMENT TO REMAIN IS DAMAGED IN APPEARANCE OR IS UNSERVICEABLE, REMOVE DAMAGED OR UNSERVICEABLE PORTIONS AND REPLACE WITH NEW PRODUCTS OF EQUAL CAPACITY AND QUALITY.

3.2 PIPING SYSTEMS - COMMON REQUIREMENTS

- A. INSTALL PIPING ACCORDING TO THE FOLLOWING REQUIREMENTS AND DIVISION 23 SECTIONS SPECIFYING PIPING SYSTEMS.
- B. DRAWING PLANS, SCHEMATICS, AND DIAGRAMS INDICATE GENERAL LOCATION AND ARRANGEMENT OF PIPING SYSTEMS. INDICATED LOCATIONS AND ARRANGEMENTS WERE USED TO SIZE PIPE AND CALCULATE FRICTION LOSS, EXPANSION, PUMP SIZING, AND OTHER DESIGN CONSIDERATIONS. INSTALL PIPING AS INDICATED UNLESS DEVIATIONS TO LAYOUT ARE APPROVED ON COORDINATION DRAWINGS.
- C. INSTALL PIPING IN CONCEALED LOCATIONS, UNLESS OTHERWISE INDICATED AND EXCEPT IN EQUIPMENT ROOMS AND SERVICE AREAS.
- D. INSTALL PIPING INDICATED TO BE EXPOSED AND PIPING IN EQUIPMENT ROOMS AND SERVICE AREAS AT RIGHT ANGLES OR PARALLEL TO BUILDING WALLS. DIAGONAL RUNS ARE PROHIBITED UNLESS SPECIFICALLY INDICATED OTHERWISE.
- E. PIPING SHALL NOT PROJECT BEYOND WALLS OR STEEL LINES NOR SHALL IT HANG BELOW SLABS MORE THAN IS ABSOLUTELY NECESSARY. PARTICULAR ATTENTION SHALL BE PAID TO THE REQUIRED CLEARANCES.
- F. OFFSET PIPING WHERE REQUIRED TO AVOID INTERFERENCE WITH OTHER WORK, TO PROVIDE GREATER HEADROOM OR CLEARANCE, OR TO CONCEAL PIPE MORE READILY. OFFSETS SHALL BE PROPERLY DRAINED OR TRAPPED WHERE NECESSARY.
- G. PROVIDE SWING JOINTS AND EXPANSION BENDS WHEREVER REQUIRED TO ALLOW THE PIPING TO EXPAND WITHOUT UNDUE STRESS TO CONNECTIONS OR EQUIPMENT.
- H. EXPOSED PIPING AROUND FIXTURES OR IN OTHER CONSPICUOUS PLACES SHALL NOT SHOW TOOL MARKS AT FITTINGS.
- I. ISOLATE PIPE FROM THE BUILDING CONSTRUCTION TO PREVENT TRANSMISSION OF VIBRATION TO THE STRUCTURE AND TO ELIMINATE NOISE.
- J. INSTALL PIPING SUCH THAT ANY EQUIPMENT CONNECTED TO PIPING MAY BE REMOVED BY DISCONNECTING TWO (2) FLANGES OR UNIONS AND REMOVING ONLY ONE OR TWO PIPE SECTIONS. ALL EQUIPMENT SHALL HAVE BOLTED OR SCREWED FLANGES OR UNIONS AT PIPE CONNECTIONS.

CCAC BOYCE ROOF REPLACEMENT

- K. INSTALL FITTINGS FOR CHANGES IN DIRECTION AND BRANCH CONNECTIONS. T-DRILL SYSTEM FOR MECHANICALLY FORMED TEE CONNECTIONS AND COUPLINGS, AND VICTAULIC HOLE CUT PIPING SYSTEM ARE NOT ALLOWED.
- L. DO NOT ROUTE PIPING THROUGH TRANSFORMER VAULTS OR ABOVE TRANSFORMERS, PANELBOARDS, OR SWITCHBOARDS, INCLUDING THE REQUIRED SERVICE SPACE FOR THIS EQUIPMENT, UNLESS THE PIPING IS SERVING THIS EQUIPMENT.
- M. INSTALL GROUPS OF PIPES PARALLEL TO EACH OTHER, SPACED TO PERMIT APPLYING INSULATION AND SERVICING OF VALVES.
- N. INSTALL PIPING ABOVE ACCESSIBLE CEILINGS TO ALLOW SUFFICIENT SPACE FOR CEILING PANEL REMOVAL.
- O. INSTALL PIPING TO PERMIT VALVE SERVICING.
- P. INSTALL PIPING AT INDICATED SLOPES.
- Q. INSTALL PIPING FREE OF SAGS AND BENDS.
- R. INSTALL PIPING TO ALLOW APPLICATION OF INSULATION.
- S. ECCENTRIC REDUCING COUPLINGS SHALL BE PROVIDED IN ALL CASES WHERE AIR OR WATER POCKETS WOULD OTHERWISE OCCUR DUE TO A REDUCTION IN PIPE SIZE.
- T. CAP AND PLUG ALL OPENINGS IN PIPES DURING CONSTRUCTION WITH SUITABLE METAL PLUGS OR CAP TO KEEP OUT DIRT AND RUBBISH UNTIL EQUIPMENT IS CONNECTED.
- U. INSTALL DRAINS, CONSISTING OF A TEE FITTING, NPS 3/4 FULL PORT-BALL VALVE, AND SHORT NPS 3/4 THREADED NIPPLE WITH CAP, AT LOW POINTS IN PIPING SYSTEM MAINS AND ELSEWHERE AS REQUIRED FOR SYSTEM DRAINAGE.
- V. SELECT SYSTEM COMPONENTS WITH PRESSURE RATING EQUAL TO OR GREATER THAN SYSTEM OPERATING PRESSURE.
- W. INSTALL ESCUTCHEONS FOR PENETRATIONS OF WALLS, CEILINGS, AND FLOORS
- X. INSTALL SLEEVES FOR PIPES PASSING THROUGH CONCRETE AND MASONRY WALLS AND CONCRETE FLOOR AND ROOF SLABS.
- Y. ABOVEGROUND, EXTERIOR-WALL PIPE PENETRATIONS: SEAL PENETRATIONS USING SLEEVES AND MECHANICAL SLEEVE SEALS. SELECT SLEEVE SIZE TO ALLOW FOR 1-INCH ANNULAR CLEAR SPACE BETWEEN PIPE AND SLEEVE FOR INSTALLING MECHANICAL SLEEVE SEALS.
- Z. UNDERGROUND, EXTERIOR-WALL PIPE PENETRATIONS: INSTALL CAST-IRON "WALL PIPES" FOR SLEEVES. SEAL PIPE PENETRATIONS USING MECHANICAL SLEEVE SEALS. SELECT SLEEVE SIZE TO ALLOW FOR 1-INCH ANNULAR CLEAR SPACE BETWEEN PIPE AND SLEEVE FOR INSTALLING MECHANICAL SLEEVE SEALS.
- AA. FIRE-BARRIER PENETRATIONS: MAINTAIN INDICATED FIRE RATING OF WALLS, PARTITIONS, CEILINGS, AND FLOORS AT PIPE PENETRATIONS. SEAL PIPE PENETRATIONS WITH FIRESTOP MATERIALS. REFER TO DIVISION 07 SECTION "PENETRATION FIRESTOPPING" FOR MATERIALS.
- BB. VERIFY FINAL EQUIPMENT LOCATIONS FOR ROUGHING-IN.
- CC. REFER TO EQUIPMENT SPECIFICATIONS IN OTHER SECTIONS OF THESE SPECIFICATIONS FOR ROUGHING-IN REQUIREMENTS.

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3.3 PIPING JOINT CONSTRUCTION

- A. JOIN PIPE AND FITTINGS ACCORDING TO THE FOLLOWING REQUIREMENTS AND DIVISION 23 SECTIONS SPECIFYING PIPING SYSTEMS.
- B. REAM ENDS OF PIPES AND TUBES AND REMOVE BURRS. BEVEL PLAIN ENDS OF STEEL PIPE.
- C. REMOVE SCALE, SLAG, DIRT, AND DEBRIS FROM INSIDE AND OUTSIDE OF PIPE AND FITTINGS BEFORE ASSEMBLY.
- D. SOLDERED JOINTS: APPLY ASTM B 813, WATER-FLUSHABLE FLUX, UNLESS OTHERWISE INDICATED, TO TUBE END. CONSTRUCT JOINTS ACCORDING TO ASTM B 828 OR CDA'S "COPPER TUBE HANDBOOK," USING LEAD-FREE SOLDER ALLOY COMPLYING WITH ASTM B 32.
- E. BRAZED JOINTS: CONSTRUCT JOINTS ACCORDING TO AWS'S "BRAZING HANDBOOK," "PIPE AND TUBE" CHAPTER, USING COPPER-PHOSPHORUS BRAZING FILLER METAL COMPLYING WITH AWS A5.8.
- F. THREADED JOINTS: THREAD PIPE WITH TAPERED PIPE THREADS ACCORDING TO ASME B1.20.1. CUT THREADS FULL AND CLEAN USING SHARP DIES. REAM THREADED PIPE ENDS TO REMOVE BURRS AND RESTORE FULL ID. JOIN PIPE FITTINGS AND VALVES AS FOLLOWS:
 - 1. APPLY APPROPRIATE TAPE OR THREAD COMPOUND TO EXTERNAL PIPE THREADS UNLESS DRY SEAL THREADING IS SPECIFIED.
 - 2. DAMAGED THREADS: DO NOT USE PIPE OR PIPE FITTINGS WITH THREADS THAT ARE CORRODED OR DAMAGED. DO NOT USE PIPE SECTIONS THAT HAVE CRACKED OR OPEN WELDS.
- G. WELDED JOINTS: CONSTRUCT JOINTS ACCORDING TO AWS D10.12, USING QUALIFIED PROCESSES AND WELDING OPERATORS ACCORDING TO PART 1 "QUALITY ASSURANCE" ARTICLE.
- H. FLANGED JOINTS: SELECT APPROPRIATE GASKET MATERIAL, SIZE, TYPE, AND THICKNESS FOR SERVICE APPLICATION. INSTALL GASKET CONCENTRICALLY POSITIONED. USE SUITABLE LUBRICANTS ON BOLT THREADS.
- I. PLASTIC PIPING SOLVENT-CEMENT JOINTS: CLEAN AND DRY JOINING SURFACES. JOIN PIPE AND FITTINGS ACCORDING TO THE FOLLOWING:
 - 1. COMPLY WITH ASTM F 402, FOR SAFE-HANDLING PRACTICE OF CLEANERS, PRIMERS, AND SOLVENT CEMENTS.
 - 2. CPVC PIPING: JOIN ACCORDING TO ASTM D 2846/D 2846M APPENDIX.
 - 3. PVC PRESSURE PIPING: JOIN SCHEDULE NUMBER ASTM D 1785, PVC PIPE AND PVC SOCKET FITTINGS ACCORDING TO ASTM D 2672. JOIN OTHER-THAN-SCHEDULE-NUMBER PVC PIPE AND SOCKET FITTINGS ACCORDING TO ASTM D 2855.
 - 4. PVC NONPRESSURE PIPING: JOIN ACCORDING TO ASTM D 2855.
- J. PLASTIC PRESSURE PIPING GASKETED JOINTS: JOIN ACCORDING TO ASTM D 3139.
- K. PLASTIC NONPRESSURE PIPING GASKETED JOINTS: JOIN ACCORDING TO ASTM D 3212.

3.4 PIPING CONNECTIONS

- A. MAKE CONNECTIONS ACCORDING TO THE FOLLOWING, UNLESS OTHERWISE INDICATED:

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1. INSTALL UNIONS, IN PIPING NPS 2 AND SMALLER, ADJACENT TO EACH VALVE AND AT FINAL CONNECTION TO EACH PIECE OF EQUIPMENT.
 2. INSTALL FLANGES, IN PIPING NPS 2-1/2 AND LARGER, ADJACENT TO FLANGED VALVES AND AT FINAL CONNECTION TO EACH PIECE OF EQUIPMENT.
 3. INSTALL DIELECTRIC FITTINGS TO CONNECT PIPING MATERIALS OF DISSIMILAR METALS.
- B. UNIONS SHALL BE USED IN PREFERENCE TO COUPLINGS WHERE THEIR USE WILL FACILITATE DISMANTLING THE PIPE FOR MAINTENANCE.
- C. PIPE SIZES INDICATED SHALL BE CARRIED FULL SIZE TO EQUIPMENT SERVED. ANY CHANGE OF SIZE TO MATCH EQUIPMENT CONNECTION SHALL BE MADE WITHIN ONE FOOT OF THE EQUIPMENT. AT TEMPERATURE CONTROL VALVES WITH SIZES SMALLER THAN CONNECTED LINES, REDUCTION SHALL BE MADE IMMEDIATELY ADJACENT TO VALVES.
- 3.5 EQUIPMENT INSTALLATION - COMMON REQUIREMENTS
- A. INSTALL EQUIPMENT TO ALLOW MAXIMUM POSSIBLE HEADROOM UNLESS SPECIFIC MOUNTING HEIGHTS ARE NOT INDICATED.
- B. INSTALL EQUIPMENT LEVEL AND PLUMB, PARALLEL AND PERPENDICULAR TO OTHER BUILDING SYSTEMS AND COMPONENTS IN EXPOSED INTERIOR SPACES, UNLESS OTHERWISE INDICATED.
- C. INSTALL PLUMBING EQUIPMENT TO FACILITATE SERVICE, MAINTENANCE, AND REPAIR OR REPLACEMENT OF COMPONENTS. CONNECT EQUIPMENT FOR EASE OF DISCONNECTING, WITH MINIMUM INTERFERENCE TO OTHER INSTALLATIONS. EXTEND GREASE FITTINGS TO ACCESSIBLE LOCATIONS.
- D. INSTALL EQUIPMENT TO ALLOW RIGHT OF WAY FOR PIPING INSTALLED AT REQUIRED SLOPE.
- 3.6 CONCRETE BASES
- A. CONCRETE BASES: ANCHOR EQUIPMENT TO CONCRETE BASE ACCORDING TO EQUIPMENT MANUFACTURER'S WRITTEN INSTRUCTIONS AND ACCORDING TO SEISMIC CODES AT PROJECT.
1. CONSTRUCT CONCRETE BASES OF DIMENSIONS INDICATED, BUT NOT LESS THAN 4 INCHES LARGER IN BOTH DIRECTIONS THAN SUPPORTED UNIT. INSTALL DOWEL RODS TO CONNECT CONCRETE BASE TO CONCRETE FLOOR.
 2. UNLESS OTHERWISE INDICATED, INSTALL DOWEL RODS ON 18-INCH CENTERS AROUND THE FULL PERIMETER OF THE BASE.
 3. INSTALL EPOXY-COATED ANCHOR BOLTS FOR SUPPORTED EQUIPMENT THAT EXTEND THROUGH CONCRETE BASE, AND ANCHOR INTO STRUCTURAL CONCRETE FLOOR.
 4. PLACE AND SECURE ANCHORAGE DEVICES. USE SUPPORTED EQUIPMENT MANUFACTURER'S SETTING DRAWINGS, TEMPLATES, DIAGRAMS, INSTRUCTIONS, AND DIRECTIONS FURNISHED WITH ITEMS TO BE EMBEDDED.
 5. INSTALL ANCHOR BOLTS TO ELEVATIONS REQUIRED FOR PROPER ATTACHMENT TO SUPPORTED EQUIPMENT.
 6. INSTALL ANCHOR BOLTS ACCORDING TO ANCHOR-BOLT MANUFACTURER'S WRITTEN INSTRUCTIONS.

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7. USE 3000-PSI, 28-DAY COMPRESSIVE-STRENGTH CONCRETE AND REINFORCEMENT AS SPECIFIED IN DIVISION 03 SECTION "CAST-IN-PLACE CONCRETE"

3.7 ERECTION OF METAL SUPPORTS AND ANCHORAGES

- A. REFER TO DIVISION 05 SECTION "METAL FABRICATIONS" FOR STRUCTURAL STEEL.
- B. CUT, FIT, AND PLACE MISCELLANEOUS METAL SUPPORTS ACCURATELY IN LOCATION, ALIGNMENT, AND ELEVATION TO SUPPORT AND ANCHOR PLUMBING MATERIALS AND EQUIPMENT.
- C. FIELD WELDING: COMPLY WITH AWS D1.1.

3.8 ERECTION OF WOOD SUPPORTS AND ANCHORAGES

- A. CUT, FIT, AND PLACE WOOD GROUNDS, NAILERS, BLOCKING, AND ANCHORAGES TO SUPPORT, AND ANCHOR PLUMBING MATERIALS AND EQUIPMENT.
- B. SELECT FASTENER SIZES THAT WILL NOT PENETRATE MEMBERS IF OPPOSITE SIDE WILL BE EXPOSED TO VIEW OR WILL RECEIVE FINISH MATERIALS. TIGHTEN CONNECTIONS BETWEEN MEMBERS. INSTALL FASTENERS WITHOUT SPLITTING WOOD MEMBERS.
- C. ATTACH TO SUBSTRATES AS REQUIRED TO SUPPORT APPLIED LOADS.

3.9 GROUTING

- A. MIX AND INSTALL GROUT FOR PLUMBING EQUIPMENT BASE BEARING SURFACES, PUMP AND OTHER EQUIPMENT BASE PLATES, AND ANCHORS.
- B. CLEAN SURFACES THAT WILL COME INTO CONTACT WITH GROUT.
- C. PROVIDE FORMS AS REQUIRED FOR PLACEMENT OF GROUT.
- D. AVOID AIR ENTRAPMENT DURING PLACEMENT OF GROUT.
- E. PLACE GROUT, COMPLETELY FILLING EQUIPMENT BASES.
- F. PLACE GROUT ON CONCRETE BASES AND PROVIDE SMOOTH BEARING SURFACE FOR EQUIPMENT.
- G. PLACE GROUT AROUND ANCHORS.
- H. CURE PLACED GROUT.

END OF SECTION

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SECTION 220517 - SLEEVES AND SLEEVE SEALS FOR PLUMBING PIPING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. PIPE SLEEVES.
- B. PIPE SLEEVE-SEALS.

1.2 RELATED REQUIREMENTS

- A. DIVISION 07 - FIRESTOPPING.
- B. SECTION 220716 - PLUMBING EQUIPMENT INSULATION.

1.3 REFERENCE STANDARDS

- A. ASTM C592 - STANDARD SPECIFICATION FOR MINERAL FIBER BLANKET INSULATION AND BLANKET-TYPE PIPE INSULATION (METAL-MESH COVERED) (INDUSTRIAL TYPE); 2022A.
- B. ASTM E814 - STANDARD TEST METHOD FOR FIRE TESTS OF PENETRATION FIRESTOP SYSTEMS; 2023A.

1.4 SUBMITTALS

- A. SEE DIVISION 01 - ADMINISTRATIVE REQUIREMENTS FOR SUBMITTAL PROCEDURES.
- B. SHOP DRAWINGS: INDICATE PIPE MATERIALS USED, JOINTING METHODS, SUPPORTS, FLOOR AND WALL PENETRATION SEALS. INDICATE INSTALLATION, LAYOUT, WEIGHTS, MOUNTING AND SUPPORT DETAILS, AND PIPING CONNECTIONS.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. PROVIDE TEMPORARY PROTECTIVE COATING ON CAST IRON AND STEEL SLEEVES IF SHIPPED LOOSE.

PART 2 PRODUCTS

2.1 PIPE SLEEVES

- A. CAST-IRON PIPE SLEEVES: CAST OR FABRICATED OF CAST OR DUCTILE IRON, WITH PLAIN ENDS.
- B. STEEL PIPE SLEEVES: ASTM A53/A53M, TYPE E, GRADE B, SCHEDULE 40, HOT-DIP GALVANIZED, WITH PLAIN ENDS.
- C. SHEET METAL SLEEVES: ASTM A653/A653M, 24 GAUGE MINIMUM THICKNESS; HOT-DIP GALVANIZED, ROUND TUBE CLOSED WITH WELDED LONGITUDINAL JOINT.

