



STATE OF ALASKA
Department of Corrections
Division of Administrative Services
802 3rd Street, Suite 224
Douglas, AK 99824

Request for Proposal

No. 200005089-10

Date of Issue: **December 21, 2022**

Project:
Yukon Kuskokwim Correctional Center (YKCC), Mechanical
Upgrades Phase II
Bethel, Alaska

Bidders Are Not Required to Return This Form.

Michael Lim
Procurement Officer
Department of Corrections

John Gard
Project Manager
Department of Corrections

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(State funded Buildings)

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IMPORTANT NOTICE: All contractors will need to contact Michael Lim at 907-465-6014 or Michael.lim@alaska.gov to pick up the drawings from Department of Corrections, 802 3rd Street, Suite 220, Douglas, AK, 99824. Drawings will not be posted online, faxed, or provided to any plans room.

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STATE OF ALASKA
DEPARTMENT OF CORRECTIONS

REQUEST FOR PROPOSALS

For Construction Contract
Competitive Sealed Proposals AS 36.30.200(b)

Yukon Kuskokwim Correctional Center Date **December 21, 2022**
YKCC Mechanical Upgrades Phase II
Project No. 200005089-10

Location of Project: Bethel, Alaska
Contracting Officer: Michael Lim
Issuing Office: Department of Corrections
State Funded ☒ Federal Aid ☐

Description of Work:

This state funded project will provide mechanical and boiler upgrades at the Yukon Kuskokwim Correctional Center in Bethel, Alaska.

The Engineer's Estimate is between \$1,500,000 and \$2,000,000.

All work shall be substantially complete by October 30, 2023. Final Completion by November 15, 2023.

Proposers are invited to submit proposals consisting of a Price Proposal and a Technical Proposal (see Section 00022) in single copy, for furnishing all labor, equipment, and materials and for performing all work for the project described above. Both Price Proposals and Technical Proposals must be received not later than 2:00 p.m. local time, at the office of the Administrative Services as indicated below, on January 3, 2023. However, the Price Proposals will be publicly opened later, following evaluation and scoring of the Technical Proposals (see Sections 00021, 00022, and 00023).

SUBMISSION OF PROPOSALS

ALL PROPOSALS, INCLUDING ANY AMENDMENTS OR WITHDRAWALS, MUST BE RECEIVED PRIOR TO THE DATE AND TIME STATED. PROPOSALS SHALL BE SUBMITTED ON THE FORMS FURNISHED AND MUST BE IN A SEALED ENVELOPE MARKED AS FOLLOWS:

Proposal for Project: Yukon Kuskokwim Correctional Center YKCC Mechanical Upgrades Phase II Project No. 200005089-10	ATTN: State of Alaska Department of Corrections 802 3rd Street, Rm 220 Douglas, Alaska 99824
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Proposals, amendments, modifications or withdrawals transmitted by mail must be received by the department prior to the scheduled time of proposal opening. Hand-delivered Proposals, amendments, or withdrawals must be received by Michael Lim, Procurement Officer, Administrative Services, 802 3rd Street, Suite 220, Douglas, Alaska 99824, prior to the scheduled date and time specified. Proposals are not publicly opened therefore a public bid opening will not be held. A proposer sending a bid amendment or withdrawal via email must transmit its documentation to the Department at this email address: erin.messing@alaska.gov EMAILED PROPOSAL WILL NOT BE ACCEPTED.

A bid guaranty is required with each bid in the amount of 5% of the amount bid. (Alternate bid items as well as supplemental bid items appearing in the bid schedule shall be included as part of the total amount bid when determining the amount of bid guaranty required for the project.)

The Department hereby notifies all bidders that it will affirmatively insure that in any contract entered into pursuant to this Invitation, Disadvantaged Business Enterprises (DBEs) will be afforded full opportunity to submit bids and will not be discriminated against on the grounds of race, color, national origin, or sex in consideration for an award.

NOTICE TO PROPOSERS

Proposers are hereby notified that data to assist in preparing Proposals is available as follows:

Question pertaining to the project requirements and specifications should be in writing and received by the procurement officer no later than close of business December 28, 2022.