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- D. VERTICAL PIPING:
 - 1. SLEEVE LENGTH: 2 INCH ABOVE FINISHED FLOOR.
 - 2. PROVIDE SEALANT FOR WATERTIGHT JOINT.
- E. SLEEVES FOR PIPE PASSING THROUGH INTERIOR WALLS, PARTITIONS, AND FLOORS SHALL BE SHEET METAL UNLESS STEEL OR BRASS SLEEVES ARE SPECIFIED BELOW.
- F. PIPE PASSING THROUGH ABOVE GRADE EXTERIOR WALLS:
 - 1. LESS THAN NPS 6: STEEL PIPE SLEEVES.
 - 2. NPS 6 AND ABOVE: CAST-IRON PIPE SLEEVES.
 - 3. PROVIDE WATERTIGHT SPACE WITH LINK RUBBER OR MODULAR SEAL BETWEEN SLEEVE AND PIPE ON BOTH PIPE ENDS.
- G. PIPE PASSING THROUGH BELOW GRADE EXTERIOR WALLS:
 - 1. ZINC COATED OR CAST IRON PIPE.
 - 2. PROVIDE WATERTIGHT SPACE WITH LINK RUBBER OR MODULAR SEAL BETWEEN SLEEVE AND PIPE ON BOTH PIPE ENDS.
- H. PIPES PASSING THROUGH ABOVE GRADE FLOOR SLABS AND MASONRY WALLS SHALL HAVE THE SPACE BETWEEN THE PIPE OR INSULATION AND THE SLEEVE PACKED WITH NON-ASBESTOS WICKING OR OTHER SUITABLE, APPROVED, NON-COMBUSTIBLE MATERIAL.
- I. PIPE PASSING THROUGH CONCRETE BEAM FLANGES:
 - 1. GALVANIZED STEEL PIPE OR BLACK IRON PIPE WITH ASPHALT COATING.
 - 2. CONNECT SLEEVE WITH FLOOR PLATE EXCEPT IN MECHANICAL ROOMS.
 - 3. FLUSH WITH THE SIDE OF THE BEAM AND LARGE ENOUGH TO ACCOMMODATE BARE PIPE ONLY.
- J. PENETRATIONS IN CONCRETE BEAM FLANGES ARE PROHIBITED THROUGH RIBS OR BEAMS WITHOUT PRIOR APPROVAL FROM THE ARCHITECT AND STRUCTURAL ENGINEER.
- K. CLEARANCES:
 - 1. PROVIDE ALLOWANCE FOR INSULATED PIPING.
 - 2. WALL, FLOOR, PARTITIONS, AND BEAM FLANGES: MINIMUM 1 INCH GREATER THAN EXTERNAL PIPE DIAMETER.
 - 3. FOR INSTALLATION OF PIPE-SLEEVE SEALS: 1 INCH (25 MM) GREATER THAN EXTERNAL PIPE DIAMETER.
 - 4. SLEEVES FOR PIPES PASSING THROUGH FOUNDATION WALLS SHALL BE TWO PIPE SIZES LARGER THAN THE PIPE PASSING THROUGH THE WALL, AND IN ACCORDANCE WITH THE LOCAL PLUMBING CODE.
 - 5. ALL RATED OPENINGS AND WALLS OF MECHANICAL EQUIPMENT ROOMS: CAULKED TIGHT WITH FIRE STOPPING MATERIAL COMPLYING WITH ASTM E814 IN ACCORDANCE WITH DIVISION 07 TO PREVENT THE SPREAD OF FIRE, SMOKE, AND GASES.

2.2 PIPE-SLEEVE SEALS

- A. MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE PRODUCTS BY ONE OF THE FOLLOWING OR AN APPROVED EQUAL.
 - 1. LINK-SEAL.
 - 2. METRAFLEX CO.
 - 3. FERNCO.

B. MODULAR MECHANICAL SLEEVE-SEAL:
SLEEVES AND SLEEVE SEALS FOR PLUMBING
PIPING
OSBORN ENGINEERING

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1. ELASTOMER-BASED INTERLOCKING LINKS CONTINUOUSLY FILL ANNULAR SPACE BETWEEN PIPE AND WALL-SLEEVE, WALL OR CASING OPENING.
 2. WATERTIGHT SEAL BETWEEN PIPE AND WALL-SLEEVE, WALL OR CASING OPENING.
 3. SIZE AND SELECT SEAL COMPONENT MATERIALS IN ACCORDANCE WITH SERVICE REQUIREMENTS.
 4. CARBON STEEL PRESSURE END PLATES. INCLUDE TWO FOR EACH SEALING ELEMENT.
 5. CONNECTING BOLTS AND NUTS: CARBON STEEL WITH CORROSION-RESISTANT COATING OF LENGTH REQUIRED TO SECURE PRESSURE PLATES TO SEALING ELEMENTS. INCLUDE ONE FOR EACH SEALING ELEMENT.
- C. SEALING COMPOUNDS:
1. PROVIDE PACKING AND SEALING COMPOUND TO FILL PIPE TO SLEEVE THICKNESS.
 2. COMBINED PACKING AND SEALING COMPOUNDING TO MATCH PARTITION FIRE-RESISTANCE HOURLY RATING.
- D. PIPE SLEEVE MATERIAL:
1. BEARING WALLS: STEEL, CAST IRON, OR TERRA-COTTA PIPE.
 2. MASONRY STRUCTURES: SHEET METAL OR FIBER.
- E. WALL SLEEVE: PVC MATERIAL WITH WATERSTOP COLLAR, AND NAILER END-CAPS.

PART 3 EXECUTION

3.1 PREPARATION

- A. REAM PIPE AND TUBE ENDS. REMOVE BURRS. BEVEL PLAIN END FERROUS PIPE.
- B. REMOVE SCALE AND FOREIGN MATERIAL, FROM INSIDE AND OUTSIDE, BEFORE ASSEMBLY.

3.2 INSTALLATION

- A. ROUTE PIPING IN ORDERLY MANNER, PLUMB AND PARALLEL TO BUILDING STRUCTURE. MAINTAIN GRADIENT.
- B. INSTALL PIPING TO CONSERVE BUILDING SPACE, TO NOT INTERFERE WITH USE OF SPACE AND OTHER WORK.
- C. INSTALL PIPING AND PIPE SLEEVES TO ALLOW FOR EXPANSION AND CONTRACTION WITHOUT STRESSING PIPE, JOINTS, OR CONNECTED EQUIPMENT.
- D. STRUCTURAL CONSIDERATIONS: DO NOT PENETRATE BUILDING STRUCTURAL MEMBERS UNLESS INDICATED.
- E. PROVIDE SLEEVES WHEN PENETRATING FOOTINGS, FLOORS, WALLS, AND PARTITIONS. SEAL PIPE INCLUDING SLEEVE PENETRATIONS TO ACHIEVE FIRE RESISTANCE EQUIVALENT TO FIRE SEPARATION REQUIRED.
1. UNDERGROUND PIPING: CAULK PIPE SLEEVE WATERTIGHT. PROVIDE MECHANICAL SLEEVE-SEAL SYSTEM.
 2. ABOVEGROUND PIPING:
 - a. PACK SOLID USING MINERAL FIBER COMPLYING WITH ASTM C592.

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- b. FILL SPACE WITH AN ELASTOMER CAULK TO A DEPTH OF 0.50 INCH WHERE PENETRATIONS OCCUR BETWEEN CONDITIONED AND UNCONDITIONED SPACES.
 - 3. ALL RATED OPENINGS: CAULK TIGHT WITH FIRE STOPPING MATERIAL COMPLYING WITH ASTM E814 IN ACCORDANCE WITH DIVISION 07 TO PREVENT THE SPREAD OF FIRE, SMOKE, AND GASES.
 - 4. CAULK EXTERIOR WALL SLEEVES WATERTIGHT. PROVIDE MECHANICAL SLEEVE-SEAL SYSTEM.
 - F. MANUFACTURED SLEEVE-SEAL SYSTEMS:
 - 1. INSTALL MANUFACTURED SLEEVE-SEAL SYSTEMS IN SLEEVES LOCATED IN GRADE SLABS AND EXTERIOR CONCRETE WALLS AT PIPING ENTRANCES INTO BUILDING.
 - 2. PROVIDE SEALING ELEMENTS OF THE SIZE, QUANTITY, AND TYPE REQUIRED FOR THE PIPING AND SLEEVE INNER DIAMETER OR PENETRATION DIAMETER.
 - 3. LOCATE PIPING IN CENTER OF SLEEVE OR PENETRATION.
 - 4. INSTALL FIELD ASSEMBLED SLEEVE-SEAL SYSTEM COMPONENTS IN ANNULAR SPACE BETWEEN SLEEVE AND PIPING.
 - 5. TIGHTEN BOLTING FOR A WATER-TIGHT SEAL.
 - 6. INSTALL IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS.
 - G. WHEN INSTALLING MORE THAN ONE PIPING SYSTEM MATERIAL, ENSURE SYSTEM COMPONENTS ARE COMPATIBLE AND JOINED TO ENSURE THE INTEGRITY OF THE SYSTEM. PROVIDE NECESSARY JOINING FITTINGS. ENSURE FLANGES, UNION, AND COUPLINGS FOR SERVICING ARE CONSISTENTLY PROVIDED.
- 3.3 CLEANING
- A. UPON COMPLETION OF WORK, CLEAN ALL PARTS OF THE INSTALLATION.
 - B. CLEAN EQUIPMENT, PIPES, VALVES, AND FITTINGS OF GREASE, METAL CUTTINGS, AND SLUDGE THAT MAY HAVE ACCUMULATED FROM THE INSTALLATION AND TESTING OF THE SYSTEM.
 - C. SEE DIVISION 01 - CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL FOR ADDITIONAL REQUIREMENTS.

END OF SECTION

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SECTION 220529 - HANGERS AND SUPPORTS FOR PLUMBING PIPING AND EQUIPMENT

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. BEAM CLAMPS.
- B. PIPE HANGERS.
- C. PIPE SUPPORTS, GUIDES, SHIELDS, AND SADDLES.
- D. ANCHORS AND FASTENERS.

1.2 RELATED REQUIREMENTS

- A. DIVISION 03 - CAST-IN-PLACE CONCRETE: CONCRETE EQUIPMENT PADS.
- B. DIVISION 05 -METAL FABRICATIONS.

1.3 REFERENCE STANDARDS

- A. ASTM A36/A36M - STANDARD SPECIFICATION FOR CARBON STRUCTURAL STEEL; 2019.
- B. ASTM A47/A47M - STANDARD SPECIFICATION FOR FERRITIC MALLEABLE IRON CASTINGS; 1999, WITH EDITORIAL REVISION (2022).
- A. ASTM A123/A123M - STANDARD SPECIFICATION FOR ZINC (HOT-DIP GALVANIZED) COATINGS ON IRON AND STEEL PRODUCTS; 2024.
- B. ASTM A153/A153M - STANDARD SPECIFICATION FOR ZINC COATING (HOT-DIP) ON IRON AND STEEL HARDWARE; 2023.
- C. ASTM A181/A181M - STANDARD SPECIFICATION FOR CARBON STEEL FORGINGS, FOR GENERAL-PURPOSE PIPING; 2025.
- D. ASTM A283/A283M - STANDARD SPECIFICATION FOR LOW AND INTERMEDIATE TENSILE STRENGTH CARBON STEEL PLATES; 2024.
- E. ASTM A395/A395M - STANDARD SPECIFICATION FOR FERRITIC DUCTILE IRON PRESSURE-RETAINING CASTINGS FOR USE AT ELEVATED TEMPERATURES; 1999 (REAPPROVED 2022).
- F. ASTM A653/A653M - STANDARD SPECIFICATION FOR STEEL SHEET, ZINC-COATED (GALVANIZED) OR ZINC-IRON ALLOY-COATED (GALVANNEALED) BY THE HOT-DIP PROCESS; 2025A.
- G. ASTM A1011/A1011M - STANDARD SPECIFICATION FOR STEEL, SHEET AND STRIP, HOT-ROLLED, CARBON, STRUCTURAL, HIGH-STRENGTH LOW-ALLOY, HIGH-STRENGTH LOW-ALLOY WITH IMPROVED FORMABILITY, AND ULTRA-HIGH STRENGTH; 2025.
- H. ASTM E84 - STANDARD TEST METHOD FOR SURFACE BURNING CHARACTERISTICS OF BUILDING MATERIALS; 2026.

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- I. ASTM E96/E96M - STANDARD TEST METHODS FOR GRAVIMETRIC DETERMINATION OF WATER VAPOR TRANSMISSION RATE OF MATERIALS; 2024A.
- J. FM (AG) - FM APPROVAL GUIDE; CURRENT EDITION.
- K. MSS SP-58 - PIPE HANGERS AND SUPPORTS - MATERIALS, DESIGN, MANUFACTURE, SELECTION, APPLICATION, AND INSTALLATION; 2025.
- L. NFPA 101 - LIFE SAFETY CODE; MOST RECENT EDITION ADOPTED BY AUTHORITY HAVING JURISDICTION, INCLUDING ALL APPLICABLE AMENDMENTS AND SUPPLEMENTS.
- M. UL (DIR) - ONLINE CERTIFICATIONS DIRECTORY; CURRENT EDITION.
- N. UL 723 - STANDARD FOR TEST FOR SURFACE BURNING CHARACTERISTICS OF BUILDING MATERIALS; CURRENT EDITION, INCLUDING ALL REVISIONS.

1.4 ADMINISTRATIVE REQUIREMENTS

- A. COORDINATION:
 - 1. COORDINATE SIZES AND ARRANGEMENT OF SUPPORTS AND BASES WITH THE ACTUAL EQUIPMENT AND COMPONENTS TO BE INSTALLED.
 - 2. COORDINATE THE WORK WITH OTHER TRADES TO PROVIDE ADDITIONAL FRAMING AND MATERIALS REQUIRED FOR INSTALLATION.
 - 3. COORDINATE COMPATIBILITY OF SUPPORT AND ATTACHMENT COMPONENTS WITH MOUNTING SURFACES AT THE INSTALLED LOCATIONS.
 - 4. COORDINATE THE ARRANGEMENT OF SUPPORTS WITH DUCTWORK, PIPING, EQUIPMENT AND OTHER POTENTIAL CONFLICTS INSTALLED UNDER OTHER SECTIONS OR BY OTHERS.
- B. SEQUENCING:
 - 1. DO NOT INSTALL PRODUCTS ON OR PROVIDE ATTACHMENT TO CONCRETE SURFACES UNTIL CONCRETE HAS FULLY CURED IN ACCORDANCE WITH DIVISION 03.

1.5 SUBMITTALS

- A. SEE DIVISION 01 AND SECTION 220500 FOR SUBMITTAL PROCEDURES.
- B. PRODUCT DATA: PROVIDE MANUFACTURER'S STANDARD CATALOG PAGES AND DATA SHEETS FOR METAL CHANNEL (STRUT) FRAMING SYSTEMS, NONPENETRATING ROOFTOP SUPPORTS, POST-INSTALLED CONCRETE AND MASONRY ANCHORS, AND THERMAL INSULATED PIPE SUPPORTS.
- C. SHOP DRAWINGS: INCLUDE DETAILS FOR FABRICATED HANGERS AND SUPPORTS.
 - 1. APPLICATION OF PROTECTIVE INSERTS, SADDLES, AND SHIELDS AT PIPE HANGERS FOR EACH TYPE OF INSULATION AND HANGER.
- D. EVALUATION REPORTS: FOR PRODUCTS SPECIFIED AS REQUIRING EVALUATION AND RECOGNITION BY ICC EVALUATION SERVICE, LLC (ICC-ES), PROVIDE CURRENT ICC-ES EVALUATION REPORTS UPON REQUEST.
- E. INSTALLER'S QUALIFICATIONS: INCLUDE EVIDENCE OF COMPLIANCE WITH SPECIFIED REQUIREMENTS.
- F. MANUFACTURER'S INSTRUCTIONS: INDICATE APPLICATION CONDITIONS AND LIMITATIONS OF USE STIPULATED BY PRODUCT TESTING AGENCY. INCLUDE

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INSTRUCTIONS FOR STORAGE, HANDLING, PROTECTION, EXAMINATION, PREPARATION, AND INSTALLATION OF PRODUCT.

1.6 QUALITY ASSURANCE

- A. COMPLY WITH APPLICABLE BUILDING CODE.
- B. INSTALLER QUALIFICATIONS FOR FIELD-WELDING: AS SPECIFIED IN DIVISION 05.
- C. PRODUCT LISTING ORGANIZATION QUALIFICATIONS: AN ORGANIZATION RECOGNIZED BY OSHA AS A NATIONALLY RECOGNIZED TESTING LABORATORY (NRTL) AND ACCEPTABLE TO AUTHORITIES HAVING JURISDICTION.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. RECEIVE, INSPECT, HANDLE, AND STORE PRODUCTS IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.

PART 2 PRODUCTS

2.1 GENERAL REQUIREMENTS

- A. STRUCTURAL PERFORMANCE: HANGERS AND SUPPORTS FOR PLUMBING PIPING AND EQUIPMENT ARE TO WITHSTAND THE EFFECTS OF GRAVITY LOADS AND STRESSES WITHIN LIMITS AND UNDER CONDITIONS INDICATED IN ACCORDANCE WITH ASCE/SEI 7.
 - 1. DESIGN SUPPORTS FOR MULTIPLE PIPES, INCLUDING PIPE STANDS, CAPABLE OF SUPPORTING COMBINED WEIGHT OF SUPPORTED SYSTEMS, SYSTEM CONTENTS, AND TEST WATER.
 - 2. DESIGN EQUIPMENT SUPPORTS CAPABLE OF SUPPORTING COMBINED OPERATING WEIGHT OF SUPPORTED EQUIPMENT AND CONNECTED SYSTEMS AND COMPONENTS.
- B. PROVIDE REQUIRED HARDWARE TO HANG OR SUPPORT PIPING, EQUIPMENT, OR FIXTURES WITH RELATED ACCESSORIES AS NECESSARY TO COMPLETE INSTALLATION OF PLUMBING WORK.
- C. PROVIDE HARDWARE PRODUCTS LISTED, CLASSIFIED, AND LABELED AS SUITABLE FOR INTENDED PURPOSE.
- D. WHERE SUPPORT AND ATTACHMENT COMPONENT TYPES AND SIZES ARE NOT INDICATED, SELECT IN ACCORDANCE WITH MANUFACTURER'S APPLICATION CRITERIA AS REQUIRED FOR THE LOAD TO BE SUPPORTED. INCLUDE CONSIDERATION FOR VIBRATION, EQUIPMENT OPERATION, AND SHOCK LOADS WHERE APPLICABLE.
- E. DO NOT USE WIRE, CHAIN, PERFORATED PIPE STRAP, OR WOOD FOR PERMANENT SUPPORTS UNLESS SPECIFICALLY INDICATED OR PERMITTED.
- F. FIRE RESISTANCE: PROVIDE HARDWARE RATED FOR 60 MINUTES RESISTANCE UNLESS SPECIFICALLY INDICATED BY THE AUTHORITY HAVING JURISDICTION.
- G. VIBRATION ISOLATION REQUIREMENTS: SEE SECTION 220548.
- H. MATERIALS FOR METAL FABRICATED SUPPORTS: COMPLY WITH DIVISION 05.

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1. GALVANIZED STEEL: HOT-DIP GALVANIZED IN ACCORDANCE WITH ASTM A123/A123M OR ASTM A153/A153M UNLESS STATED OTHERWISE.
 - I. CORROSION RESISTANCE: USE CORROSION-RESISTANT METAL-BASED MATERIALS FULLY COMPATIBLE WITH EXPOSED PIPING MATERIALS AND SUITABLE FOR THE ENVIRONMENT WHERE INSTALLED.
 1. INDOOR DRY LOCATIONS: USE MATERIAL INDICATED IN THIS SPECIFICATION.
 2. OUTDOOR, DAMP, OR WET-INDOOR, COASTAL LOCATIONS, COASTAL: USE TYPE 304 STAINLESS STEEL.
 3. CORROSIVE CHEMICAL ENVIRONMENT OR EXTERIOR SUPPORTS FOR COASTAL AREAS: USE TYPE 316 STAINLESS STEEL.
 - J. DIELECTRIC BARRIERS: PROVIDE BETWEEN METALLIC SUPPORTS AND METALLIC PIPING AND ASSOCIATED ITEMS OF DISSIMILAR TYPE; ACCEPTABLE DIELECTRIC BARRIERS INCLUDE COATINGS ATTACHED SECURELY TO PIPE OR ITEM. COPPER COATED, PLATED OR COLORED HANGERS AND SUPPORTS ARE NOT ACCEPTABLE.
- 2.2 MANUFACTURERS
- A. FURNISH ALL HANGERS, SUPPORPTS, HARDWARE, FITTINGS, AND ACCESSORIES FROM SINGLE MANUFACTURER.
 - B. MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE PRODUCTS BY ONE OF THE FOLLOWING OR AN APPROVED EQUAL.
 1. ANVIL INTERNATIONAL, LLC.
 2. CLEVIS
 3. COOPER B-LINE; BRAND OF EATON, ELECTRICAL SECTOR
 4. GRIPPLE, INC.
 5. MIRO INDUSTRIES, INC.
 6. UNISTRUT, A BRAND OF ATKORE INTERNATIONAL, INC.
- 2.3 SECONDARY PIPE POSITIONING AND SUPPORTS:
- A. SUPPORT AND POSITIONING OF PIPING SHALL BE BY MEANS OF ENGINEERED METHODS THAT COMPLY WITH IAPMO PS 42-96. THESE SHALL BE HUBBARD ENTERPRISES/HOLDRITE SUPPORT SYSTEMS OR OWNER-APPROVED EQUIVALENT.
 - B. FOR PLENUM APPLICATIONS USE PIPE SUPPORTS THAT MEET ASTM E-84 25/50 STANDARDS, SUCH AS THE HUBBARD ENTERPRISES/HOLDRITE FLAME FIGHTER TM OR OWNER-APPROVED EQUIVALENT.
 - C. FOR VERTICAL MID-SPAN SUPPORTS OF PIPING 4" AND UNDER, USE HUBBARD ENTERPRISES/HOLDRITE STOUT BRACKETS WITH HUBBARD ENTERPRISES/HOLDRITE STOUT CLAMPS OR TWO-HOLE PIPE CLAMPS (MSS TYPE 26).
 - D. PROVIDE RUBBER COATED, PLASTIC, OR EPOXY COATED HANGERS AND SUPPORTS FOR COPPER PIPING. COPPER COATED, PLATED OR COLORED HANGERS AND SUPPORTS ARE NOT ACCEPTABLE.
 - E. MAKESHIFT, FIELD DEVISED METHODS OF PLUMBING PIPE POSITIONING AND SUPPORTS, SUCH AS WITH THE USE OF SCRAP FRAMING MATERIALS, ARE NOT ALLOWED.

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2.4 BEAM CLAMPS

- A. MSS SP-58 TYPES 19 THROUGH 23, 25 OR 27 THROUGH 30 BASED ON REQUIRED LOAD.
- B. C-CLAMP: MSS SP-58 TYPE 23, MALLEABLE IRON AND STEEL WITH PLAIN, STAINLESS STEEL, AND ZINC FINISH.
 - 1. USE OF "C" CLAMPS AND BEAM CLAMPS OF "C" PATTERN AND ANY MODIFICATIONS THEREOF ARE PROHIBITED FOR ALL PIPE SIZES 6" AND GREATER.
 - 2. "C" CLAMPS USED FOR PIPE SIZES 3" AND 4" MUST ALSO BE INSTALLED WITH BEAM CLAMP RETAINING STRAPS WITH A MINIMUM OF 1" OF STRAP TO BE BENT OVER THE BEAM SIDE OF THE FLANGE OPPOSITE THE SIDE THE BEAM CLAMP IS MOUNTED ON.
- C. SMALL OR JUNIOR BEAM CLAMP: MSS SP-58 TYPE 19, MALLEABLE IRON WITH ZINC FINISH. FOR INVERTED USAGE PROVIDE MANUFACTURER LISTED SIZE(S).
- D. WIDE MOUTH BEAM CLAMP: MSS SP-58 TYPE 19, MALLEABLE IRON WITH PLAIN FINISH.
- E. CENTERLOAD BEAM CLAMP WITH EXTENSION PIECE: MSS SP-58 TYPE 30, MALLEABLE IRON WITH PLAIN FINISH.
- F. UL (DIR) APPROVED BEAM CLAMP: MSS SP-58
- G. PROVIDE CLAMPS WITH HARDENED STEEL CUP-POINT SET SCREWS AND LOCK-NUTS FOR ANCHORING IN PLACE.
- H. MATERIAL: ASTM A395/A395M DUCTILE IRON, ASTM A36/A36M CARBON STEEL, ASTM A47/A47M MALLEABLE IRON, ASTM A181/A181M FORGED STEEL, OR ASTM A283/A283M STEEL.

2.5 PIPE HANGERS

- A. BAND HANGERS, ADJUSTABLE:
 - 1. MSS SP-58 TYPE 7 OR 9, ASTM A1011/A1011M STEEL OR ASTM A653/A653M CARBON STEEL.
 - 2. GALVANIZED METALLIC COATINGS: PREGALVANIZED OR HOT-DIP GALVANIZED
 - 3. NONMETALLIC COATINGS: PLASTIC COATED OR EPOXY POWDER COATED.
- B. J-HANGERS, ADJUSTABLE:
 - 1. MSS SP-58 TYPE 5, ASTM A1011/A1011M STEEL OR ASTM A653/A653M CARBON STEEL.
 - 2. GALVANIZED METALLIC COATINGS: PREGALVANIZED OR HOT-DIP GALVANIZED.
 - 3. NONMETALLIC COATINGS: PLASTIC COATED OR EPOXY POWDER COATED.
 - 4. FELT-LINED: PROVIDE FOR UNINSULATED PIPE TO REDUCE NOISE AND PREVENT STATIC ISSUES.
- C. SWIVEL RING HANGERS, ADJUSTABLE:
 - 1. MSS SP-58 TYPE 10, EPOXY-PAINTED, ZINC-COLORED.
 - 2. MATERIAL: ASTM A395/A395M DUCTILE IRON, ASTM A36/A36M CARBON STEEL, ASTM A47/A47M MALLEABLE IRON, ASTM A181/A181M FORGED STEEL, OR ASTM A283/A283M STEEL.
 - 3. FM (AG) AND UL (DIR) LISTED FOR SPECIFIC PIPE SIZE RUNS AND LOADS.
 - 4. UL (DIR) LISTED FOR SPECIFIC PIPE SIZE RUNS AND LOADS.
 - 5. GALVANIZED METALLIC COATINGS: PREGALVANIZED OR HOT-DIP GALVANIZED.
 - 6. NONMETALLIC COATINGS: PLASTIC COATED OR EPOXY POWDER COATED.

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7. FELT-LINED: PROVIDE FOR UNINSULATED PIPE TO REDUCE NOISE AND PREVENT STATIC ISSUES.

D. CLEVIS HANGERS, ADJUSTABLE:

1. FELT-LINED: MSS SP-58 TYPE 1, ZINC-PLATED, SILICONE-FREE CARBON STEEL.
2. STANDARD-DUTY: MSS SP-58 TYPE 1, ZINC-COLORED, EPOXY PLATED.
3. UL AND FM LISTED
4. UL LISTED
5. GALVANIZED METALLIC COATINGS: PREGALVANIZED OR HOT-DIP GALVANIZED.
6. NONMETALLIC COATINGS: PLASTIC COATED OR EPOXY POWDER COATED

2.6 PIPE CLAMPS

A. RISER CLAMPS:

1. FOR INSULATED PIPE RUNS, PROVIDE TWO BOLT-TYPE CLAMPS DESIGNED FOR INSTALLATION UNDER INSULATION.
2. MSS SP-58 TYPE 1 OR 8, CARBON STEEL WITH GALVANIZED FINISH.
3. MEDIUM SPLIT HORIZONTAL PIPE CLAMP: MSS SP-58 TYPE 4, CARBON STEEL WITH GALVANIZED FINISH.
4. UL LISTED

B. EXTENSION SPLIT PIPE CLAMP:

1. MSS SP-58 TYPE 12, HINGED SPLIT RING AND YOKE ROLLER HANGER WITH EPOXY COPPER, PLAIN, OR ZINC FINISH.
2. MATERIAL: ASTM A47/A47M MALLEABLE IRON OR ASTM A36/A36M CARBON STEEL.
3. PROVIDE HANGER ROD AND NUTS OF THE SAME TYPE AND MATERIAL FOR A GIVEN PIPE RUN.

C. OFFSET PIPE CLAMPS: DOUBLE-LEG DESIGN TWO-PIECE PIPE CLAMP.

D. STRUT CLAMPS:

1. PIPE CLAMP: TWO-PIECE RIGID, UNIVERSAL, OR OUTER DIAMETER TYPE, CARBON STEEL WITH GALVANIZED STEEL FINISH.

E. INSULATION COUPLING:

1. TWO BOLT-TYPE CLAMPS DESIGNED FOR INSTALLATION UNDER INSULATION.
2. MATERIAL: CARBON STEEL WITH EPOXY COPPER, EPOXY PLATED, OR GALVANIZED STEEL FINISH.

2.7 PIPE SUPPORTS, GUIDES, SHIELDS, AND SADDLES

A. DIELECTRIC BARRIERS: PROVIDE BETWEEN METALLIC SUPPORTS AND METALLIC PIPING AND ASSOCIATED ITEMS OF DISSIMILAR TYPE; ACCEPTABLE DIELECTRIC BARRIERS INCLUDE COATINGS ATTACHED SECURELY TO PIPE OR ITEM. COPPER COATED, PLATED OR COLORED HANGERS AND SUPPORTS AND NOT ACCEPTABLE.

B. STANCHIONS:

1. MATERIAL: MALLEABLE IRON, ASTM A47/A47M; OR CARBON STEEL, ASTM A36/A36M.
2. PROVIDE COATED SADDLES TO ISOLATE STEEL HANGERS FROM DISSIMILAR METAL TUBE OR PIPE.
3. FOR PIPE RUNS, USE STANCHIONS OF SAME TYPE AND MATERIAL WHERE VERTICAL ADJUSTMENT IS REQUIRED FOR STATIONARY PIPE.

CCAC BOYCE ROOF REPLACEMENT

- C. U-BOLTS:
 - 1. MSS SP-58 TYPE 24, CARBON STEEL U-BOLT FOR PIPE SUPPORT OR ANCHORING.
- D. INTERMEDIATE PIPE ALIGNMENT GUIDES:
 - 1. PIPE SIZES 6 INCH AND SMALLER: MINIMUM CLEARANCE OF 0.16 INCH.
 - 2. PIPE SIZE 8 INCH: 0.625 INCH U-BOLT WITH DOUBLE NUTS PROVIDING MINIMUM CLEARANCE OF 0.28 INCH.
 - 3. USE PIPE CLAMPS WITH OVERSIZE PIPE SLEEVE THAT PROVIDES CLEARANCE AROUND PIPE.
- E. PIPE ALIGNMENT GUIDES:
 - 1. PIPE SIZES 4 INCH (100 MM, DN) AND SMALLER: SPIDER OR SLEEVE TYPE.
 - 2. PIPE SIZES 6 INCH (150 MM, DN) AND LARGER: ROLLER TYPE. FOR IF LONGITUDINAL MOVEMENT CAUSED BY EXPANSION AND CONTRACTION OCCURS BUT VERTICAL ADJUSTMENT IS UNNECESSARY.
- F. PIPE SHIELDS FOR INSULATED PIPING:
 - 1. MSS SP-58 TYPE 40, CARBON STEEL WITH GALVANIZED FINISH AND STAINLESS STEEL.
 - 2. GENERAL CONSTRUCTION AND REQUIREMENTS:
 - a. SURFACE BURNING CHARACTERISTICS: COMPLY WITH ASTM E84 OR UL 723.
 - b. SHIELDS MATERIAL: CARBON STEEL WITH GALVANIZED FINISH.
 - c. MAXIMUM INSULATED PIPE OUTER DIAMETER: 12-5/8 INCH.
 - d. SERVICE TEMPERATURE: MINUS 40 TO 178 DEGREES F.
 - e. PIPE SHIELDS TO BE PROVIDED AT HANGER, SUPPORT, AND GUIDE LOCATIONS ON PIPE REQUIRING INSULATION OR ADDITIONAL SUPPORT.
- G. PIPE SUPPORTS:
 - 1. MATERIAL: ASTM A395/A395M DUCTILE IRON, ASTM A36/A36M CARBON STEEL, ASTM A47/A47M MALLEABLE IRON, ASTM A181/A181M FORGED STEEL, OR ASTM A283/A283M STEEL.
 - 2. OPERATING TEMPERATURES FROM 122 TO 446 DEGREES F:
 - a. OVERHEAD SUPPORT: MSS SP-58 TYPE 1 OR 3 THROUGH 12 CLAMPS WITH APPROPRIATE SADDLE OF MSS SP-58 TYPE 40 FOR INSULATED PIPE.
 - b. ROLLER SUPPORT: MSS SP-58 TYPES 41 OR 43 THROUGH 46 ROLLER CHAIR SUPPORT WITH APPROPRIATE SADDLE OF MSS SP-58 TYPE 39 FOR INSULATED PIPE.
- H. PIPE SUPPORTS, THERMAL INSULATED:
 - 1. GENERAL REQUIREMENTS:
 - a. INSULATED PIPE SUPPORTS TO BE PROVIDED AT HANGER, SUPPORT, AND GUIDE LOCATIONS ON PIPE REQUIRING INSULATION OR ADDITIONAL SUPPORT.
 - b. PIPE INSULATION PROTECTION SHIELDS TO BE PROVIDED AT THE HANGER POINTS AND GUIDE LOCATIONS ON PIPES REQUIRING INSULATION.
 - c. SURFACE BURNING CHARACTERISTICS: FLAME SPREAD INDEX/SMOKE DEVELOPED INDEX OF 5/30, MAXIMUM, WHEN TESTED IN ACCORDANCE WITH ASTM E84 OR UL 723.
 - d. INSULATION INSERTS TO CONSIST OF RIGID PHENOLIC FOAM INSULATION SURROUNDED BY 360 DEGREE, PVC JACKETING.
 - 2. PVC JACKET:

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- a. PIPE INSULATION PROTECTION SHIELDS TO BE PROVIDED WITH BALL BEARING HINGE AND LOCKING SEAM.
- b. MOISTURE VAPOR TRANSMISSION: 0.0071 PERM INCH, WHEN TESTED IN ACCORDANCE WITH ASTM E96/E96M.
- c. MINIMUM THICKNESS: 60 MIL, 0.06 INCH.

2.8 ANCHORS AND FASTENERS

- A. UNLESS OTHERWISE INDICATED AND WHERE NOT OTHERWISE RESTRICTED, USE THE ANCHOR AND FASTENER TYPES INDICATED FOR THE SPECIFIED APPLICATIONS.
- B. CONCRETE: USE PRESET CONCRETE INSERTS, EXPANSION ANCHORS, OR SCREW ANCHORS.
- C. SOLID OR GROUT-FILLED MASONRY: USE EXPANSION ANCHORS OR SCREW ANCHORS.
- D. HOLLOW MASONRY: USE TOGGLE BOLTS.
- E. HOLLOW STUD WALLS: USE TOGGLE BOLTS.
- F. STEEL: USE BEAM CEILING CLAMPS, BEAM CLAMPS, MACHINE BOLTS, OR WELDED THREADED STUDS.
- G. BEAM CEILING FLANGES: ASTM A47/A47M GRADE 32510, MALLEABLE IRON OR STAINLESS STEEL WITH COPPER, PLAIN, STAINLESS STEEL, OR ZINC FINISH.
- H. SHEET METAL: USE SHEET METAL SCREWS.
- I. WOOD: USE WOOD SCREWS.
- J. PLASTIC AND LEAD ANCHORS ARE NOT PERMITTED.
- K. POWDER-ACTUATED FASTENERS ARE NOT PERMITTED.
- L. HAMMER-DRIVEN ANCHORS AND FASTENERS ARE NOT PERMITTED.
- M. POST-INSTALLED CONCRETE AND MASONRY ANCHORS: EVALUATED AND RECOGNIZED BY ICC EVALUATION SERVICE, LLC (ICC-ES) FOR COMPLIANCE WITH APPLICABLE BUILDING CODE.
- N. PRESET CONCRETE INSERTS: CONTINUOUS METAL STRUT CHANNEL AND SPOT INSERTS SPECIFICALLY DESIGNED TO BE CAST IN CONCRETE CEILINGS, WALLS, AND FLOORS.
 - 1. CHANNEL MATERIAL: USE GALVANIZED STEEL.
 - 2. MANUFACTURER: SAME AS MANUFACTURER OF METAL STRUT CHANNEL FRAMING SYSTEM.
- O. CONCRETE INSERTS:

PART 3 EXECUTION

3.1 EXAMINATION

- A. VERIFY THAT FIELD MEASUREMENTS ARE AS INDICATED.
- B. VERIFY THAT MOUNTING SURFACES ARE READY TO RECEIVE SUPPORT AND ATTACHMENT COMPONENTS.

CCAC BOYCE ROOF REPLACEMENT

- C. VERIFY THAT CONDITIONS ARE SATISFACTORY FOR INSTALLATION PRIOR TO STARTING WORK.

3.2 INSTALLATION

- A. COMPLY WITH REQUIREMENTS IN ASSEMBLIES. REFER TO DIVISION 07 FIRESTOPPING FOR FIRESTOPPING MATERIALS AND INSTALLATION, FOR PENETRATIONS THROUGH FIRE-RATED WALLS, CEILINGS, AND ASSEMBLIES.
- B. STRENGTH OF SUPPORT ASSEMBLIES: WHERE NOT INDICATED, SELECT SIZES OF COMPONENTS, SO STRENGTH WILL BE ADEQUATE TO CARRY PRESENT AND FUTURE STATIC LOADS WITHIN SPECIFIED LOADING LIMITS. MINIMUM STATIC DESIGN LOAD USED FOR STRENGTH DETERMINATION IS TO INCLUDE WEIGHT OF SUPPORTED COMPONENTS PLUS 200 LB.
- C. INSTALL HANGERS AND SUPPORTS TO ALLOW CONTROLLED THERMAL MOVEMENT OF PIPING SYSTEMS, TO PERMIT FREEDOM OF MOVEMENT BETWEEN PIPE ANCHORS, AND TO FACILITATE ACTION OF EXPANSION JOINTS, EXPANSION LOOPS, EXPANSION BENDS, AND SIMILAR UNITS.
- D. INSTALL LATERAL BRACING WITH PIPE HANGERS AND SUPPORTS TO PREVENT SWAYING.
- E. INSTALL BUILDING ATTACHMENTS WITHIN CONCRETE SLABS OR ATTACH TO STRUCTURAL STEEL. INSTALL ADDITIONAL ATTACHMENTS AT CONCENTRATED LOADS, INCLUDING VALVES, FLANGES, AND STRAINERS, 2-1/2 INCH AND LARGER AND AT CHANGES IN DIRECTION OF PIPING. COORDINATE LOCATION OF CONCRETE INSERTS BEFORE CONCRETE IS PLACED.
- F. LOAD DISTRIBUTION: INSTALL HANGERS AND SUPPORTS SO THAT PIPING LIVE AND DEAD LOADS AND STRESSES FROM MOVEMENT WILL NOT BE TRANSMITTED TO CONNECTED EQUIPMENT.
- G. PIPE SLOPES: INSTALL HANGERS AND SUPPORTS TO PROVIDE INDICATED PIPE SLOPES AND TO NOT EXCEED MAXIMUM PIPE DEFLECTIONS ALLOWED BY ASME B31.9 FOR BUILDING SERVICES PIPING.
- H. INSTALL PRODUCTS IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.
- I. PROVIDE INDEPENDENT SUPPORT FROM BUILDING STRUCTURE. DO NOT PROVIDE SUPPORT FROM PIPING, DUCTWORK, CONDUIT, OR OTHER SYSTEMS.
- J. UNLESS SPECIFICALLY INDICATED OR APPROVED BY ARCHITECT, DO NOT PROVIDE SUPPORT FROM SUSPENDED CEILING SUPPORT SYSTEM OR CEILING GRID.
- K. UNLESS SPECIFICALLY INDICATED OR APPROVED BY ARCHITECT, DO NOT PROVIDE SUPPORT FROM ROOF DECK.
- L. DO NOT PENETRATE OR OTHERWISE NOTCH OR CUT STRUCTURAL MEMBERS WITHOUT APPROVAL OF STRUCTURAL ENGINEER.
- M. FIELD WELDING: COMPLY WITH AWS D1.1/D1.1M PROCEDURES FOR SHIELDED, METAL ARC WELDING; APPEARANCE AND QUALITY OF WELDS; AND METHODS USED IN CORRECTING WELDING WORK; AND WITH THE FOLLOWING:
 - 1. USE MATERIALS AND METHODS THAT MINIMIZE DISTORTION AND DEVELOP STRENGTH AND CORROSION RESISTANCE OF BASE METALS.
 - 2. OBTAIN FUSION WITHOUT UNDERCUT OR OVERLAP.