Michael Lim
Procurement Officer
Michael.lim@alaska.gov
Ph: (907) 465-6014
802 3rd Street, Suite 220
Douglas, Alaska 99824

Other Information:

DRAWINGS: The department is not publicly posting the project drawings. Bidders must email the procurement officer Michael.lim@alaska.gov and request the project drawings. Project drawings will be emailed to bidders in pdf format. Project drawings must be securely held by the bidder. 11 x 17 project drawings will be available upon request.

YKCC ON-SITE WORK SCHEDULE LIMITATIONS: On-site work shall be 7 days a week, from 7:00 AM until 5:00 PM. No overtime allowed unless approved by the DOC.

PRE-PROPOSAL INSPECTION OF SITE MEETING: No pre-bid site visit will be provided unless the bidder requests it.

PROPRIETARY INFORMATION: Proposers should not include proprietary information in proposals if such information should not be disclosed to the public. Any language within a submittal purporting to render all or portions of a proposal confidential will be disregarded. Proprietary information which may be provided after selection for contract negotiations will be confidential if expressly agreed to by the Contracting Agency (AS 36.30.230).

COST INCURRED PRIOR TO CONTRACT: Proposers are specifically advised that a contract shall not be in effect until a written agreement is executed by an authorized agent of the Contracting Agency. The Contracting Agency shall not be liable for any cost incurred by a Proposer in response to this solicitation, including any work done, even in good faith, prior to execution of a contract and issuance of a Notice to Proceed.

MINOR INFORMALITIES: The Contracting Agency expressly reserves the right to waive minor informalities, negotiate changes or reject any and all proposals and to not award the proposed contract, if in its best interest. "Minor Informalities" means matters of form rather than substance which are evident from the submittal, or are insignificant matters that have a negligible effect on price, quantity, quality, delivery, or contractual conditions and can be waived or corrected without prejudice to other Offerors (2 AAC 12.990).

Reminder: Alaska Statute AS 36.30.210 requires all Proposers to have a valid Alaska Business License and an Alaska Contractor's Certificate of Registration prior to award. To qualify as an Alaska Offeror (bidder) under AS 36.30.321, an Offeror shall have a valid Alaska business license at the time designated in the request for proposals for opening of the proposals, shall meet the definition of AS 36.30.990 (2), and submit the required Section 00411 with their proposal.

PROPOSAL EVALUATION PROCEDURE

Proposals will be evaluated by a committee (2 AAC 12, Article 4). Scoring of proposals will be accomplished as follows

1.1 Each Evaluator will individually read and rate Proposer's response to each criterion, except for Alaska Bidde, (Offeror) Preference and Price Proposal as described under Evaluation Criteria (Section 00023). Ratings will be based solely on contents of proposals. Except as may be stated within any criterion description, a rating of "5" indicates the most responsive; ratings of "4-1" indicate progressively less responsiveness; and a rating of "0" indicates Non-responsive. Tie scores are permissible for evaluation criteria addressing schedule. Ratings are multiplied by the assigned weights for each criterion to obtain criterion scores.

1.2 After completion of individual ratings, the Evaluation Committee will meet to discuss proposals. Evaluators may then alter their ratings; however, any changes shall be based solely on the Evaluation Criteria set forth in the RFP. Additional criteria may not be considered. (2 AAC 12.260(b)).

1.3 During the Evaluation Committee Meeting, Evaluators may discuss factual knowledge of, and may investigate Proposers' and proposed Subcontractors' prior work experience and performance, including projects referenced in proposal, available written evaluations, etcetera, and may contact listed references or other persons knowledgeable of a Contractor's and/or a Subcontractor's past performance. Factors such as overall experience relative to the proposed contract, quality of work, and ability to meet schedules may be addressed. If any issues of significant concern to the proposed contract are discovered, the Committee may:

- a. Provide written recommendations to the Contracting Officer for consideration prior to contract award;
- b. Recommend suspension of the Proposer from consideration for award of the contract if there is probable cause for debarment (AS 36.30.635); or
- c. Conduct discussions in accordance with paragraph 1.4, below.