CCAC BOYCE ROOF REPLACEMENT

3. REMOVE WELDING FLUX IMMEDIATELY.
 4. FINISH WELDS AT EXPOSED CONNECTIONS, SO NO ROUGHNESS SHOWS AFTER FINISHING AND SO CONTOURS OF WELDED SURFACES MATCH ADJACENT CONTOURS.
- N. PROVIDE THERMAL INSULATED PIPE SUPPORTS COMPLETE WITH HANGERS AND ACCESSORIES. INSTALL THERMAL INSULATED PIPE SUPPORTS DURING THE INSTALLATION OF THE PIPING SYSTEM.
- O. EQUIPMENT SUPPORT AND ATTACHMENT:
1. USE METAL FABRICATED SUPPORTS OR SUPPORTS ASSEMBLED FROM METAL CHANNEL (STRUT) TO SUPPORT EQUIPMENT AS REQUIRED.
 2. USE METAL CHANNEL (STRUT) SECURED TO STUDS TO SUPPORT EQUIPMENT SURFACE-MOUNTED ON HOLLOW STUD WALLS WHEN WALL STRENGTH IS NOT SUFFICIENT TO RESIST PULL-OUT.
 3. USE METAL CHANNEL (STRUT) TO SUPPORT SURFACE-MOUNTED EQUIPMENT IN WET OR DAMP LOCATIONS TO PROVIDE SPACE BETWEEN EQUIPMENT AND MOUNTING SURFACE.
 4. UNLESS OTHERWISE INDICATED, MOUNT FLOOR-MOUNTED EQUIPMENT ON PROPERLY SIZED 4 INCH HIGH CONCRETE PAD CONSTRUCTED IN ACCORDANCE WITH DIVISION 03.
 5. SECURELY FASTEN FLOOR-MOUNTED EQUIPMENT. DO NOT INSTALL EQUIPMENT SUCH THAT IT RELIES ON ITS OWN WEIGHT FOR SUPPORT.
- P. PRESET CONCRETE INSERTS: USE MANUFACTURER-PROVIDED CLOSURE STRIPS TO INHIBIT CONCRETE SEEPAGE DURING CONCRETE POUR.
- Q. SECURE FASTENERS ACCORDING TO MANUFACTURER'S RECOMMENDED TORQUE SETTINGS.
- R. REMOVE TEMPORARY SUPPORTS.
- S. INSULATED PIPING:
1. ATTACH CLAMPS AND SPACERS TO PIPING.
 - a. PIPING OPERATING ABOVE AMBIENT AIR TEMPERATURE: CLAMP MAY PROJECT THROUGH INSULATION.
 - b. PIPING OPERATING BELOW AMBIENT AIR TEMPERATURE: USE THERMAL HANGER SHIELD INSERT WITH CLAMP SIZED TO MATCH OD OF INSERT.
 - c. DO NOT EXCEED PIPE STRESS LIMITS ALLOWED BY ASME B31.9 FOR BUILDING SERVICES PIPING.
 2. INSTALL MSS SP-58, TYPE 39, PROTECTION SADDLES IF INSULATION WITHOUT VAPOR BARRIER IS INDICATED. FILL INTERIOR VOIDS WITH INSULATION THAT MATCHES ADJOINING INSULATION.
 - a. THERMAL HANGER SHIELD INSERTS MAY BE USED AS AN OPTION. INCLUDE STEEL WEIGHT-DISTRIBUTION PLATE FOR PIPE 4 INCH AND LARGER IF PIPE IS INSTALLED ON ROLLERS.
 3. INSTALL MSS SP-58, TYPE 40, PROTECTIVE SHIELDS ON COLD PIPING WITH VAPOR BARRIER. SHIELDS ARE TO SPAN AN ARC OF 180 DEGREES.
 - a. THERMAL HANGER SHIELD INSERTS MAY BE USED AS AN OPTION. INCLUDE STEEL WEIGHT-DISTRIBUTION PLATE FOR PIPE 4 INCH AND LARGER IF PIPE IS INSTALLED ON ROLLERS.
 4. SHIELD DIMENSIONS FOR PIPE: NOT LESS THAN THE FOLLOWING:
 - a. 1/4 INCH TO 3-1/2 INCH: 12 INCH LONG AND 0.048 INCH THICK.
 - b. 4 INCH: 12 INCH LONG AND 0.06 INCH THICK.
 - c. 5 INCH AND 6 INCH: 18 INCH LONG AND 0.06 INCH THICK.

CCAC BOYCE ROOF REPLACEMENT

- d. 8 INCH TO 14 INCH: 24 INCH LONG AND 0.075 INCH THICK.
- 5. PIPES 8 INCH AND LARGER: INCLUDE WOOD OR REINFORCED CALCIUM-SILICATE-INSULATION INSERTS OF LENGTH AT LEAST AS LONG AS PROTECTIVE SHIELD.
- T. METAL PIPE-HANGER INSTALLATION: COMPLY WITH MSS SP-58. INSTALL HANGERS, SUPPORTS, CLAMPS, AND ATTACHMENTS AS REQUIRED TO PROPERLY SUPPORT PIPING FROM BUILDING STRUCTURE.
 - 1. PIPES OF VARIOUS SIZES: SUPPORT TOGETHER AND SPACE TRAPEZES FOR SMALLEST PIPE SIZE, OR INSTALL INTERMEDIATE SUPPORTS FOR SMALLER-DIAMETER PIPES AS SPECIFIED FOR INDIVIDUAL PIPE HANGERS.
 - 2. FIELD FABRICATE IN ACCORDANCE WITH ASTM A36/A36M CARBON-STEEL SHAPES SELECTED FOR LOADS BEING SUPPORTED. WELD STEEL IN ACCORDANCE WITH AWS D1.1/D1.1M.
- U. THERMAL HANGER SHIELD INSTALLATION: INSTALL IN PIPE HANGER OR SHIELD FOR INSULATED PIPING.
- V. FASTENER SYSTEM INSTALLATION:
 - 1. INSTALL MECHANICAL-EXPANSION ANCHORS IN CONCRETE AFTER CONCRETE IS PLACED AND COMPLETELY CURED. INSTALL FASTENERS IN ACCORDANCE WITH MANUFACTURER'S WRITTEN INSTRUCTIONS.
 - 2. INSTALL LAG SCREW WOOD FASTENERS IN ACCORDANCE WITH MANUFACTURER'S WRITTEN INSTRUCTIONS.
 - 3. INSTALL FASTENERS IN ACCORDANCE WITH MANUFACTURER'S WRITTEN INSTRUCTIONS.
- W. PIPE STAND INSTALLATION:
 - 1. PIPE STAND TYPES, EXCEPT CURB-MOUNTED TYPE: ASSEMBLE COMPONENTS AND MOUNT ON SMOOTH ROOF SURFACE. DO NOT PENETRATE ROOF MEMBRANE.
 - 2. CURB-MOUNTED-TYPE PIPE STANDS: ASSEMBLE COMPONENTS OR FABRICATE PIPE STAND AND MOUNT ON PERMANENT, STATIONARY ROOF CURB. SEE DIVISION 07 "ROOF ACCESSORIES" FOR CURBS.
- X. PIPE-POSITIONING-SYSTEM INSTALLATION: INSTALL SUPPORT DEVICES TO MAKE RIGID SUPPLY AND WASTE PIPING CONNECTIONS TO EACH PLUMBING FIXTURE.
- Y. INSTALL HANGERS AND SUPPORTS COMPLETE WITH NECESSARY ATTACHMENTS, INSERTS, BOLTS, RODS, NUTS, WASHERS, AND OTHER ACCESSORIES.
- Z. EQUIPMENT SUPPORT INSTALLATION:
 - 1. FABRICATE FROM WELDED-STRUCTURAL-STEEL SHAPES.
 - 2. FABRICATE STRUCTURAL-STEEL STANDS TO SUSPEND EQUIPMENT FROM STRUCTURE OVERHEAD OR TO SUPPORT EQUIPMENT ABOVE FLOOR.
 - 3. GROUTING: PLACE GROUT UNDER SUPPORTS FOR FLOOR-MOUNTED EQUIPMENT, AND MAKE BEARING SURFACE SMOOTH.
 - 4. PROVIDE LATERAL BRACING, TO PREVENT SWAYING.
- 3.3 ADJUSTING
 - A. HANGER ADJUSTMENTS: ADJUST HANGERS TO DISTRIBUTE LOADS EQUALLY ON ATTACHMENTS AND TO ACHIEVE INDICATED SLOPE OF PIPE.
 - B. TRIM EXCESS LENGTH OF CONTINUOUS-THREAD HANGER AND SUPPORT RODS TO 1-1/2 INCH.

CCAC BOYCE ROOF REPLACEMENT

3.4 PAINTING

- A. TOUCHUP:
 - 1. GALVANIZED SURFACES: CLEAN WELDS, BOLTED CONNECTIONS, AND ABRADED AREAS, AND APPLY GALVANIZING-REPAIR PAINT TO COMPLY WITH ASTM A780/A780M.

3.5 HANGER AND SUPPORT SCHEDULE

- A. SPECIFIC HANGER AND SUPPORT REQUIREMENTS ARE IN SECTIONS SPECIFYING PIPING SYSTEMS AND EQUIPMENT.
- B. WHERE HORIZONTAL PIPES 4 INCH AND LARGER CONVEY DRAINAGE OR WASTE, AND WHERE A PIPE FITTING CHANGES THE FLOW DIRECTION GREATER THAN 45 DEGREES, RIGID BRACING OR OTHER RIGID SUPPORT ARRANGEMENTS SHALL BE INSTALLED TO RESIST MOVEMENT OF THE UPSTREAM PIPE IN A DIRECTION OPPOSITE THE PIPE FLOW. A CHANGE OF FLOW DIRECTION INTO A VERTICAL PIPE SHALL NOT REQUIRE THE UPSTREAM PIPE TO BE BRACED.
- C. ANCHORAGE SHALL BE PROVIDED TO RESTRAIN DRAINAGE PIPING FROM AXIAL MOVEMENT.
- D. FOR PIPE SIZES GREATER THAN 4 INCH, RESTRAINTS SHALL BE PROVIDED FOR DRAIN PIPES AT ALL CHANGES IN DIRECTION AND AT ALL CHANGES OF DIAMETER GREATER THAN TWO PIPE SIZES. BRACES, BLOCKS, RODDING AND OTHER SUITABLE METHODS AS SPECIFIED BY THE COUPLING MANUFACTURER SHALL BE UTILIZED.
- E. THE MAXIMUM HORIZONTAL SPACING OF CAST-IRON PIPE HANGERS SHALL BE INCREASED TO 10 FEET WHERE 10-FOOT LENGTHS OF PIPE ARE INSTALLED.
- F. FOR PLASTIC PIPE SYSTEMS ONLY: FOR SIZES 2 INCHES AND SMALLER, A GUIDE SHALL BE INSTALLED MIDWAY BETWEEN REQUIRED VERTICAL SUPPORTS. SUCH GUIDES SHALL PREVENT PIPE MOVEMENT IN A DIRECTION PERPENDICULAR TO THE AXIS OF THE PIPE.
- G. COMPLY WITH MSS SP-58 FOR PIPE-HANGER SELECTIONS AND APPLICATIONS THAT ARE NOT SPECIFIED IN PIPING SYSTEM SECTIONS.
- H. USE HANGERS AND SUPPORTS WITH GALVANIZED METALLIC COATINGS FOR PIPING AND EQUIPMENT THAT WILL NOT HAVE FIELD-APPLIED FINISHES.
- I. USE NONMETALLIC COATINGS ON ATTACHMENTS FOR ELECTROLYTIC PROTECTION WHERE ATTACHMENTS ARE IN DIRECT CONTACT WITH COPPER TUBING.
- J. USE CARBON-STEEL PIPE HANGERS AND SUPPORTS AND ATTACHMENTS FOR GENERAL SERVICE APPLICATIONS.
- K. USE STAINLESS STEEL PIPE HANGERS AND STAINLESS STEEL ATTACHMENTS FOR HOSTILE ENVIRONMENT
 - 1. HOSTILE ENVIROMENTS INCLUDE: POOL EQUIPMENT ROOM, CHEMICAL STORAGE ROOMS, NATATORIUMS, AND COASTAL AREAS
- L. USE PADDED HANGERS FOR PIPING THAT IS SUBJECT TO SCRATCHING.
- M. USE THERMAL HANGER SHIELD INSERTS FOR INSULATED PIPING AND TUBING.
- N. HORIZONTAL-PIPING HANGERS AND SUPPORTS: UNLESS OTHERWISE INDICATED AND EXCEPT AS SPECIFIED IN PIPING SYSTEM SECTIONS, INSTALL THE FOLLOWING TYPES:

HANGERS AND SUPPORTS FOR PLUMBING

PIPING AND EQUIPMENT

OSBORN ENGINEERING

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1. ADJUSTABLE, STEEL CLEVIS HANGERS (MSS TYPE 1): FOR SUSPENSION OF NONINSULATED OR INSULATED, STATIONARY PIPES 1/2 INCH TO 30 INCH.
2. YOKE-TYPE PIPE CLAMPS (MSS TYPE 2): FOR SUSPENSION OF UP TO 1050 DEGREES F PIPES 4 INCH TO 24 INCH, REQUIRING UP TO 4 INCH OF INSULATION.
3. CARBON- OR ALLOY-STEEL, DOUBLE-BOLT PIPE CLAMPS (MSS TYPE 3): FOR SUSPENSION OF PIPES 3/4 INCH TO 36 INCH, REQUIRING CLAMP FLEXIBILITY AND UP TO 4 INCH OF INSULATION.
4. STEEL PIPE CLAMPS (MSS TYPE 4): FOR SUSPENSION OF COLD AND HOT PIPES 1/2 INCH TO 24 INCH IF LITTLE OR NO INSULATION IS REQUIRED.
5. PIPE HANGERS (MSS TYPE 5): FOR SUSPENSION OF PIPES 1/2 INCH TO 4 INCH, TO ALLOW OFF-CENTER CLOSURE FOR HANGER INSTALLATION BEFORE PIPE ERECTION.
6. ADJUSTABLE, SWIVEL SPLIT- OR SOLID-RING HANGERS (MSS TYPE 6): FOR SUSPENSION OF NONINSULATED, STATIONARY PIPES 3/4 INCH TO 8 INCH.
7. ADJUSTABLE, STEEL BAND HANGERS (MSS TYPE 7): FOR SUSPENSION OF NONINSULATED, STATIONARY PIPES 1/2 INCH TO 8 INCH.
8. ADJUSTABLE BAND HANGERS (MSS TYPE 9): FOR SUSPENSION OF NONINSULATED, STATIONARY PIPES 1/2 INCH TO 8 INCH.
9. ADJUSTABLE, SWIVEL-RING BAND HANGERS (MSS TYPE 10): FOR SUSPENSION OF NONINSULATED, STATIONARY PIPES 1/2 INCH TO 8 INCH.
10. SPLIT PIPE RING WITH OR WITHOUT TURNBUCKLE HANGERS (MSS TYPE 11): FOR SUSPENSION OF NONINSULATED, STATIONARY PIPES 3/8 INCH TO 8 INCH.
11. EXTENSION HINGED OR TWO-BOLT SPLIT PIPE CLAMPS (MSS TYPE 12): FOR SUSPENSION OF NONINSULATED, STATIONARY PIPES 3/8 INCH TO 3 INCH.
12. U-BOLTS (MSS TYPE 24): FOR SUPPORT OF HEAVY PIPES 10 INCH (250 MM) AND UP.
13. CLIPS (MSS TYPE 26): FOR SUPPORT OF INSULATED PIPES NOT SUBJECT TO EXPANSION OR CONTRACTION.
14. PIPE SADDLE SUPPORTS (MSS TYPE 36): FOR SUPPORT OF PIPES 4 INCH TO 36 INCH, WITH STEEL-PIPE BASE STANCHION SUPPORT AND CAST-IRON FLOOR FLANGE OR CARBON-STEEL PLATE.
15. PIPE STANCHION SADDLES (MSS TYPE 37): FOR SUPPORT OF PIPES 4 INCH TO 36 INCH, WITH STEEL-PIPE BASE STANCHION SUPPORT AND CAST-IRON FLOOR FLANGE OR CARBON-STEEL PLATE, AND WITH U-BOLT TO RETAIN PIPE.
16. ADJUSTABLE PIPE SADDLE SUPPORTS (MSS TYPE 38): FOR STANCHION-TYPE SUPPORT FOR PIPES 2-1/2 INCH TO 36 INCH IF VERTICAL ADJUSTMENT IS REQUIRED, WITH STEEL-PIPE BASE STANCHION SUPPORT AND CAST-IRON FLOOR FLANGE.
17. SINGLE-PIPE ROLLS (MSS TYPE 41): FOR SUSPENSION OF PIPES 1 INCH TO 30 INCH, FROM TWO RODS IF LONGITUDINAL MOVEMENT CAUSED BY EXPANSION AND CONTRACTION OCCURS.
18. ADJUSTABLE ROLLER HANGERS (MSS TYPE 43): FOR SUSPENSION OF PIPES 2-1/2 INCH TO 24 INCH, FROM SINGLE ROD IF HORIZONTAL MOVEMENT CAUSED BY EXPANSION AND CONTRACTION OCCURS.
19. COMPLETE PIPE ROLLS (MSS TYPE 44): FOR SUPPORT OF PIPES 2 INCH TO 24 INCH IF LONGITUDINAL MOVEMENT CAUSED BY EXPANSION AND CONTRACTION OCCURS BUT VERTICAL ADJUSTMENT IS UNNECESSARY.
20. PIPE ROLL AND PLATE UNITS (MSS TYPE 45): FOR SUPPORT OF PIPES 2 INCH TO 24 INCH IF SMALL HORIZONTAL MOVEMENT CAUSED BY EXPANSION AND CONTRACTION OCCURS AND VERTICAL ADJUSTMENT IS UNNECESSARY.
21. ADJUSTABLE PIPE ROLL AND BASE UNITS (MSS TYPE 46): FOR SUPPORT OF PIPES 2 INCH TO 30 INCH IF VERTICAL AND LATERAL ADJUSTMENT DURING INSTALLATION, IN ADDITION TO EXPANSION AND CONTRACTION, IS REQUIRED.

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- O. VERTICAL-PIPING CLAMPS: UNLESS OTHERWISE INDICATED AND EXCEPT AS SPECIFIED IN PIPING SYSTEM SECTIONS, INSTALL THE FOLLOWING TYPES:
1. EXTENSION PIPE OR RISER CLAMPS (MSS TYPE 8): FOR SUPPORT OF PIPE RISERS 3/4 INCH TO 24 INCH.
 2. CARBON- OR ALLOY-STEEL RISER CLAMPS (MSS TYPE 42): FOR SUPPORT OF PIPE RISERS 3/4 INCH TO 24 INCH IF LONGER ENDS ARE REQUIRED FOR RISER CLAMPS.
- P. HANGER-ROD ATTACHMENTS: UNLESS OTHERWISE INDICATED AND EXCEPT AS SPECIFIED IN PIPING SYSTEM SECTIONS, INSTALL THE FOLLOWING TYPES:
1. STEEL TURNBUCKLES (MSS TYPE 13): FOR ADJUSTMENT OF UP TO 6 INCH FOR HEAVY LOADS.
 2. STEEL CLEVISES (MSS TYPE 14): FOR 120 DEG F TO 450 DEG F PIPING INSTALLATIONS.
 3. SWIVEL TURNBUCKLES (MSS TYPE 15): FOR USE WITH MSS TYPE 11 SPLIT PIPE RINGS.
 4. MALLEABLE-IRON SOCKETS (MSS TYPE 16): FOR ATTACHING HANGER RODS TO VARIOUS TYPES OF BUILDING ATTACHMENTS.
 5. STEEL WELDLESS EYE NUTS (MSS TYPE 17): FOR 120 DEG F TO 450 DEG F PIPING INSTALLATIONS.
- Q. BUILDING ATTACHMENTS: UNLESS OTHERWISE INDICATED AND EXCEPT AS SPECIFIED IN PIPING SYSTEM SECTIONS, INSTALL THE FOLLOWING TYPES:
1. STEEL OR MALLEABLE-CONCRETE INSERTS (MSS TYPE 18): FOR UPPER ATTACHMENT TO SUSPEND PIPE HANGERS FROM CONCRETE CEILING.
 2. TOP-BEAM C-CLAMPS (MSS TYPE 19): FOR USE UNDER ROOF INSTALLATIONS WITH BAR-JOIST CONSTRUCTION, TO ATTACH TO TOP FLANGE OF STRUCTURAL SHAPE.
 3. SIDE-BEAM OR CHANNEL CLAMPS (MSS TYPE 20): FOR ATTACHING TO BOTTOM FLANGE OF BEAMS, CHANNELS, OR ANGLES.
 4. CENTER-BEAM CLAMPS (MSS TYPE 21): FOR ATTACHING TO CENTER OF BOTTOM FLANGE OF BEAMS.
 5. WELDED BEAM ATTACHMENTS (MSS TYPE 22): FOR ATTACHING TO BOTTOM OF BEAMS IF LOADS ARE CONSIDERABLE AND ROD SIZES ARE LARGE.
 6. C-CLAMPS (MSS TYPE 23): FOR STRUCTURAL SHAPES.
 7. TOP-BEAM CLAMPS (MSS TYPE 25): FOR TOP OF BEAMS IF HANGER ROD IS REQUIRED TANGENT TO FLANGE EDGE.
 8. SIDE-BEAM CLAMPS (MSS TYPE 27): FOR BOTTOM OF STEEL I-BEAMS.
 9. STEEL-BEAM CLAMPS WITH EYE NUTS (MSS TYPE 28): FOR ATTACHING TO BOTTOM OF STEEL I-BEAMS FOR HEAVY LOADS.
 10. LINKED-STEEL CLAMPS WITH EYE NUTS (MSS TYPE 29): FOR ATTACHING TO BOTTOM OF STEEL I-BEAMS FOR HEAVY LOADS, WITH LINK EXTENSIONS.
 11. MALLEABLE-BEAM CLAMPS WITH EXTENSION PIECES (MSS TYPE 30): FOR ATTACHING TO STRUCTURAL STEEL.
 12. WELDED-STEEL BRACKETS: FOR SUPPORT OF PIPES FROM BELOW OR FOR SUSPENDING FROM ABOVE BY USING CLIP AND ROD. USE ONE OF THE FOLLOWING FOR INDICATED LOADS:
 - a. LIGHT (MSS TYPE 31): 750 LB.
 - b. MEDIUM (MSS TYPE 32): 1500 LB.
 - c. HEAVY (MSS TYPE 33): 3000 LB.
 13. SIDE-BEAM BRACKETS (MSS TYPE 34): FOR SIDES OF STEEL OR WOODEN BEAMS.
 14. PLATE LUGS (MSS TYPE 57): FOR ATTACHING TO STEEL BEAMS IF FLEXIBILITY AT BEAM IS REQUIRED.