1.4 The Committee may decide to conduct discussions (or "interviews") with responsible Proposers whose proposals are determined to be reasonably susceptible of being selected for award for the purpose of clarification to assure full understanding of, and responsiveness to, the solicitation requirements (AS 36.30.240 & 2 AAC 12.290). After discussions, Evaluators will determine the final scoring and ranking for award by evaluating written and oral responses using only the Evaluation Criteria set forth in the Project Manual. Additional criteria may not be considered. (2 AAC 12.260(b)).

1.5 The Contracting Agency will then open the Price Proposals in public and calculate scores for price in accordance with Section 00023.

1.6 All Proposers will be advised of the Proposer selected for award after completion of the evaluation process. A Notice of Intent to Award will be provided to all Offerors. TECHNICAL AND PRICE PROPOSALS WILL NOT BE DISCLOSED TO THE PUBLIC OR TO COMPETING OFFERORS UNTIL AFTER A NOTICE OF INTENT TO AWARD IS ISSUED.

(END OF SECTION 00021)

SUBMITTAL CHECKLIST

Competitive Sealed Proposals - AS 36.30.200(b)

Project: YKCC Mechanical Upgrades Phase II

Project No. : 200005089-10

EXAMINATION OF WORK SITE AND RFP

- [] 1. Proposers are expected to examine carefully the site of the proposed work and the RFP Documents before submitting a proposal. The submission of a proposal shall be considered prima facie evidence that the Proposer has made such examination and is satisfied as to the conditions to be encountered in performing the work and as to the requirements of the Contract Documents.

PREPARATION OF PROPOSALS

- [] 2. Proposers must carefully review the RFP Documents for defects and questionable material and become familiar with submittal requirements before preparing proposals. Any explanation desired by Proposers regarding the meaning or interpretation of any of the project documents provided by the Contracting Agency must be requested in writing as indicated in the Request for Proposals (Document 00020). Substantive issues will be addressed in an addendum to all recipients on record as receiving the RFP Documents. Oral explanations or instructions given before the award of the contract will not be binding. Failure to comply with directions will result in lower score and may eliminate a submittal from consideration. ***Protests based upon any omission, error or content of this solicitation may be disallowed at the discretion of the contracting agency if the protest is not received in writing at least ten agency work days prior to the submittal deadline (2 AAC 12.615(a)).***
- [] 3. Review all parts of the RFP Documents, and then focus on the following documents: RFP, this Submittal Checklist, Evaluation Criteria, and the Proposal Forms.
- [] 4. Review the Evaluation Criteria. Read the criteria in each section in light of the proposed project as portrayed in the RFP Documents. Be aware of the assigned weight for each criterion. Plan your proposal to address the applicable criteria. All criteria Responses shall not exceed the number of pages stated below.
- [] 5. Prepare a distinct Response for each criterion. Failure to respond directly to any criteria will result in an evaluation score of zero for that criterion. Acceptable Responses must be specific and directly related to the proposed project. Marketing brochures and photographs, federal standard forms 330s, marketing resumes, and other non-project specific materials will be discarded without evaluation and should not be submitted.
- [] 6. ***Each criterion Response must be titled, numbered and assembled in the order in which the criteria are listed in Section 00023***, so the criterion to which information applies shall be plainly evident. Material not so identified or assembled may be discarded without evaluation. Responses shall be presented on 8 ½" X 11" paper, except for a minimal number of larger sheets (e.g. 11"x17") that may be used for drawings & schedules if they are folded to 8½" x 11" size. Larger sheets will be counted as one page in the page count. **CAUTION:** small print or typeface that is difficult to read will negatively influence evaluation of your submittal.
- [] 7. Complete all entries on the Price Proposal Form (Section 00310) and Contractor's Technical Proposal (Section 00313). Note the statutory requirements for Alaska Licenses and be sure to sign and date the Certification.
- [] 8. Attach criteria Responses (**EXCEPT PRICE PROPOSAL**) to the Contractor's Technical Proposal (Section 00313). The maximum number of attached pages (each printed side equals one page) for criteria Responses shall not exceed: **10 pages**.

Page limit applies solely to the attachments to the Contractor's Technical Proposal form. CAUTION: Criteria Responses which exceed the maximum page limit or otherwise do not meet requirements stated herein, may result in disqualification.

PRICE PROPOSAL

- [] 9. Review the Price Proposal, Bid Schedule, and Bid Bond documents. Prepare a Price Proposal for all labor, materials, equipment and services necessary to complete the Work in the RFP Documents. Complete the three documents on the forms furnished, or copies thereof.
- [] 9.1 The Bid Schedule will provide for quotation of a price or prices for one or more contract items which may include unit price or lump sum items and alternative, optional or supplemental price schedules or a combination thereof which will result in a total proposed price for the work
- [] 9.2 Where required, Proposers must quote on all items and THEY ARE WARNED that failure to do so will disqualify them. When quotations on all items are not required, Proposers should insert the words "no bid" in the space provided for any item not requiring a quotation and for which no quotation is made.
- [] 9.3 On unit price contracts Proposers shall also show the products of the respective unit prices and quantities written in figures in the column provided for the purpose and the total amount of the proposal obtained by adding the amounts of the several

items. All the figures shall be in ink or typed.

- [] 9.4 When provided within the supplements to the bid schedule Proposers shall specify those Alaska Bidder, Product Preference and Alaska Veteran Owned Business preferences applicable to their proposal. All entries made by Proposers and designating applicable preferences must conform to the requirements of AS 36.30 and the instructions on the forms to warrant consideration.
- [] 9.5 Neither conditional nor alternative bids will be considered unless called for.
- [] 9.6 Unless specifically called for, telegraphic or telefacsimile bids will not be considered.
- [] 9.7 The Proposal forms must be signed with ink. If the Proposer is a corporation, the proposal shall be signed by an individual having authority to sign the contract. If the Proposer is a partnership, the proposal shall be signed by any authorized member of the partnership. If the Proposer is a sole proprietorship, the proposal shall be signed by the owner. Any erasure or change on the forms must be initialed by the person signing the proposal.

ACKNOWLEDGEMENT OF ADDENDA

- [] 10. The Price Proposal and Technical Proposal forms provide for acknowledgement individually of all Addenda to the RFP Documents. All addenda shall be acknowledged on these forms or by telegram prior to the scheduled time for submittal of proposals. If no addenda are received, the word "None" should be shown as specified.

REQUIRED DOCUMENTS

- [] 11. Submittals shall consist of the following applicable items assembled as follows and in the order listed. Proposals will not be considered if documents are not completely filled out. Telegraphic or telefacsimile submittals are NOT acceptable.
- [] 11.1 **Two (2)** copies of Contractor's Technical Proposal Form Section 00313 (at least one copy with original signature) with attached responses to all Evaluation Criteria [**EXCEPT PRICE PROPOSAL**]. Each copy shall be fastened with one staple in the upper left corner. No other form of binding shall be used and no cover and no transmittal letter other than the Contractor's Technical Proposal form will be included. If claiming Alaska Bidder (Offeror) Preference include the certification form (Section 004111). CAUTION: Failure to comply with this instruction will negatively influence evaluation of Submittal.
- [] 11.2 **One copy** of the Price Proposal (Section 00310), with the Bid Schedule (Section 00312), Alaska Products Preference Worksheet if claiming Alaska Products Preference (Section 00311), Alaska Veteran Preference Certification if claiming the Alaska Veteran Preference (Section 00415), and Bid Bond (Section 00410) attached, with one staple in the upper left corner. The Price Proposal, Bid Schedule and Bid Bond shall be enclosed together in a separate sealed envelope marked on the outside to identify it as **PRICE PROPOSAL** and with the names of the Project and Proposer.

DO NOT place your Technical Proposal Form (Section 00313) in the sealed price proposal envelope.

- [] 11.3 **CAUTION:** If you replicate (other than by photocopy) any form in the Project Manual in lieu of filling out forms provided by the Contracting Agency, provide a signed certification that lists such forms and attests that they are exact replicas of that issued by the Contracting Agency. Changed forms may result in rejection at the Contracting Agency's discretion. Any alteration may be cause for rejection without recourse.

DELIVERY

- [] 12. Deliver **submittals in one sealed package** to the location and before the submittal deadline cited on page 1 of the Request for Proposals. Do not include in the package any proposals or bids for other projects. **Mark the outside of the package** to identify the Project and the Proposer. Proposals must be received prior to the specified date and time. Late proposals will not be opened (2 AAC 12.250).