CCAC BOYCE ROOF REPLACEMENT

15. HORIZONTAL TRAVELERS (MSS TYPE 58): FOR SUPPORTING PIPING SYSTEMS SUBJECT TO LINEAR HORIZONTAL MOVEMENT WHERE HEADROOM IS LIMITED.
 - R. SADDLES AND SHIELDS: UNLESS OTHERWISE INDICATED AND EXCEPT AS SPECIFIED IN PIPING SYSTEM SECTIONS, INSTALL THE FOLLOWING TYPES:
 1. STEEL-PIPE-COVERING PROTECTION SADDLES (MSS TYPE 39): TO FILL INTERIOR VOIDS WITH INSULATION THAT MATCHES ADJOINING INSULATION.
 2. PROTECTION SHIELDS (MSS TYPE 40): OF LENGTH RECOMMENDED IN WRITING BY MANUFACTURER TO PREVENT CRUSHING INSULATION.
 3. THERMAL HANGER SHIELD INSERTS: FOR SUPPORTING INSULATED PIPE.
 - S. SPRING HANGERS AND SUPPORTS: UNLESS OTHERWISE INDICATED AND EXCEPT AS SPECIFIED IN PIPING SYSTEM SECTIONS, INSTALL THE FOLLOWING TYPES:
 1. RESTRAINT-CONTROL DEVICES (MSS TYPE 47): WHERE INDICATED TO CONTROL PIPING MOVEMENT.
 2. SPRING CUSHIONS (MSS TYPE 48): FOR LIGHT LOADS IF VERTICAL MOVEMENT DOES NOT EXCEED 1-1/4 INCH.
 3. SPRING-CUSHION ROLL HANGERS (MSS TYPE 49): FOR EQUIPPING TYPE 41 ROLL HANGER WITH SPRINGS.
 4. SPRING SWAY BRACES (MSS TYPE 50): TO RETARD SWAY, SHOCK, VIBRATION, OR THERMAL EXPANSION IN PIPING SYSTEMS.
 5. VARIABLE-SPRING HANGERS (MSS TYPE 51): PRESET TO INDICATED LOAD, AND LIMIT VARIABILITY FACTOR TO 25 PERCENT TO ALLOW EXPANSION AND CONTRACTION OF PIPING SYSTEM FROM HANGER.
 6. VARIABLE-SPRING BASE SUPPORTS (MSS TYPE 52): PRESET TO INDICATED LOAD, AND LIMIT VARIABILITY FACTOR TO 25 PERCENT TO ALLOW EXPANSION AND CONTRACTION OF PIPING SYSTEM FROM BASE SUPPORT.
 7. VARIABLE-SPRING TRAPEZE HANGERS (MSS TYPE 53): PRESET TO INDICATED LOAD, AND LIMIT VARIABILITY FACTOR TO 25 PERCENT TO ALLOW EXPANSION AND CONTRACTION OF PIPING SYSTEM FROM TRAPEZE SUPPORT.
 8. CONSTANT SUPPORTS: FOR CRITICAL PIPING STRESS AND IF NECESSARY TO AVOID TRANSFER OF STRESS FROM ONE SUPPORT TO ANOTHER SUPPORT, CRITICAL TERMINAL, OR CONNECTED EQUIPMENT. INCLUDE AUXILIARY STOPS FOR ERECTION, HYDROSTATIC TEST, AND LOAD-ADJUSTMENT CAPABILITY. THESE SUPPORTS INCLUDE THE FOLLOWING TYPES:
 - a. HORIZONTAL (MSS TYPE 54): MOUNTED HORIZONTALLY.
 - b. VERTICAL (MSS TYPE 55): MOUNTED VERTICALLY.
 - c. TRAPEZE (MSS TYPE 56): TWO VERTICAL-TYPE SUPPORTS AND ONE TRAPEZE MEMBER.
 - T. COMPLY WITH MSS SP-58 FOR TRAPEZE PIPE-HANGER SELECTIONS AND APPLICATIONS THAT ARE NOT SPECIFIED IN PIPING SYSTEM SECTIONS.
 - U. USE MECHANICAL-EXPANSION ANCHORS INSTEAD OF BUILDING ATTACHMENTS WHERE REQUIRED IN CONCRETE CONSTRUCTION.
 - V. USE PIPE-POSITIONING SYSTEMS IN PIPE SPACES BEHIND PLUMBING FIXTURES TO SUPPORT SUPPLY AND WASTE PIPING FOR PLUMBING FIXTURES.
- 3.6 FIELD QUALITY CONTROL
- A. SEE DIVISION 01 - QUALITY REQUIREMENTS FOR ADDITIONAL REQUIREMENTS.
 - B. INSPECT SUPPORT AND ATTACHMENT COMPONENTS FOR DAMAGE AND DEFECTS.

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- C. REPAIR CUTS AND ABRASIONS IN GALVANIZED FINISHES USING ZINC-RICH PAINT RECOMMENDED BY MANUFACTURER. REPLACE COMPONENTS THAT EXHIBIT SIGNS OF CORROSION.
- D. CORRECT DEFICIENCIES AND REPLACE DAMAGED OR DEFECTIVE SUPPORT AND ATTACHMENT COMPONENTS.

END OF SECTION

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SECTION 220553 - IDENTIFICATION FOR PLUMBING PIPING AND EQUIPMENT

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. NAMEPLATES.
- B. TAGS.
- C. PIPE MARKERS.
- D. UNDERGROUND WARNING TAPE.
- E. CEILING TACKS.

1.2 RELATED REQUIREMENTS

- A. DIVISION 09 - INTERIOR PAINTING: IDENTIFICATION PAINTING.
- B. SECTION 226000 - GAS AND VACUUM SYSTEMS FOR LABORATORY AND HEALTHCARE FACILITIES: SUPPLY OF PIPE LABELS FOR PLACEMENT UNDER THIS SECTION.

1.3 REFERENCE STANDARDS

- A. ASME A13.1 - SCHEME FOR THE IDENTIFICATION OF PIPING SYSTEMS; 2023.
- B. ASTM D709 - STANDARD SPECIFICATION FOR LAMINATED THERMOSETTING MATERIALS; 2025.

1.4 SUBMITTALS

- A. SEE DIVISION 01 AND SECTION 220500 FOR SUBMITTAL PROCEDURES.
- B. SCHEDULES:
 - 1. SUBMIT PLUMBING COMPONENT IDENTIFICATION SCHEDULE LISTING EQUIPMENT, PIPING, AND VALVES.
- C. PRODUCT DATA: PROVIDE MANUFACTURERS CATALOG LITERATURE FOR EACH PRODUCT REQUIRED.
- D. PROJECT RECORD DOCUMENTS: RECORD ACTUAL LOCATIONS OF TAGGED VALVES.

PART 2 PRODUCTS

2.1 PLUMBING COMPONENT IDENTIFICATION GUIDELINE

- A. NAMEPLATES:
 - 1. HEAT EXCHANGERS, WATER HEATERS, AND OTHER HEAT TRANSFER PRODUCTS.
 - 2. CONTROL PANELS, TRANSDUCERS, AND OTHER RELATED CONTROL EQUIPMENT PRODUCTS.

CCAC BOYCE ROOF REPLACEMENT

3. PUMPS, TANKS, FILTERS, WATER TREATMENT DEVICES, AND OTHER PLUMBING EQUIPMENT PRODUCTS.

B. TAGS:

1. MANUAL OPERATED AND AUTOMATED CONTROL VALVES.
2. INSTRUMENTATION, RELAYS, GAUGES, AND OTHER RELATED CONTROL EQUIPMENT PRODUCTS.
3. CEILING TACKS PLACED ON LAY-IN CEILING SURFACE TO REFERENCE PLUMBING COMPONENTS.

C. PIPE MARKERS: ALL PIPING.

2.2 NAMEPLATES

A. MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE PRODUCTS BY ONE OF THE FOLLOWING OR AN APPROVED EQUAL.

1. BRIMAR INDUSTRIES, INC
2. CRAFTMARK PIPE MARKERS
3. KOLBI PIPE MARKER CO
4. SETON IDENTIFICATION PRODUCTS

B. DESCRIPTION: LAMINATED PIECE WITH UP TO THREE LINES OF TEXT.

1. LETTER COLOR: WHITE.
2. LETTER HEIGHT: 1/4 INCH.
3. BACKGROUND COLOR: BLACK.
4. NAMEPLATE HEIGHT: 3/4 INCH.
5. NAMEPLATE MATERIAL:
 - a. FLEXIBLE: VINYL WITH ADHESIVE BACKING PER ASTM D709.
 - b. METAL: BRASS WITH CENTER-SIDE HOLES FOR SCREW FASTENING.

2.3 TAGS

A. MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE PRODUCTS BY ONE OF THE FOLLOWING OR AN APPROVED EQUAL.

1. BRIMAR INDUSTRIES, INC
2. CRAFTMARK PIPE MARKERS
3. KOLBI PIPE MARKER CO
4. SETON IDENTIFICATION PRODUCTS

B. FLEXIBLE: VINYL WITH ENGRAVED BLACK LETTERS ON LIGHT CONTRASTING BACKGROUND COLOR WITH UP TO THREE LINES OF TEXT. MINIMUM TAG SIZE 1-1/2 INCH IN DIAMETER.

C. METAL: BRASS, 19 GAUGE 1-1/2 INCH IN DIAMETER WITH SMOOTH EDGES, BLANK, SMOOTH EDGES, AND CORROSION-RESISTANT BALL CHAIN. UP TO THREE LINES OF TEXT.

D. VALVE TAG CHART: TYPEWRITTEN 12-POINT LETTER SIZE LIST IN ANODIZED ALUMINUM FRAME.

2.4 PIPE MARKERS

A. MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE PRODUCTS BY ONE OF THE FOLLOWING OR AN APPROVED EQUAL.

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1. BRADY CORPORATION
 2. BRIMAR INDUSTRIES, INC
 3. CRAFTMARK PIPE MARKERS
 4. KOLBI PIPE MARKER CO
 5. SETON IDENTIFICATION PRODUCTS
- B. COMPLY WITH ASME A13.1.
- C. FLEXIBLE MARKER: FACTORY FABRICATED, SEMI-RIGID, PREFORMED TO FIT AROUND PIPE OR PIPE COVERING; MINIMUM INFORMATION INDICATING FLOW DIRECTION ARROW AND IDENTIFICATION OF FLUID CONVEYED.
- D. FLEXIBLE TAPE MARKER: FLEXIBLE, VINYL FILM TAPE WITH PRESSURE-SENSITIVE ADHESIVE BACKING AND PRINTED MARKINGS.
- E. UNDERGROUND FLEXIBLE MARKER: BRIGHT-COLORED CONTINUOUSLY PRINTED RIBBON TAPE, MINIMUM 6 INCHES WIDE BY 4 MIL, 0.004 INCH THICK, MANUFACTURED FOR DIRECT BURIAL SERVICE.
- F. IDENTIFICATION SCHEME, ASME A13.1:
1. PRIMARY: EXTERNAL PIPE DIAMETER, UNINSULATED OR INSULATED.
 - a. 3/4 TO 1-1/4 INCHES: USE 8 INCH FIELD-LENGTH WITH 1/2 INCH TEXT HEIGHT.
 - b. 1-1/2 TO 2 INCHES: USE 8 INCH FIELD-LENGTH WITH 3/4 INCH TEXT HEIGHT.
 - c. 2-1/2 TO 6 INCHES: USE 12 INCH FIELD-LENGTH WITH 1-1/4 INCH TEXT HEIGHT.
 - d. 8 TO 10 INCHES: USE 24 INCH FIELD-LENGTH WITH 2-1/2 INCH TEXT HEIGHT.
 - e. OVER 10 INCHES: USE 32 INCH FIELD-LENGTH WITH 3-1/2 INCH TEXT HEIGHT.
 2. TERTIARY: OTHER DETAILS.
 - a. DIRECTIONAL FLOW ARROW.
 - b. LINE PRESSURE.
 - c. LINE TEMPERATURE.
- 2.5 UNDERGROUND WARNING TAPE
- A. MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE PRODUCTS BY ONE OF THE FOLLOWING OR AN APPROVED EQUAL.
1. BRADY CORPORATION
 2. BRIMAR INDUSTRIES, INC
 3. KOLBI PIPE MARKER CO
 4. SETON IDENTIFICATION PRODUCTS
- B. MATERIALS: USE POLYETHYLENE TAPE SUITABLE FOR DIRECT BURIAL, UNLESS OTHERWISE INDICATED.
1. EXCEPTION: USE FOIL-BACKED DETECTABLE TYPE TAPE WHERE REQUIRED BY SERVING UTILITY OR WHERE DIRECTED BY OWNER.
- C. NON-DETECTABLE TYPE TAPE: 6 INCHES WIDE, WITH MINIMUM THICKNESS OF 4 MIL, 0.004 INCH.
- D. FOIL-BACKED DETECTABLE TYPE TAPE: 3 INCHES WIDE, WITH MINIMUM THICKNESS OF 5 MIL, 0.005 INCH, UNLESS OTHERWISE REQUIRED FOR PROPER DETECTION.

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- E. LEGEND: TYPE OF SERVICE, CONTINUOUSLY REPEATED OVER FULL LENGTH OF TAPE.
- F. COLOR:
 - 1. TAPE FOR BURIED POWER LINES: BLACK TEXT ON RED BACKGROUND.
 - 2. TAPE FOR BURIED COMMUNICATION, ALARM, AND SIGNAL LINES: BLACK TEXT ON ORANGE BACKGROUND.

2.6 CEILING TACKS

- A. MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE PRODUCTS BY ONE OF THE FOLLOWING OR AN APPROVED EQUAL.
 - 1. BRADY CORPORATION
 - 2. BRIMAR INDUSTRIES, INC
 - 3. CRAFTMARK PIPE MARKERS
 - 4. BRIMAR INDUSTRIES, INC
 - 5. KOLBI PIPE MARKER CO
 - 6. SETON IDENTIFICATION PRODUCTS
- B. DESCRIPTION: STEEL WITH 3/4 INCH DIAMETER COLOR CODED HEAD.
- C. COLOR CODE AS FOLLOWS:
 - 1. PLUMBING EQUIPMENT: YELLOW.
 - 2. PLUMBING VALVES: GREEN.
 - 3. HEATING/COOLING VALVES: BLUE.

PART 3 EXECUTION

3.1 PREPARATION

- A. DEGREASE AND CLEAN SURFACES TO RECEIVE IDENTIFICATION PRODUCTS.

3.2 INSTALLATION

- A. INSTALL FLEXIBLE NAMEPLATES WITH CORROSIVE-RESISTANT MECHANICAL FASTENERS, OR ADHESIVE. APPLY WITH SUFFICIENT ADHESIVE TO ENSURE PERMANENT ADHESION AND SEAL WITH CLEAR LACQUER.
- B. INSTALL TAGS IN CLEAR VIEW AND ALIGN WITH AXIS OF PIPING
- C. INSTALL PLASTIC PIPE MARKERS IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.
- D. INSTALL PLASTIC TAPE PIPE MARKER AROUND PIPE IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.
- E. INSTALL UNDERGROUND PLASTIC PIPE MARKERS 6 TO 8 INCHES BELOW FINISHED GRADE, DIRECTLY ABOVE BURIED PIPE.
- F. APPLY ASME A13.1 PIPE MARKING RULES:
 - 1. PLACE PIPE MARKER ADJACENT TO CHANGES IN DIRECTION.
 - 2. PLACE PIPE MARKER NEAR EACH BRANCH CONNECTION, EXCLUDING SHORT TAKEOFFS FOR FIXTURES AND TERMINAL UNITS. WHERE FLOW PATTERN IS NOT OBVIOUS, MARK EACH PIPE AT BRANCH.
 - 3. PLACE PIPE MARKER ADJACENT TO EACH VALVE PORT AND FLANGE END.

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4. PLACE PIPE MARKER NEAR MAJOR EQUIPMENT AND OTHER POINTS OF ORIGINATION OR TERMINATION.
 5. PLACE PIPE MARKER AT BOTH SIDES OF FLOOR AND WALL PENETRATIONS.
 6. PLACE PIPE MARKER AT ACCESS DOORS, MANHOLES, AND SIMILAR ACCESS POINTS THAT PERMIT VIEW OF CONCEALED PIPE.
 7. PLACE PIPE MARKER EVERY 25 FEET INTERVAL OF STRAIGHT RUN.
- G. INSTALL CEILING TACKS TO LOCATE VALVES OR DAMPERS ABOVE LAY-IN PANEL CEILINGS. LOCATE IN CORNER OF PANEL CLOSEST TO EQUIPMENT.
- H. COLOR CODING AND IDENTIFICATION NOMENCLATURE USED WITH LABELS SHALL BE IN ACCORDANCE WITH ASME A13.1 PER THE TABLE BELOW.
1. LOW-PRESSURE COMPRESSED-AIR PIPING: WHITE LETTERS ON AN ANSI Z535.1 SAFETY-BLUE BACKGROUND.
 2. HIGH-PRESSURE COMPRESSED-AIR PIPING: WHITE LETTERS ON AN ANSI Z535.1 SAFETY-BLUE BACKGROUND.
 3. VACUUM PIPING: WHITE LETTERS ON AN ANSI Z535.1 SAFETY-BLUE BACKGROUND.
 4. DOMESTIC COLD-WATER PIPING: WHITE LETTERS ON AN ANSI Z535.1 SAFETY-GREEN BACKGROUND.
 5. DOMESTIC HOT-WATER PIPING: WHITE LETTERS ON AN ANSI Z535.1 SAFETY-GREEN BACKGROUND.
 6. DOMESTIC HOT-WATER RETURN PIPING: WHITE LETTERS ON AN ANSI Z535.1 SAFETY-GREEN BACKGROUND.
 7. SANITARY WASTE PIPING: WHITE LETTERS ON A BLACK BACKGROUND.
 8. STORM DRAINAGE PIPING: WHITE LETTERS ON A BLACK BACKGROUND.
 9. NONPOTABLE COLD WATER: BLACK LETTERS ON AN ANSI Z535.1 SAFETY-YELLOW BACKGROUND.
 10. NONPOTABLE HOT WATER: BLACK LETTERS ON AN ANSI Z535.1-YELLOW BACKGROUND.
 11. NONPOTABLE HOT-WATER RECIRCULATION: BLACK LETTERS ON AN ANSI Z535.1-YELLOW BACKGROUND.
 12. REAGENT WATER PIPING: WHITE LETTERS ON AN ANSI Z535.1 SAFETY-BLUE BACKGROUND.
 13. DEIONIZED WATER PIPING: WHITE LETTERS ON AN ANSI Z535.1 SAFETY-BLUE BACKGROUND.
 14. DISTILLED WATER PIPING: WHITE LETTERS ON AN ANSI Z535.1 SAFETY-BLUE BACKGROUND.
 15. REVERSE OSMOSIS WATER PIPING: WHITE LETTERS ON AN ANSI Z535.1 SAFETY-BLUE BACKGROUND.

END OF SECTION

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SECTION 220719 - PLUMBING PIPING AND EQUIPMENT INSULATION

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. FLEXIBLE ELASTOMERIC CELLULAR INSULATION.
- B. FLEXIBLE GLASS FIBER EQUIPMENT INSULATION
- C. RIGID GLASS FIBER EQUIPMENT INSULATION
- D. GLASS FIBER PIPE INSULATION.
- E. POLYOLEFIN
- F. JACKETING AND ACCESSORIES.

1.2 RELATED REQUIREMENTS

1.3 REFERENCE STANDARDS

1.4 SUBMITTALS

- A. SEE DIVISION 01 AND DIVION 22 FOR SUBMITTAL PROCEDURES.
- B. PRODUCT DATA: PROVIDE PRODUCT DESCRIPTION, THERMAL CHARACTERISTICS, LIST OF MATERIALS AND THICKNESS FOR EACH SERVICE, AND LOCATIONS.

1.5 QUALITY ASSURANCE

- A. MANUFACTURER QUALIFICATIONS: COMPANY SPECIALIZING IN MANUFACTURING THE PRODUCTS SPECIFIED IN THIS SECTION.
- B. APPLICATOR QUALIFICATIONS: COMPANY SPECIALIZING IN PERFORMING THE TYPE OF WORK SPECIFIED IN THIS SECTION AND APPROVED BY MANUFACTURER.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. ACCEPT MATERIALS ON SITE, LABELED WITH MANUFACTURER'S IDENTIFICATION, PRODUCT DENSITY, AND THICKNESS.
- B. PROTECT INSULATION FROM WEATHER AND CONSTRUCTION TRAFFIC, DIRT, WATER, CHEMICAL, AND MECHANICAL DAMAGE, BY STORING IN ORIGINAL WRAPPING.