WITHDRAWAL OR REVISION OF BIDS

- [] 13. A Proposer may withdraw or revise a proposal after it has been delivered to the Contracting Agency, provided that the request for such withdrawal or revision is received by the designated office, in writing, by email before the time set for submittal of proposals. If the Technical Proposal is to be changed, email the pages with changes to erin.messing@alaska.gov. If the Price Proposal is to be changed, email the revised Bid Schedule to the email listed above.

(END OF SECTION 00022)

EVALUATION CRITERIA

Competitive Sealed Proposals - AS 36.30.200(b)

Project: YKCC Mechanical Upgrades Phase II

Project No. : 200005089-10

1. Project Understanding and Methodology

1. Weight: 10

Response must **demonstrate your comprehension of the project objectives, requirements and services**. Identify any pertinent issues and potential problems related to the project. Describe the proposed methodologies to overcome potential problems to achieve project success. Response must demonstrate offeror's approaches to account for unique conditions of the facility.

Response must **outline the methods for accomplishing the proposed contract**. Describe what, when, where, how and in what sequence the work will be done. **Describe specific measures to coordinate construction activities with other on-going construction work at the facility**. Identify the amount and type of work to be performed by any Subcontractors. Consider how each task may be carried out; what services or interaction are required from/with the Contracting Agency; Using Agency; etcetera. Suggest alternative, if appropriate. Identify any **distinct and substantive qualifications** for undertaking the proposed contract such as the availability of specialized equipment or unique approaches or concepts **relevant to the required services** which the firms may use.

2. Project Management Plan

2. Weight: 5

Response must describe the administrative and operational structures that will be used for performing the proposed contract. For example consider: who will have overall responsibility for the contract? What will the lines of authority be? Describe how communications will be maintained between your Project Staff and the Contracting Agency. Explain how your team will be completely accountable.

3. Experience and Qualifications

3. Weight: 25

Response must describe the **relevant qualifications and experience** of the prime contractor (offeror), and major subcontractors including experience on similar projects and dates of construction. Describe the relevant qualifications and experience of key personnel (of prime and subcontractors) who will actually perform the work. Describe the work to be performed by the individuals you name and detail specific **qualifications and substantive experience directly related to the proposed contract, years of experience and jobs completed with similar size and scope**. A response prepared specifically for this proposal is required. Resumes including non-relevant information may detract from the evaluation of your proposal. Focus on individual's specific duties and responsibilities and how project experience is relevant to the proposed contract.

Response must describe the prim contractor (offeror's) and major subcontractors past performance, specifically addressing work experience within active and occupied secure facilities, and including conformance to specification and standards of good workmanship, forecasting and containment of cost or price, history of reasonable and cooperative behavior and overall concern for the interests of the using agency or client, and adherence to contract schedules. In addition the prim contractor must describe past experience successfully delivering projects in remote/rural Alaska locations.

For each person named, identify: employer, job classification, and state of residency. List at least three (3) references (contact persons and telephone numbers) for each person. **Please don't use any current DOC staff as reference.**

If the team is composed of a prime and subcontractors, discuss any prior work relationships among the firms – in particular, regarding project similar to this project. Discuss each firm's particular responsibilities for prior contracts at correctional facilities that were similar to the work proposed in the Project Documents. Indicate which of the firms were involved in such contracts. For each contract, list the contracting entity and a reference (contact person and a telephone number).

4. Schedule

4. Weight: 5

All work shall be Substantially Complete by October 30, 2023. Assuming that a NTP will be issued by January 23, 2023.

Provide a schedule that shows key activities and milestones that are needed to successfully complete this project. Describe how you plan to meet or accelerate this schedule.

Response must show how the work of the proposer/contractor will align with Department of Correction's use or propose potential alternative construction schedule phases that could better meet schedule and fit the needs of the Using Agency. Also, describe how proposer/contractor will deal with potential scheduling conflicts associated with user activities. In addition, discuss methods that will be employed to deal with incidental scheduling changes and provide specific examples and methods and solutions used to minimize delays and disruptions and accelerate progress.