1.7 FIELD CONDITIONS

- A. MAINTAIN AMBIENT TEMPERATURES AND CONDITIONS REQUIRED BY MANUFACTURERS OF ADHESIVES, MASTICS, AND INSULATION CEMENTS.

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- B. MAINTAIN TEMPERATURE BEFORE, DURING, AND AFTER INSTALLATION FOR MINIMUM OF 24 HOURS.

PART 2 PRODUCTS

2.1 REGULATORY REQUIREMENTS

- A. SURFACE BURNING CHARACTERISTICS: FLAME SPREAD INDEX/SMOKE DEVELOPED INDEX OF 25/50, MAXIMUM, WHEN TESTED IN ACCORDANCE WITH ASTM E84 OR UL 723.

2.2 FLEXIBLE GLASS FIBER EQUIPMENT INSULATION

- A. INSULATION: ASTM C553; FLEXIBLE, NONCOMBUSTIBLE.
 - 1. K VALUE: 0.24 AT 75 DEGREES F, WHEN TESTED IN ACCORDANCE WITH ASTM C177 OR ASTM C518.
 - 2. MAXIMUM SERVICE TEMPERATURE: 450 DEGREES F.
 - 3. MAXIMUM WATER VAPOR ABSORPTION: 5.0 PERCENT BY WEIGHT.
- B. VAPOR BARRIER JACKET: KRAFT PAPER REINFORCED WITH GLASS FIBER YARN AND BONDED TO ALUMINIZED FILM.
 - 1. MOISTURE VAPOR PERMEABILITY: 0.02 PERM INCH, WHEN TESTED IN ACCORDANCE WITH ASTM E96/E96M.
 - 2. SECURE WITH SELF-SEALING LONGITUDINAL LAPS AND BUTT STRIPS.
 - 3. SECURE WITH OUTWARD CLINCH EXPANDING STAPLES AND VAPOR BARRIER MASTIC.
- C. TIE WIRE: 0.048 INCH STAINLESS STEEL WITH TWISTED ENDS ON MAXIMUM 12 INCH CENTERS.
- D. VAPOR BARRIER LAP ADHESIVE: COMPATIBLE WITH INSULATION.
 - 1. FOR INDOOR APPLICATIONS, USE ADHESIVE THAT HAS A VOC CONTENT OF 50 G/L OR LESS WHEN CALCULATED ACCORDING TO 40 CFR 59, SUBPART D (EPA METHOD 24).
- E. INSULATING CEMENT/MASTIC: ASTM C195; HYDRAULIC SETTING ON MINERAL WOOL.

2.3 GLASS FIBER PIPE INSULATION

- A. MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE PRODUCTS BY ONE OF THE FOLLOWING OR AN APPROVED EQUAL.
 - 1. CERTAINTEED CORPORATION
 - 2. JOHNS MANVILLE CORPORATION
 - 3. KNAUF INSULATION
- B. INSULATION: ASTM C547 AND ASTM C795 FOR APPLICATION ON AUSTENITIC STAINLESS STEEL; RIGID MOLDED, NONCOMBUSTIBLE.
 - 1. K VALUE: ASTM C177, 0.24 AT 75 DEGREES F.
 - 2. MAXIMUM SERVICE TEMPERATURE: 850 DEGREES F.
 - 3. MAXIMUM MOISTURE ABSORPTION: 0.2 PERCENT BY VOLUME.
- C. VAPOR BARRIER JACKET: WHITE KRAFT PAPER WITH GLASS FIBER YARN, BONDED TO ALUMINIZED FILM; MOISTURE VAPOR TRANSMISSION WHEN TESTED IN ACCORDANCE WITH ASTM E96/E96M OF 0.02 PERM.

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- D. TIE WIRE: 0.048 INCH STAINLESS STEEL WITH TWISTED ENDS ON MAXIMUM 12 INCH CENTERS.
- E. VAPOR BARRIER LAP ADHESIVE: COMPATIBLE WITH INSULATION.
- F. INSULATING CEMENT/MASTIC: ASTM C195; HYDRAULIC SETTING ON MINERAL WOOL.
- G. OUTDOOR VAPOR BARRIER MASTIC: VINYL EMULSION TYPE ACRYLIC OR MASTIC, COMPATIBLE WITH INSULATION, BLACK COLOR.
- H. OUTDOOR BREATHER MASTIC: VINYL EMULSION TYPE ACRYLIC OR MASTIC, COMPATIBLE WITH INSULATION, BLACK COLOR.
- I. INSULATING CEMENT: ASTM C449.
- J. FOR INDOOR APPLICATIONS, USE ADHESIVE THAT HAS A VOC CONTENT OF 50 G/L OR LESS WHEN CALCULATED ACCORDING TO 40 CFR 59, SUBPART D (EPA METHOD 24).

2.4 FLEXIBLE ELASTOMERIC CELLULAR INSULATION

- A. MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE PRODUCTS BY ONE OF THE FOLLOWING OR AN APPROVED EQUAL.
 - 1. AEROFLEX USA
 - 2. ARMACELL LLC
 - 3. K-FLEX USA LLC
- B. INSULATION: PREFORMED FLEXIBLE ELASTOMERIC CELLULAR RUBBER INSULATION COMPLYING WITH ASTM C534/C534M GRADE 1; USE MOLDED TUBULAR MATERIAL WHEREVER POSSIBLE.
 - 1. MINIMUM SERVICE TEMPERATURE: MINUS 40 DEGREES F.
 - 2. MAXIMUM SERVICE TEMPERATURE: 220 DEGREES F.
 - 3. CONNECTION: WATERPROOF VAPOR BARRIER ADHESIVE.
- C. ELASTOMERIC FOAM ADHESIVE: AIR DRIED, CONTACT ADHESIVE, COMPATIBLE WITH INSULATION.
- D. FOR INDOOR APPLICATIONS, USE ADHESIVE THAT HAS A VOC CONTENT OF 50 G/L OR LESS WHEN CALCULATED ACCORDING TO 40 CFR 59, SUBPART D (EPA METHOD 24).
- E. WEATHER BARRIER: AIR DRIED, CONTACT ADHESIVE, COMPATIBLE WITH INSULATION AND ASTM E84 COMPLIANT.

2.5 POLYOLEFIN

- A. MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE PRODUCTS BY ONE OF THE FOLLOWING OR AN APPROVED EQUAL.
 - 1. AEROFOAM
 - 2. THERMOBREAK
- B. INDOOR
 - 1. PHYSICALLY CROSS-LINKED POLYOLEFIN FOAM WITH FACTORY APPLIED REINFORCED ALUMINUM FOIL.
 - 2. DENSITY: 1.5 PCF (FOAM CORE ONLY). THERMAL CONDUCTIVITY : MAXIMUM 0.22 BTU.IN/H.FT2. °F @ 73°F MEAN TEMPERATURE WATER ABSORPTION: <0.2 % V/V.

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3. WATER VAPOR PERMEABILITY (ASTM E96/E96M): MAXIMUM 0.002 PERM-INCH
SERVICE TEMPERATURE RANGE: - 112 °F ~ +212°F
LEACHABLE CHLORIDES (ASTM C871) : < 12 PPM
4. NO MOLD GROWTH WHEN TESTED TO ASTM C1338.
5. FIRE RATING : COMPLIES WITH NFPA 90A AND B (ASTM E84 25/50 RATING).

C. OUTDOOR EXPOSED

1. PHYSICALLY CROSSLINKED CLOSED CELL POLYOLEFIN FOAM WITH FACTORY APPLIED, HEAVY DUTY MULTILAYER COMPOSITE WITH A UV AND WEATHER DURABLE COATING.
2. WATER VAPOR PERMEABILITY (ASTM E96): MAXIMUM 0.003 PERM-INCH
3. PUNCTURE RESISTANCE (ASTM D4833): > 400 N.
4. UV RESISTANCE (ISO 4892-3): NO CHANGE IN PERFORMANCE OR APPEARANCE AFTER 3000 HOURS QUV EXPOSURE.
DENSITY, CONDUCTIVITY, WATER ABSORPTION, TEMP RANGE AND FIRE RATING EQUAL TO INDOOR.

2.6 JACKETING AND ACCESSORIES

A. PVC PLASTIC JACKET:

1. JACKET: ONE PIECE MOLDED TYPE FITTING COVERS AND SHEET MATERIAL, OFF-WHITE COLOR.
 - a. MINIMUM SERVICE TEMPERATURE: 0 DEGREES F.
 - b. MAXIMUM SERVICE TEMPERATURE: 150 DEGREES F.
 - c. MOISTURE VAPOR PERMEABILITY: 0.002 PERM INCH, MAXIMUM, WHEN TESTED IN ACCORDANCE WITH ASTM E96/E96M.
 - d. THICKNESS: 10 MIL, 0.010 INCH.
 - e. CONNECTIONS: BRUSH ON WELDING ADHESIVE.
2. COVERING ADHESIVE MASTIC: COMPATIBLE WITH INSULATION.

B. ABS PLASTIC JACKET:

1. JACKET: ONE PIECE MOLDED TYPE FITTING COVERS AND SHEET MATERIAL, OFF-WHITE COLOR.
 - a. MINIMUM SERVICE TEMPERATURE: MINUS 40 DEGREES F.
 - b. MAXIMUM SERVICE TEMPERATURE: 180 DEGREES F.
 - c. MOISTURE VAPOR PERMEABILITY: 0.012 PERM INCH, WHEN TESTED IN ACCORDANCE WITH ASTM E96/E96M.
 - d. THICKNESS: 30 MIL, 0.03 INCH.
 - e. CONNECTIONS: BRUSH ON WELDING ADHESIVE.

C. ALUMINUM JACKET:

1. COMPLY WITH ASTM B209/B209M, TEMPER H14, MINIMUM THICKNESS OF 0.016 INCH WITH FACTORY-APPLIED POLYETHYLENE AND KRAFT PAPER MOISTURE BARRIER ON THE INSIDE SURFACE.
2. THICKNESS: 0.016 INCH SHEET.
3. FINISH: SMOOTH.
4. JOINING: LONGITUDINAL SLIP JOINTS AND 2 INCH LAPS.
5. FITTINGS: 0.016 INCH THICK DIE-SHAPED FITTING COVERS WITH FACTORY-ATTACHED PROTECTIVE LINER.
6. METAL JACKET BANDS: 3/8 INCH WIDE; 0.015 INCH THICK ALUMINUM OR 0.010 INCH THICK STAINLESS STEEL.

D. ALUMINUM-FOIL LAMINATE JACKET:

1. FACTORY-APPLIED, PRESSURE SENSITIVE ADHESIVE JACKETING ON PAPER RELEASE LINER.

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2. FINISH: ALUMINUM SMOOTH.
3. COMPLY WITH ASTM C1775.
- E. STAINLESS STEEL JACKET: ASTM A666/A666M, TYPE 304 STAINLESS STEEL.
 1. THICKNESS: 0.010 INCH.
 2. FINISH: SMOOTH.
 3. METAL JACKET BANDS: 3/8 INCH WIDE; 0.010 INCH THICK STAINLESS STEEL.
- F. REINFORCED TAPE:
 1. FSK TAPE SUITABLE FOR SEALING SEAMS BETWEEN INSULATION, INSULATED PIPE BENDS, AND FITTINGS RESULTING IN A TIGHT, SMOOTH SURFACE WITHOUT WRINKLES.
 2. COMPLY WITH UL 723 OR ASTM E84.
 3. MOISTURE VAPOR PERMEABILITY: 0.00 PERM INCH, WHEN TESTED IN ACCORDANCE WITH ASTM E96/E96M.
 4. FINISH: MATCH INSULATION.

PART 3 EXECUTION

3.1 EXAMINATION

- A. VERIFY THAT PIPING HAS BEEN TESTED BEFORE APPLYING INSULATION MATERIALS.
- B. VERIFY THAT SURFACES ARE CLEAN AND DRY, WITH FOREIGN MATERIAL REMOVED.

3.2 INSTALLATION - EQUIPMENT

- A. INSTALL IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.
- B. FACTORY INSULATED EQUIPMENT: DO NOT INSULATE.
- C. EXPOSED EQUIPMENT: LOCATE INSULATION AND COVER SEAMS IN LEAST VISIBLE LOCATIONS.
- D. APPLY INSULATION CLOSE TO EQUIPMENT BY GROOVING, SCORING, AND BEVELING INSULATION. FASTEN INSULATION TO EQUIPMENT WITH STUDS, PINS, CLIPS, ADHESIVE, WIRES, OR BANDS.
- E. FILL JOINTS, CRACKS, SEAMS, AND DEPRESSIONS WITH BEDDING COMPOUND TO FORM SMOOTH SURFACE. ON COLD EQUIPMENT, USE VAPOR BARRIER CEMENT.
- F. INSULATED EQUIPMENT CONTAINING FLUIDS BELOW AMBIENT TEMPERATURE: INSULATE ENTIRE SYSTEM.
- G. FOR FIBERGLASS INSULATED EQUIPMENT CONTAINING FLUIDS BELOW AMBIENT TEMPERATURE, PROVIDE VAPOR BARRIER JACKETS, FACTORY-APPLIED OR FIELD-APPLIED, AND FINISH WITH GLASS CLOTH AND VAPOR BARRIER ADHESIVE.
- H. FIBERGLASS INSULATED EQUIPMENT CONTAINING FLUIDS ABOVE AMBIENT TEMPERATURE: PROVIDE STANDARD JACKETS, WITH OR WITHOUT VAPOR BARRIER, FACTORY-APPLIED OR FIELD-APPLIED. FINISH WITH GLASS CLOTH AND ADHESIVE.
- I. INSERTS AND SHIELDS:
 1. SHIELDS: GALVANIZED STEEL BETWEEN HANGERS AND INSERTS.
 2. INSERT LOCATION: BETWEEN SUPPORT SHIELD AND EQUIPMENT AND UNDER THE FINISH JACKET.

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- 3. INSERT CONFIGURATION: MINIMUM 6 INCHES LONG, OF SAME THICKNESS AND CONTOUR AS ADJOINING INSULATION; MAY BE FACTORY FABRICATED.
- 4. INSERT MATERIAL: HYDROUS CALCIUM SILICATE INSULATION OR OTHER HEAVY DENSITY INSULATING MATERIAL SUITABLE FOR THE PLANNED TEMPERATURE RANGE.
- J. FINISH INSULATION AT SUPPORTS, PROTRUSIONS, AND INTERRUPTIONS.
- K. EXTERIOR APPLICATIONS:
 - 1. PROVIDE VAPOR BARRIER JACKET.
 - 2. COVER WITH ALUMINUM OR STAINLESS STEEL.
- L. NAMEPLATES AND ASME STAMPS: BEVEL AND SEAL INSULATION AROUND; DO NOT INSULATE OVER.
- M. EQUIPMENT REQUIRING ACCESS FOR MAINTENANCE, REPAIR, OR CLEANING: INSTALL INSULATION SO IT CAN BE EASILY REMOVED AND REPLACED WITHOUT DAMAGE.

3.3 INSTALLATION - PIPING

- A. INSTALL IN ACCORDANCE WITH NORTH AMERICAN INSULATION MANUFACTURERS ASSOCIATION (NAIMA) NATIONAL INSULATION STANDARDS.
- B. EXPOSED PIPING: LOCATE INSULATION AND COVER SEAMS IN LEAST VISIBLE LOCATIONS.
- C. INSULATED PIPES CONVEYING FLUIDS BELOW AMBIENT TEMPERATURE: INSULATE ENTIRE SYSTEM INCLUDING FITTINGS, VALVES, UNIONS, FLANGES, STRAINERS, FLEXIBLE CONNECTIONS, PUMP BODIES, AND EXPANSION JOINTS.
- D. GLASS FIBER INSULATED PIPES CONVEYING FLUIDS BELOW AMBIENT TEMPERATURE:
 - 1. PROVIDE VAPOR BARRIER JACKETS, FACTORY-APPLIED OR FIELD-APPLIED. SECURE WITH SELF-SEALING LONGITUDINAL LAPS AND BUTT STRIPS WITH PRESSURE-SENSITIVE ADHESIVE. SECURE WITH OUTWARD CLINCH EXPANDING STAPLES AND VAPOR BARRIER MASTIC.
 - 2. INSULATE FITTINGS, JOINTS, AND VALVES WITH MOLDED INSULATION OF LIKE MATERIAL AND THICKNESS AS ADJACENT PIPE. FINISH WITH GLASS CLOTH AND VAPOR BARRIER ADHESIVE OR PVC FITTING COVERS.
- E. GLASS FIBER INSULATED PIPES CONVEYING FLUIDS ABOVE AMBIENT TEMPERATURE:
 - 1. PROVIDE STANDARD JACKETS, WITH OR WITHOUT VAPOR BARRIER, FACTORY-APPLIED OR FIELD-APPLIED. SECURE WITH SELF-SEALING LONGITUDINAL LAPS AND BUTT STRIPS WITH PRESSURE-SENSITIVE ADHESIVE. SECURE WITH OUTWARD CLINCH EXPANDING STAPLES.
 - 2. INSULATE FITTINGS, JOINTS, AND VALVES WITH INSULATION OF LIKE MATERIAL AND THICKNESS AS ADJOINING PIPE. FINISH WITH GLASS CLOTH AND ADHESIVE OR PVC FITTING COVERS.
- F. INSERTS AND SHIELDS:
 - 1. APPLICATION: ALL PIPING.
 - 2. SHIELDS: GALVANIZED STEEL BETWEEN PIPE HANGERS OR PIPE HANGER ROLLS AND INSERTS.
 - 3. INSERT LOCATION: BETWEEN SUPPORT SHIELD AND PIPING AND UNDER THE FINISH JACKET.
 - 4. INSERT CONFIGURATION: MINIMUM 6 INCHES LONG, OF SAME THICKNESS AND CONTOUR AS ADJOINING INSULATION; MAY BE FACTORY FABRICATED.

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5. INSERT MATERIAL: HYDROUS CALCIUM SILICATE INSULATION OR OTHER HEAVY DENSITY INSULATING MATERIAL SUITABLE FOR THE PLANNED TEMPERATURE RANGE.
- G. CONTINUE INSULATION THROUGH WALLS, SLEEVES, PIPE HANGERS, AND OTHER PIPE PENETRATIONS. FINISH AT SUPPORTS, PROTRUSIONS, AND INTERRUPTIONS. AT FIRE SEPARATIONS, SEE DIVISION 07.
- H. PIPE EXPOSED IN MECHANICAL EQUIPMENT ROOMS OR FINISHED SPACES (LESS THAN 10 FEET ABOVE FINISHED FLOOR): FINISH WITH PVC JACKET AND FITTING COVERS.
- I. EXTERIOR APPLICATIONS: PROVIDE VAPOR BARRIER JACKET. INSULATE FITTINGS, JOINTS, AND VALVES WITH INSULATION OF LIKE MATERIAL AND THICKNESS AS ADJOINING PIPE. PROVIDE FACTORY OR FIELD APPLIED CLADDING. -
 1. MINIMUM 16 MILS LAMINATED COVERING. PUNCTURE RESISTANT, ZERO PERMEABILITY, AND UV RESISTANT WITH PRESSURE SENSITIVE ADHESIVE.
- J. BURIED PIPING: PROVIDE FACTORY FABRICATED ASSEMBLY WITH INNER ALL-PURPOSE SERVICE JACKET WITH SELF-SEALING LAP, AND ASPHALT IMPREGNATED OPEN MESH GLASS FABRIC, WITH ONE MIL, 0.001 INCH THICK ALUMINUM FOIL SANDWICHED BETWEEN THREE LAYERS OF BITUMINOUS COMPOUND; OUTER SURFACE FACED WITH A POLYESTER FILM.
- K. HEAT TRACED PIPING: REFER TO 220533 - HEAT TRACING FOR PLUMBING PIPING.

3.4 SCHEDULES

- A. GENERAL REQUIREMENTS:
 1. PIPING INSTALLED IN WET/HUMID LOCATIONS, AND PIPING RECEIVING CHILLED WATER/COOLING COIL CONDENSATE WASTE, SHALL BE INSULATED WITH MINIMUM 1 INCH, AND IN ACCORDANCE WITH THE SCHEDULES BELOW, THICK PRE-FORMED FLAME-RETARDANT FLEXIBLE ELASTOMERIC CELLULAR PIPE INSULATION INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS.
 2. ITEMS NOT INSULATED: UNLESS OTHERWISE INDICATED, DO NOT INSTALL INSULATION ON THE FOLLOWING:
 - a. DRAINAGE PIPING LOCATED IN CRAWL SPACES.
 - b. UNDERGROUND PIPING.
 - c. CHROME-PLATED PIPES AND FITTINGS UNLESS THERE IS A POTENTIAL FOR PERSONNEL INJURY.
- B. INDOOR PLUMBING SYSTEMS:
 1. ROOF DRAIN BODIES:
 - a. GLASS FIBER, POLYOLEFIN, OR ELASTOMERIC
 - 1) THICKNESS: 1 INCH
 2. PRIMARY AND SECONDARY ROOF AND STORM DRAINAGE: ALL ABOVE GRADE HORIZONTAL PIPING INCLUDING FIRST AND LAST FITTING CONNECTED TO A VERTICAL RUN :
 - a. GLASS FIBER, POLYOLEFIN, OR ELASTOMERIC
 - 1) THICKNESS: 1 INCH
- C. OUTDOOR, ABOVEGROUND PIPING INSULATION SCHEDULE
 1. OUTDOOR HOT WATER, COLD WATER, HOT WATER RECIRCULATION
 - a. GLASS FIBER, POLYOLEFIN, OR ELASTOMERIC
 - 1) THICKNESS: 2 INCH

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- 2) PROVIDE WITH FIELD APPLIED JACKET: ALUMINUM - SMOOTH

END OF SECTION

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SECTION 221005 - PLUMBING PIPING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. STORM DRAINAGE PIPING, BURIED WITHIN 5 FEET OF BUILDING.
- B. STORM DRAINAGE PIPING, ABOVE GRADE.
- C. PIPE FLANGES, UNIONS, AND COUPLINGS.

1.2 SUBMITTALS

- A. SEE DIVISION 01 AND SECTION 220500 FOR SUBMITTAL PROCEDURE.
- B. PRODUCT DATA: PROVIDE DATA ON PIPE MATERIALS, PIPE FITTINGS, VALVES, AND ACCESSORIES. PROVIDE MANUFACTURERS CATALOG INFORMATION. INDICATE VALVE DATA AND RATINGS.
- C. SHOP DRAWINGS: FOR NON-PENETRATING ROOFTOP SUPPORTS, SUBMIT DETAILED LAYOUT DEVELOPED FOR THIS PROJECT, WITH DESIGN CALCULATIONS FOR LOADINGS AND SPACINGS.
- D. MAINTENANCE MATERIALS: FURNISH THE FOLLOWING FOR OWNER'S USE IN MAINTENANCE OF PROJECT.
 - 1. SEE DIVISION 01 - PRODUCT REQUIREMENTS FOR ADDITIONAL PROVISIONS.

1.3 QUALITY ASSURANCE

- A. PERFORM WORK IN ACCORDANCE WITH APPLICABLE CODES.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. PROVIDE TEMPORARY END CAPS AND CLOSURES ON PIPING AND FITTINGS. MAINTAIN IN PLACE UNTIL INSTALLATION.
- B. PROTECT PIPING SYSTEMS FROM ENTRY OF FOREIGN MATERIALS BY TEMPORARY COVERS, COMPLETING SECTIONS OF THE WORK, AND ISOLATING PARTS OF COMPLETED SYSTEM.

1.5 FIELD CONDITIONS

- A. DO NOT INSTALL UNDERGROUND PIPING WHEN BEDDING IS WET OR FROZEN.

PART 2 PRODUCTS

2.1 GENERAL REQUIREMENTS

- A. SOLVENT CEMENT AND ADHESIVE PRIMER:

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1. USE PVC SOLVENT CEMENT THAT HAS A VOC CONTENT OF 510 G/L OR LESS WHEN CALCULATED ACCORDING TO 40 CFR 59, SUBPART D (EPA METHOD 24).
2. USE ADHESIVE PRIMER THAT HAS A VOC CONTENT OF 550 G/L OR LESS WHEN CALCULATED ACCORDING TO 40 CFR 59, SUBPART D (EPA METHOD 24).

2.2 SANITARY WASTE VENT PIPING, ABOVE GRADE

- A. PVC PIPE: ASTM D2665. SCHEDULE 40 SOLID-WALL DRAIN, WASTE, AND VENT.
 1. FITTINGS: PVC DWV.
 2. JOINTS: SOLVENT WELDED, WITH ASTM D2564 SOLVENT CEMENT.
 3. PVC PIPING SHALL NOT BE INSTALLED IN RETURN AIR PLENUMS.

2.3 STORM DRAINAGE PIPING, BURIED WITHIN 5 FEET OF BUILDING

- A. CAST IRON PIPE: ASTM A74 EXTRA HEAVY WEIGHT.
 1. FITTINGS: CAST IRON.
 2. JOINT SEALS: ASTM C564 NEOPRENE GASKETS, OR LEAD AND OAKUM.

2.4 STORM DRAINAGE PIPING, ABOVE GRADE

- A. CAST IRON PIPE: ASTM A74 SERVICE WEIGHT.
 1. FITTINGS: CAST IRON.
 2. JOINT SEALS: ASTM C564 NEOPRENE GASKETS, O.
- B. CAST IRON PIPE: CISPI 301, HUBLESS, SERVICE WEIGHT.
 1. FITTINGS: CAST IRON.
 2. JOINTS: NEOPRENE GASKETS AND STAINLESS STEEL CLAMP-AND-SHIELD ASSEMBLIES.

2.5 PIPE FLANGES, UNIONS, AND COUPLINGS

- A. UNIONS FOR PIPE SIZES 3 INCH AND UNDER:
 1. FERROUS PIPE: CLASS 150 MALLEABLE IRON THREADED UNIONS.
 2. COPPER TUBE AND PIPE: CLASS 150 BRONZE UNIONS WITH SOLDERED JOINTS.
 3. COMPRESSED AIR COPPER TUBE AND PIPE: CLASS 150 BRONZE UNIONS WITH BRAZED JOINTS.
 4. COMPRESSED AIR FLEXIBLE CONNECTOR: CORRUGATED STAINLESS STEEL TUBING WITH STAINLESS STEEL WIRE-BRAID COVERING AND ENDS WELDED TO INNER TUBING. WORKING PRESSURE 200 PSI MINIMUM.
- B. FLANGES FOR PIPE SIZES OVER 1 INCH:
 1. FERROUS PIPE: CLASS 150 MALLEABLE IRON THREADED OR FORGED STEEL SLIP-ON FLANGES; PREFORMED NEOPRENE GASKETS.
 2. COPPER TUBE AND PIPE: CLASS 150 SLIP-ON BRONZE FLANGES; PREFORMED NEOPRENE GASKETS.
- C. NO-HUB COUPLINGS:
 1. TESTING: IN ACCORDANCE WITH ASTM C1277 AND CISPI 310.
 2. GASKET MATERIAL: NEOPRENE COMPLYING WITH ASTM C564.
 3. BAND MATERIAL: STAINLESS STEEL.
 4. EYELET MATERIAL: STAINLESS STEEL.
 5. MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE PRODUCTS BY ONE OF THE FOLLOWING OR AN APPROVED EQUAL.
 - a. CHARLOTTE

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- b. IDEAL CLAMP PRODUCTS, INC: .
 - c. MIFAB, INC:
 - d. TYLER
- D. SHIELDED, HEAVY DUTY NO-HUB COUPLINGS:
 - 1. TESTING: IN ACCORDANCE WITH ASTM C1540, FM 1680, AND CISPI 310.
 - 2. GASKET MATERIAL: NEOPRENE COMPLYING WITH ASTM C564.
 - 3. BAND MATERIAL: STAINLESS STEEL.
 - 4. EYELET MATERIAL: STAINLESS STEEL.
 - 5. MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE PRODUCTS BY ONE OF THE FOLLOWING OR AN APPROVED EQUAL.
 - a. CHARLOTTE
 - b. IDEAL CLAMP PRODUCTS, INC
 - c. MIFAB, INC
 - d. TYLER
- E. DIELECTRIC CONNECTIONS: UNION WITH GALVANIZED OR PLATED STEEL THREADED END, COPPER SOLDER END, WATER IMPERVIOUS ISOLATION BARRIER.

PART 3 EXECUTION

3.1 PIPING GENERAL

- A. EXCAVATION, BACKFILLING, AND DE-WATERING THAT ARE INCIDENTAL TO THE PLUMBING WORK SHALL BE PERFORMED BY THE PLUMBING CONTRACTOR. THE UNDERGROUND INSTALLATION MUST BE INSPECTED AND APPROVED BY THE BUILDING DEPARTMENT INSPECTOR AND ARCHITECT PRIOR TO BACKFILLING AND TAMPING. CARE SHOULD BE EXERCISED IN PREPARING THE BOTTOM OF THE TRENCH TO ACCEPT THE PIPING AND IT SHOULD BE UNIFORMLY TAMPED AND BE FREE FROM HIGH SPOTS.
- B. ALL PIPING SHALL BE RUN STRAIGHT, PLUMB AND GRADED IN THE DIRECTION INDICATED ON THE PLANS. ALL CUT PIPE SHALL BE SQUARELY CUT WITH A NON-CHIP FORMING PROCESS WHERE POSSIBLE. THE CUT SHALL BE PROPERLY REAMED TO REMOVE ALL CONSTRUCTION AND BURRS BEFORE MAKING THE JOINT. ALL EXPOSED THREADS SHALL BE PAINTED OR OTHERWISE COATED TO STOP CORROSION.
- C. PITCH ALL 3 INCH AND SMALLER DRAINAGE PIPING AT 1/4" PER FOOT MINIMUM AND 4 INCH AND LARGER DRAINAGE PIPING AT 1/8" PER FOOT MINIMUM UNLESS OTHERWISE NOTED.
- D. ALL PIPING PENETRATING RATED FLOORS AND WALLS SHALL BE SEALED TO MAINTAIN FIRE RATING AND INTEGRITY OF SEPARATION. WHERE PIPES PASS THROUGH FIRE WALLS, FIRE- PARTITIONS, FIRE-RATED PIPE CHASE WALLS OR FLOORS ABOVE GRADE, A FIRE SEAL SHALL BE PROVIDED. REFER TO ARCHITECTURAL DRAWINGS FOR ALL FIRE STOPPING INFORMATION AND DETAILS RELATING TO PLUMBING PENETRATIONS INTO OR THROUGH FIRE RATED ASSEMBLIES.

3.2 CUTTING AND PATCHING

- A. CUT AND PATCH EXISTING CONSTRUCTION AS REQUIRED FOR THE PROPER INSTALLATION OF THIS WORK. CUT OPENINGS CAREFULLY WITHOUT UNDUE WEAKENING OF THE STRUCTURE OR DAMAGE TO THE BUILDING. DO NOT CUT STRUCTURAL MEMBERS WITHOUT PERMISSION OF THE ARCHITECT. PROVIDE

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REQUIRED BRACING, SHORING, WEATHER PROTECTION, ETC. FOR OPENINGS AND WATER STOPS IN CONCRETE FLOORS.

- B. PATCHING SHALL REPLACE THE WORK TO A CONDITION AT LEAST EQUAL TO ITS CONDITION BEFORE THE CUTTING WAS DONE. USE MATERIALS AND METHODS APPROVED BY THE ARCHITECT.
- C. CUTTING AND PATCHING INCLUDES NECESSARY RELOCATION OF EXISTING PIPES, CONDUITS, ETC. THAT PASS THROUGH OPENINGS AND THE PROPER CLOSING OF OPENINGS IN WALLS, FLOORS CEILINGS, ETC. WHERE ABANDONED MECHANICAL FACILITIES ARE REMOVED.

3.3 EXCAVATION, BACKFILLING AND PUMPING

- A. EXCAVATE, BACKFILL AND COMPACT ALL TRENCHES REQUIRED FOR UNDERGROUND PLUMBING WORK. MAINTAIN TRENCHES FREE OF WATER UNTIL INSTALLATION IS COMPLETE AND PROVIDE ALL NECESSARY SHORING.
- B. CONTRACTOR SHALL FIELD VERIFY ALL EXISTING UNDERGROUND UTILITIES AND AVOID DAMAGE TO SAME. WHERE EXISTING UTILITIES ARE DAMAGED, THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL REPAIRS OR REPLACEMENT.
- C. EXCAVATE TRENCHES SUITABLE IN WIDTH TO PROVIDE MINIMUM OF 6" CLEAR SPACE BETWEEN THE BARREL OF THE PIPE AND THE TRENCH WALL ON BOTH SIDES OF THE PIPE. ACCURATELY GRADE THE TRENCH BOTTOM TO PROVIDE UNIFORM BEARING AND SUPPORT FOR EACH SECTION OF THE PIPE ON UNDISTURBED SOIL AT EVERY POINT ALONG IT'S ENTIRE LENGTH. TAKE CARE NOT TO EXCAVATE BELOW THE DEPTH NECESSARY AND EXCAVATE BELL HOLES TO ENSURE PROPER BEDDING. BACKFILL OVER DEPTHS WITH LOOSE, GRANULAR, MOIST MATERIAL AND THOROUGHLY COMPACT TO THE DEPTH REQUIRED. COMPACT TO 95 PERCENT OF THE MAXIMUM DENSITY BASED ON MODIFIED PROCTOR DENSITY CRITERIA.
- D. PLACE AND COMPACT BACKFILL MATERIAL IN 6" LAYERS UNTIL THE PIPE HAS A MINIMUM COVER OF 12". PLACE AND COMPACT THE REMAINING MATERIAL IN 12" LAYERS. GRADE THE SURFACE TO A REASONABLE UNIFORMITY AND LEAVE THE MOUNDING IN NEAT CONDITION AS APPROVED BY THE ARCHITECT.
- E. BACKFILL ALL TRENCHES PASSING UNDER FOUNDATIONS WITH CONCRETE TO THE UNDERSIDE OF THE FOUNDATION AND AT A 2:1 SLOPE AWAY FROM EACH SIDE OF THE FOUNDATION. BACKFILL ALL TRENCHES THAT ARE PARALLEL AND DEEPER THAN FOUNDATIONS WITH CONCRETE TO A POINT THAT WILL PLACE THE TOP OF THE CONCRETE ON A 2:1 SLOPE AWAY FROM THE FOUNDATION BOTTOM. DO NOT BACKFILL TRENCHES UNTIL ALL REQUIRED TESTS AND INSPECTIONS ARE COMPLETED.
- F. WHERE TRENCH WALLS ARE BELOW THE WATER TABLE, THE CONTRACTOR SHALL TAKE ALL MEASURES TO ENSURE TRENCH WALLS REMAIN STABLE, INCLUDING ALL DE-WATERING.
- G. PLASTIC PIPE SHOULD ALWAYS BE BURIED IN STRICT ACCORDANCE WITH THE ASTM STANDARD RELEVANT TO THE TYPE OF PLASTIC PIPING SYSTEM BEING INSTALLED. THOSE STANDARDS ARE:
 - 1. ASTM D2321: STANDARD PRACTICE FOR UNDERGROUND INSTALLATION OF THERMOPLASTIC PIPE FOR SEWERS AND OTHER GRAVITY-FLOW APPLICATIONS.
 - 2. ASTM D2774: STANDARD PRACTICE FOR UNDERGROUND INSTALLATION OF THERMOPLASTIC PRESSURE PIPING.

CCAC BOYCE ROOF REPLACEMENT

3.4 EXAMINATION

- A. VERIFY THAT EXCAVATIONS ARE TO REQUIRED GRADE, DRY, AND NOT OVER-EXCAVATED.

3.5 PREPARATION

- A. REAM PIPE AND TUBE ENDS. REMOVE BURRS. BEVEL PLAIN END FERROUS PIPE.
- B. REMOVE SCALE AND DIRT, ON INSIDE AND OUTSIDE, BEFORE ASSEMBLY.
- C. PREPARE PIPING CONNECTIONS TO EQUIPMENT WITH FLANGES OR UNIONS.

3.6 INSTALLATION

- A. INSTALL IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.
- B. PROVIDE NON-CONDUCTING DIELECTRIC CONNECTIONS WHEREVER JOINTING DISSIMILAR METALS.
- C. ROUTE PIPING IN ORDERLY MANNER AND MAINTAIN GRADIENT. ROUTE PARALLEL AND PERPENDICULAR TO WALLS.
- D. INSTALL PIPING TO MAINTAIN HEADROOM, CONSERVE SPACE, AND NOT INTERFERE WITH USE OF SPACE.
- E. GROUP PIPING WHENEVER PRACTICAL AT COMMON ELEVATIONS.
- F. INSTALL PIPING TO ALLOW FOR EXPANSION AND CONTRACTION WITHOUT STRESSING PIPE, JOINTS, OR CONNECTED EQUIPMENT. SEE SECTION 220516.
- G. PROVIDE CLEARANCE IN HANGERS AND FROM STRUCTURE AND OTHER EQUIPMENT FOR INSTALLATION OF INSULATION AND ACCESS TO VALVES AND FITTINGS.
 - 1. SEE SECTION 220719.
- H. PROVIDE ACCESS WHERE VALVES AND FITTINGS ARE NOT EXPOSED.
 - 1. COORDINATE SIZE AND LOCATION OF ACCESS DOORS WITH DIVISION 08.
- I. ESTABLISH ELEVATIONS OF BURIED PIPING OUTSIDE THE BUILDING TO ENSURE NOT LESS THAN 4.5 FT OF COVER.
- J. INSTALL VENT PIPING PENETRATING ROOFED AREAS TO MAINTAIN INTEGRITY OF ROOF ASSEMBLY;.
- K. WHERE PIPE SUPPORT MEMBERS ARE WELDED TO STRUCTURAL BUILDING FRAMING, SCRAPE, BRUSH CLEAN, AND APPLY ONE COAT OF ZINC-RICH PRIMER TO WELDING.
- L. PROVIDE SUPPORT FOR UTILITY METERS IN ACCORDANCE WITH REQUIREMENTS OF UTILITY COMPANIES.
- M. PREPARE EXPOSED, UNFINISHED PIPE, FITTINGS, SUPPORTS, AND ACCESSORIES FOR FINISH PAINTING.
 - 1. SEE DIVISION 09 FOR PAINTING OF INTERIOR PLUMBING SYSTEMS AND COMPONENTS.
 - 2. SEE DIVISION 09 FOR PAINTING OF EXTERIOR PLUMBING SYSTEMS AND COMPONENTS.
- N. INSTALL BELL AND SPIGOT PIPE WITH BELL END UPSTREAM.

CCAC BOYCE ROOF REPLACEMENT

- O. INSTALL VALVES WITH STEMS UPRIGHT OR HORIZONTAL, NOT INVERTED. SEE SECTION 220523.
- P. INSTALL WATER PIPING TO ASME B31.9.
- Q. PVC PIPE: MAKE SOLVENT-WELDED JOINTS IN ACCORDANCE WITH ASTM D2855.
- R. PVC PIPING MAY NOT BE INSTALLED IN A RETURN AIR PLENUM FOR ANY ABOVE GRADE PIPING APPLICATIONS.
- S. SLEEVE PIPES PASSING THROUGH PARTITIONS, WALLS, AND FLOORS.
- T. INSERTS:
 - 1. PROVIDE INSERTS FOR PLACEMENT IN CONCRETE FORMWORK.
 - 2. PROVIDE INSERTS FOR SUSPENDING HANGERS FROM REINFORCED CONCRETE SLABS AND SIDES OF REINFORCED CONCRETE BEAMS.
 - 3. PROVIDE HOOKED ROD TO CONCRETE REINFORCEMENT SECTION FOR INSERTS CARRYING PIPE OVER 4 INCHES.
 - 4. WHERE CONCRETE SLABS FORM FINISHED CEILING, LOCATE INSERTS FLUSH WITH SLAB SURFACE.
 - 5. WHERE INSERTS ARE OMITTED, DRILL THROUGH CONCRETE SLAB FROM BELOW AND PROVIDE THROUGH-BOLT WITH RECESSED SQUARE STEEL PLATE AND NUT ABOVE SLAB.
- U. PIPE HANGERS AND SUPPORTS:
 - 1. INSTALL IN ACCORDANCE WITH MSS SP-58.
 - 2. SUPPORT HORIZONTAL PIPING AS INDICATED.
 - 3. INSTALL HANGERS TO PROVIDE MINIMUM 1/2 INCH SPACE BETWEEN FINISHED COVERING AND ADJACENT WORK.
 - 4. PLACE HANGERS WITHIN 12 INCHES OF EACH HORIZONTAL ELBOW.
 - 5. USE HANGERS WITH 1-1/2 INCH MINIMUM VERTICAL ADJUSTMENT. DESIGN HANGERS FOR PIPE MOVEMENT WITHOUT DISENGAGEMENT OF SUPPORTED PIPE.
 - 6. SUPPORT VERTICAL PIPING AT EVERY FLOOR. SUPPORT RISER PIPING INDEPENDENTLY OF CONNECTED HORIZONTAL PIPING.
 - 7. WHERE SEVERAL PIPES CAN BE INSTALLED IN PARALLEL AND AT SAME ELEVATION, PROVIDE MULTIPLE OR TRAPEZE HANGERS.
 - 8. PROVIDE COPPER PLATED HANGERS AND SUPPORTS FOR COPPER PIPING.
 - 9. PRIME COAT EXPOSED STEEL HANGERS AND SUPPORTS. HANGERS AND SUPPORTS LOCATED IN CRAWL SPACES, PIPE SHAFTS, AND SUSPENDED CEILING SPACES ARE NOT CONSIDERED EXPOSED.
 - a. PAINTING OF INTERIOR PLUMBING SYSTEMS AND COMPONENTS IS SPECIFIED IN DIVISION 09.
 - b. PAINTING OF EXTERIOR PLUMBING SYSTEMS AND COMPONENTS IS SPECIFIED IN DIVISION 09.
 - 10. PROVIDE HANGERS ADJACENT TO MOTOR-DRIVEN EQUIPMENT WITH VIBRATION ISOLATION; SEE SECTION 220548.
 - 11. SUPPORT CAST IRON DRAINAGE PIPING AT EVERY JOINT.
- V. WHEN INSTALLING MORE THAN ONE PIPING SYSTEM MATERIAL, ENSURE SYSTEM COMPONENTS ARE COMPATIBLE AND JOINED TO ENSURE THE INTEGRITY OF THE SYSTEM. PROVIDE NECESSARY JOINING FITTINGS. ENSURE FLANGES, UNION, AND COUPLINGS FOR SERVICING ARE CONSISTENTLY PROVIDED.

CCAC BOYCE ROOF REPLACEMENT

3.7 APPLICATION

- A. INSTALL UNIONS DOWNSTREAM OF VALVES AND AT EQUIPMENT OR APPARATUS CONNECTIONS.
- B. INSTALL BRASS MALE ADAPTERS EACH SIDE OF VALVES IN COPPER PIPED SYSTEM. SOLDER ADAPTERS TO PIPE.

3.8 TOLERANCES

- A. DRAINAGE PIPING: ESTABLISH INVERT ELEVATIONS WITHIN 1/2 INCH VERTICALLY OF LOCATION INDICATED AND SLOPE TO DRAIN AT MINIMUM SLOPE AS FOLLOWS:
 - 1. FOR PIPING 3 INCH AND SMALLER, 1/4 INCH PER FOOT.
 - 2. FOR PIPING 4 INCH AND SMALLER, 1/8 INCH PER FOOT.
- B. WATER PIPING: SLOPE AT MINIMUM OF 1/32 INCH PER FOOT AND ARRANGE TO DRAIN AT LOW POINTS.

3.9 FIELD TESTS AND INSPECTIONS

- A. VERIFY AND INSPECT SYSTEMS ACCORDING TO REQUIREMENTS BY THE AUTHORITY HAVING JURISDICTION. IN THE ABSENCE OF SPECIFIC TEST AND INSPECTION PROCEDURES PROCEED AS INDICATED BELOW.
- B. SANITARY WASTE AND VENT PIPING AND STORM PIPING:
 - 1. DURING INSTALLATION, NOTIFY AUTHORITIES HAVING JURISDICTION AT LEAST 24 HOURS BEFORE INSPECTION MUST BE MADE. PERFORM TESTS SPECIFIED BELOW IN PRESENCE OF AUTHORITIES HAVING JURISDICTION.
 - a. ROUGHING-IN INSPECTION: ARRANGE FOR INSPECTION OF PIPING BEFORE CONCEALING OR CLOSING-IN AFTER ROUGHING-IN AND BEFORE SETTING FIXTURES.
 - b. FINAL INSPECTION: ARRANGE FOR FINAL INSPECTION BY AUTHORITIES HAVING JURISDICTION TO OBSERVE TESTS SPECIFIED BELOW AND TO ENSURE COMPLIANCE WITH REQUIREMENTS.
 - 2. RE-INSPECTION: IF AUTHORITIES HAVING JURISDICTION FIND THAT PIPING WILL NOT PASS TEST OR INSPECTION, MAKE REQUIRED CORRECTIONS AND ARRANGE FOR RE-INSPECTION.
 - 3. REPORTS: PREPARE INSPECTION REPORTS AND HAVE THEM SIGNED BY AUTHORITIES HAVING JURISDICTION.
 - 4. TEST SANITARY DRAINAGE AND VENT PIPING ACCORDING TO PROCEDURES OF AUTHORITIES HAVING JURISDICTION OR IN ABSENCE OF PUBLISHED PROCEDURES, AS FOLLOWS:
 - a. TEST FOR LEAKS AND DEFECTS IN NEW PIPING AND PARTS OF EXISTING PIPING THAT HAVE BEEN ALTERED, EXTENDED, OR REPAIRED. IF TESTING IS PERFORMED IN SEGMENTS, SUBMIT SEPARATE REPORT FOR EACH TEST, COMPLETE WITH DIAGRAM OF PORTION OF PIPING TESTED.
 - b. LEAVE UNCOVERED AND UNCONCEALED NEW, ALTERED, EXTENDED, OR REPLACED DRAINAGE PIPING UNTIL IT HAS BEEN TESTED AND APPROVED. EXPOSE WORK THAT WAS COVERED OR CONCEALED BEFORE IT WAS TESTED.
 - c. TEST PROCEDURE: TEST DRAINAGE PIPING ON COMPLETION OF ROUGHING IN. CLOSE OPENINGS IN PIPING SYSTEM AND FILL WITH WATER TO POINT OF OVERFLOW, BUT NOT LESS THAN 10-FOOT HEAD OF WATER. FROM 15 MINUTES BEFORE INSPECTION STARTS TO

CCAC BOYCE ROOF REPLACEMENT

COMPLETION OF INSPECTION, WATER LEVEL MUST NOT DROP. INSPECT JOINTS FOR LEAKS.

- d. REPAIR LEAKS AND DEFECTS WITH NEW MATERIALS AND RETEST PIPING, OR PORTION THEREOF, UNTIL SATISFACTORY RESULTS ARE OBTAINED.
 - e. PREPARE REPORTS FOR TESTS AND REQUIRED CORRECTIVE ACTION.
- C. TEST RESULTS: DOCUMENT AND CERTIFY SUCCESSFUL RESULTS, OTHERWISE REPAIR, DOCUMENT, AND RETEST.

3.10 SERVICE CONNECTIONS

- A. PROVIDE NEW STORM SEWER SERVICES. BEFORE COMMENCING WORK, CHECK INVERT ELEVATIONS REQUIRED FOR SEWER CONNECTIONS, CONFIRM INVERTS AND ENSURE THAT THESE CAN BE PROPERLY CONNECTED WITH SLOPE FOR DRAINAGE AND COVER TO AVOID FREEZING.

3.11 SCHEDULES

A. GENERAL

1. WHERE HORIZONTAL PIPES 4 INCHES (102 MM) AND LARGER CONVEY DRAINAGE OR WASTE, AND WHERE A PIPE FITTING CHANGES THE FLOW DIRECTION GREATER THAN 45 DEGREES (0.79 RAD), RIGID BRACING OR OTHER RIGID SUPPORT ARRANGEMENTS SHALL BE INSTALLED TO RESIST MOVEMENT OF THE UPSTREAM PIPE IN A DIRECTION OPPOSITE THE PIPE FLOW. A CHANGE OF FLOW DIRECTION INTO A VERTICAL PIPE SHALL NOT REQUIRE THE UPSTREAM PIPE TO BE BRACED.
2. ANCHORAGE SHALL BE PROVIDED TO RESTRAIN DRAINAGE PIPING FROM AXIAL MOVEMENT.
3. FOR PIPE SIZES GREATER THAN 4 INCHES (102 MM), RESTRAINTS SHALL BE PROVIDED FOR DRAIN PIPES AT ALL CHANGES IN DIRECTION AND AT ALL CHANGES IN DIAMETER GREATER THAN TWO PIPE SIZES. BRACES, BLOCKS, RODDING AND OTHER SUITABLE METHODS AS SPECIFIED BY THE COUPLING MANUFACTURER SHALL BE UTILIZED.

B. PIPE HANGER SPACING:

1. CAST IRON PIPING:
 - a. PIPE SIZE: ALL
 - 1) MAXIMUM HORIZONTAL HANGER SPACING: 5 FT.
 - a) THE MAXIMUM HORIZONTAL SPACING OF CAST-IRON PIPE HANGERS SHALL BE INCREASED TO 10 FEET WHERE 10-FOOT LENGTHS OF PIPE ARE INSTALLED.
 - 2) MAXIMUM VERTICAL HANGER SPACING: 15 FEET.
2. PVC PIPING:
 - a. PIPE SIZE: ALL:
 - 1) MAXIMUM HORIZONTAL HANGER SPACING: 4 FT.
 - 2) MAXIMUM VERTICAL HANGER SPACING: 10 FT.
 - a) FOR SIZES 2 INCHES AND SMALLER, A GUIDE SHALL BE INSTALLED MIDWAY BETWEEN REQUIRED VERTICAL SUPPORTS. SUCH GUIDES SHALL PREVENT PIPE MOVEMENT IN A DIRECTION PERPENDICULAR TO THE AXIS OF THE PIPE.

C. PIPE HANGER THREADED ROD DIAMETER:

1. METAL PIPING:
 - a. PIPE SIZE: 1/2 INCH TO 1-1/4 INCH:
 - 1) HANGER ROD DIAMETER: 3/8 INCHES.

CCAC BOYCE ROOF REPLACEMENT

- b. PIPE SIZE: 1-1/2 INCH TO 2 INCH:
 - 1) HANGER ROD DIAMETER: 3/8 INCH.
 - c. PIPE SIZE: 2-1/2 INCH TO 3 INCH:
 - 1) HANGER ROD DIAMETER: 1/2 INCH.
 - d. PIPE SIZE: 4 INCH TO 5 INCH:
 - 1) HANGER ROD DIAMETER: 5/8 INCH.
 - e. PIPE SIZE: 6 INCH TO 12 INCH:
 - 1) HANGER ROD DIAMETER: 7/8 INCH.
 - f. PIPE SIZE: 14 INCH TO 18 INCH:
 - 1) HANGER ROD DIAMETER: 1 INCH.
2. PLASTIC PIPING:
- a. PIPE SIZE: 1/2 INCH TO 2 INCH:
 - 1) HANGER ROD DIAMETER: 3/8 INCH.
 - b. PIPE SIZE: 2-1/2 INCH TO 4 INCH:
 - 1) HANGER ROD DIAMETER: 1/2 INCH.
 - c. PIPE SIZE: 5 INCH TO 6 INCH:
 - 1) HANGER ROD DIAMETER: 5/8 INCH.
 - d. PIPE SIZE: 8 INCH TO 12 INCH:
 - 1) HANGER ROD DIAMETER: 3/4 INCH.

END OF SECTION

CCAC BOYCE ROOF REPLACEMENT

SECTION 221423 - STORM DRAINAGE PIPING SPECIALTIES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. ROOF AND EXTERIOR SURFACE DRAINS.
- B. CLEANOUTS.

1.2 RELATED REQUIREMENTS

- A. DIVISION 07 ROOFING SECTIONS.
- B. SECTION 221005 - PLUMBING PIPING.

1.3 REFERENCE STANDARDS

- A. ASME A112.6.4 - ROOF, DECK, AND BALCONY DRAINS; 2022.
- B. ASME A112.36.2 - CLEANOUTS; 2022.
- C. NSF 14 - PLASTICS PIPING SYSTEM COMPONENTS AND RELATED MATERIALS; 2025.

1.4 SUBMITTALS

- A. SEE DIVISION 01-ADMINISTRATIVE REQUIREMENTS FOR SUBMITTAL PROCEDURES.
- B. PRODUCT DATA: PROVIDE MANUFACTURER'S LITERATURE AND DATA SHEETS FOR EACH PRODUCT. INCLUDE INFORMATION ON FABRICATION MATERIALS, ASSEMBLY OF COMPONENTS, DIMENSIONS, RATINGS, FINISHES, ROUGH-IN REQUIREMENTS, AND INSTALLED ACCESSORIES.
- C. SHOP DRAWINGS:
 - 1. PROVIDE DIMENSIONED PLANS SHOWING LOCATIONS OF DRAINS FOR THE FOLLOWING:
 - a. ROOF DRAINS AND EXTERIOR SURFACE DRAINS.
- D. MANUFACTURER'S INSTRUCTIONS: PROVIDE FOR PRODUCTS LISTED BELOW. INCLUDE INSTRUCTIONS FOR HANDLING, PROTECTION, EXAMINATION, PREPARATION, AND INSTALLATION.
 - 1. TRENCH DRAINS.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. SEE DIVISION 01-CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL FOR PACKAGING WASTE REQUIREMENTS.
- B. RECEIVE, INSPECT, HANDLE, AND STORE PRODUCTS IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.
- C. KEEP PRODUCTS IN ORIGINAL MANUFACTURER'S PACKAGING AND PROTECT FROM DAMAGE UNTIL READY FOR INSTALLATION.

CCAC BOYCE ROOF REPLACEMENT

- D. STORE PRODUCTS UNDER COVER AND PROTECTED FROM WEATHER AND DIRT. ELEVATE ABOVE GRADE.
- E. STORE PLASTIC PRODUCTS PROTECTED FROM DIRECT SUNLIGHT.

PART 2 PRODUCTS

2.1 GENERAL REQUIREMENTS

- A. PLASTIC STORM DRAINAGE PIPING SPECIALTIES: PROVIDE PLASTIC PRODUCTS COMPLYING WITH NSF 14.
- B. SOURCE LIMITATIONS: FURNISH DRAINS AND STORM DRAINAGE PIPING SPECIALTIES OF SAME KIND BY SAME MANUFACTURER.

2.2 ROOF AND EXTERIOR SURFACE DRAINS

- A. MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE PRODUCTS BY ONE OF THE FOLLOWING OR AN APPROVED EQUAL.
 - 1. JAY R. SMITH MFG CO; A DIVISION OF MORRIS GROUP INTERNATIONAL
 - 2. JOSAM COMPANY
 - 3. MARATHON ROOFING PRODUCTS
 - 4. MENZIES METAL PRODUCTS
 - 5. MIFAB, INC
 - 6. OMG ROOFING PRODUCTS
 - 7. SIOUX CHIEF MANUFACTURING COMPANY, INC.
 - 8. THALER METAL INDUSTRIES LTD.
 - 9. THUNDERBIRD PRODUCTS
 - 10. WADE; A SUBSIDIARY OF MCWANE INC.
 - 11. WATTS; A WATTS WATER TECHNOLOGIES COMPANY
 - 12. ZURN INDUSTRIES, LLC
- B. CAST IRON ROOF DRAINS AND OVERFLOW ROOF DRAINS:
 - 1. REFER TO SCHEDULE ON DRAWINGS.
 - 2. ASSEMBLY: ASME A112.6.4.
 - 3. BODY: LACQUERED CAST IRON WITH MEMBRANE CLAMPING RING WITH GRAVEL STOP.
 - 4. STRAINER: REMOVABLE CAST IRON DOME.
 - 5. OVERFLOW DRAINS: PROVIDE 2-INCH HIGH EXTERNAL OVERFLOW WATERDAM OR INTERNAL STANDPIPE EXTENSION.
- C. CANOPY, CORNICE, AND GUTTER DRAINS:
 - 1. REFER TO SCHEDULE ON DRAWINGS.
 - 2. ASSEMBLY: ASME A112.6.4.
 - 3. BODY: LACQUERED CAST IRON WITH MEMBRANE CLAMP.
 - 4. STRAINER: REMOVABLE BRONZE STRAINER.

2.3 CLEANOUTS

- A. MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE PRODUCTS BY ONE OF THE FOLLOWING OR AN APPROVED EQUAL.
 - 1. JAY R. SMITH MFG CO; A DIVISION OF MORRIS GROUP INTERNATIONAL
 - 2. MIFAB, INC

CCAC BOYCE ROOF REPLACEMENT

3. SIOUX CHIEF MANUFACTURING COMPANY, INC.
 4. WADE; A SUBSIDIARY OF MCWANE INC.
 5. WATTS; A WATTS WATER TECHNOLOGIES COMPANY
 6. ZURN INDUSTRIES, LLC
- B. FLOOR CLEANOUTS:
1. REFER TO SCHEDULE ON DRAWINGS.
 2. ASSEMBLY: ASME A112.36.2.
- C. WALL CLEANOUTS:
1. REFER TO SCHEDULE ON DRAWINGS.
 2. ASSEMBLY: ASME A112.36.2.

PART 3 EXECUTION

3.1 EXAMINATION

- A. VERIFY CONDITIONS ARE SATISFACTORY FOR INSTALLATION PRIOR TO STARTING WORK.

3.2 INSTALLATION

- A. INSTALL PRODUCTS IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.
- B. MAINTAIN CONTINUITY OF WATERPROOFING MEMBRANES. SECURE WATERPROOFING MEMBRANES TO DRAIN CLAMPING COLLARS.
- C. INSTALL ROOF DRAINS IN ACCORDANCE WITH ROOF MEMBRANE MANUFACTURER'S WRITTEN INSTALLATION INSTRUCTIONS AT LOW POINTS OF ROOF AREAS.
1. INSTALL FLASHING COLLAR OR FLANGE OF ROOF DRAIN TO MAINTAIN INTEGRITY OF WATERPROOF MEMBRANES WHERE PENETRATED.
 2. INSTALL EXPANSION JOINTS, IF INDICATED, IN ROOF DRAIN OUTLETS.
 3. POSITION ROOF DRAINS FOR EASY ACCESS AND MAINTENANCE.
- D. INSTALL CLEANOUTS IN ABOVEGROUND PIPING AND BUILDING DRAIN PIPING IN ACCORDANCE WITH THE FOLLOWING INSTRUCTIONS UNLESS OTHERWISE INDICATED:
1. USE CLEANOUTS THE SAME SIZE AS DRAINAGE PIPING UP TO 4 INCH. USE 4 INCH FOR LARGER DRAINAGE PIPING UNLESS LARGER CLEANOUT IS INDICATED.
 2. LOCATE CLEANOUTS AT EACH CHANGE IN DIRECTION OF PIPING GREATER THAN 45 DEGREES.
 3. LOCATE CLEANOUTS AT MAXIMUM INTERVALS OF 100 FEET.
 4. LOCATE CLEANOUTS AT BASE OF EACH VERTICAL STORM PIPING CONDUCTOR.
- E. INSTALL DRAIN-OUTLET BACKWATER VALVES IN OUTLET OF DRAINS
- F. INSTALL TEST TEES IN VERTICAL CONDUCTORS AND NEAR FLOOR.
- G. INSTALL WALL CLEANOUTS IN VERTICAL CONDUCTORS. INSTALL ACCESS DOOR IN WALL IF INDICATED.
- H. INSTALL ROOF DRAINS AT LOW POINTS OF ROOF AREAS.
- I. ASSEMBLE CHANNEL DRAINAGE SYSTEM COMPONENTS IN ACCORDANCE WITH MANUFACTURER'S WRITTEN INSTRUCTIONS. INSTALL ON SUPPORT DEVICES SO THAT TOP WILL BE FLUSH WITH ADJACENT SURFACE.

CCAC BOYCE ROOF REPLACEMENT

- J. FOR CLEANOUTS LOCATED IN CONCEALED PIPING, INSTALL CLEANOUT WALL ACCESS COVERS, OF TYPES INDICATED, WITH FRAME AND COVER FLUSH WITH FINISHED WALL.
- K. FOR FLOOR CLEANOUTS FOR PIPING BELOW FLOORS, INSTALL CLEANOUT DECK PLATES WITH TOP FLUSH WITH FINISHED FLOOR.
- L. INSTALL DOWNSPOUT NOZZLES AT EXPOSED BOTTOM OF CONDUCTORS WHERE THEY SPILL ONTO GRADE.
- M. INSTALL THROUGH-PENETRATION FIRESTOP ASSEMBLIES FOR PENETRATIONS OF FIRE- AND SMOKE-RATED ASSEMBLIES.
 - 1. COMPLY WITH REQUIREMENTS IN DIVISION 07-PENETRATION FIRESTOPPING.

3.3 INSTALLATION OF FLASHING

- A. FABRICATE FLASHING FROM SINGLE PIECE OF METAL UNLESS LARGE PANS, SUMPS, OR OTHER DRAINAGE SHAPES ARE REQUIRED.
- B. INSTALL SHEET FLASHING ON PIPES, SLEEVES, AND SPECIALTIES PASSING THROUGH OR EMBEDDED IN FLOORS AND ROOFS WITH WATERPROOF MEMBRANE.
- C. SET FLASHING ON FLOORS AND ROOFS IN SOLID COATING OF BITUMINOUS CEMENT.
- D. SECURE FLASHING INTO SLEEVE AND SPECIALTY CLAMPING RING OR DEVICE.

3.4 CLEANING

- A. SEE DIVISION 01-EXECUTION AND CLOSEOUT REQUIREMENTS FOR ADDITIONAL REQUIREMENTS.
- B. CLEAN DEBRIS FROM DRAINS.

3.5 PROTECTION

- A. PROTECT INSTALLED DRAINS FROM ACCUMULATING DIRT AND DEBRIS THROUGH REMAINDER OF CONSTRUCTION.
- B. PROTECT INSTALLED PRODUCTS FROM DAMAGE DUE TO SUBSEQUENT CONSTRUCTION OPERATIONS.
- C. PLACE PLUGS IN ENDS OF UNCOMPLETED PIPING AT END OF EACH DAY AND WHEN WORK STOPS.

END OF SECTION