Response must describe how proposer/contractor will deal with potential scheduling conflicts associated with the ongoing construction work within the facilities. The proposal shall outline methods that will be employed to deal with incidentals scheduling changes and provide specific examples of methods and solutions used to minimize delays and disruptions and accelerate progress.

The schedule may be on one (1) 11 x 17 sheet, which **will** be counted as **one (1)** page toward the proposal page limit.

5. Alaska Bidder (Offeror) Preference

5. Weight: 10

To be granted this preference:

Offeror must claim the Alaska Bidder (Offeror) Preference in Section 00313 AND provide a signed Alaska Bidder Preference Certification Form (Section 00411). In Claiming the Alaska Bidder (Offeror) Preference, the Offeror is certifying that they meet the requirements of AS 36.30.990.

Response will be scored: Rating x Number of Evaluators x Weight = Criterion Score. Rating will be as follows:

An Alaska Offeror's preference (i.e. a Rating of 5) will be assigned to the proposal of an Offeror who certifies (by claiming the preference in Section 00313 and by submitting a signed Alaska Bidder Preference Certification) that they are an Alaska Bidder (offeror).

No Alaska Offeror's preference (i.e. a Rating of 0) will be assigned to the proposal of an Offeror who does not certify that it qualifies as an Alaska bidder (offeror) as described above.

No narrative response to this criterion is required within the Offeror's Proposal.

PRICE EVALUATION

6. Price Proposal

6. Weight: 45

Provide a Price Proposal (as instructed by the Submittal Checklist) for all labor, subcontracts, equipment, expenses, etc., in compliance with the Project Manual. Submit a completed Price Proposal [Section 00310], the Bid Schedule [Section 00312] and Bid Bond [Section 00410]. Include Alaska Product Preference Worksheet (Section 00311) and Alaska Veteran's Preference Certification (Section 00415), if applicable.

The Price Proposal score will be calculated as follows:

$$\text{Criterion Score} = \frac{(\text{Lowest bid price from all offerors} \times \text{MPP})}{\text{Offeror's Bid Price}}$$

Wherein: For purpose of scoring, the **Bid Price** will be the Adjusted Basic Bid Amount as stated on the Bid Schedule, and,

The **MPP** (Maximum Possible Points) will equal (5) x (# of Evaluators) x (Weight assigned to Criterion).

CAUTION – Funding is limited for this project. Price Proposals that exceed \$1,500,000.00 for the Total Bid (line a on the Bid Schedule) may be considered nonresponsive.

(END OF SECTION 00023)

STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES
INFORMATION TO BIDDERS

This Information to Bidders outlines requirements that a bidder must follow when submitting a bid. The Department will reject a noncompliant bid.

100.01 BIDDERS QUALIFICATIONS

A bidder shall:

Submit evidence of a valid Department of Commerce, Community, and Economic Development certificate of Contractor Registration (Contractor Registration), under AS 08.18, and submit evidence of a valid Alaska Business License prior to award; and

When requested, submit a completed Contractor's Questionnaire (Form 25D-8) stating previous experience in performing comparable work, business and technical organization, financial resources, and equipment available to be used in performing the work.

All firms desiring to participate in DOT&PF construction projects must register annually by submitting a completed Bidder Registration (Form 25D-6).

Before a bid is considered for award, the bidder may be requested by the Department to submit a statement of facts, in detail, as to his previous experience in performing comparable work, his business and technical organization, financial resources, and plant available to be used in performing the contemplated work.

100.02 CONTENTS OF BID PACKAGE

Upon request, the Department will furnish prospective bidders with a bid package, at the price stated in the Invitation To Bid.

The bid package includes the following:

- 1) Location and description of the project;
- 2) Time in which the work must be completed;
- 3) Amount of the bid guaranty;
- 4) Date, time, and place when bids are due;
- 5 Plans and specifications; and
- 6) Bid forms.

Unless otherwise stated in the bid package, the Plans, Contract Provisions and Specifications, Standard Modifications, Special Provisions, permits, forms and any other documents designated in the bid package are considered a part of the bid whether attached or not.

100.03 EXAMINATION OF CONTRACT REQUIREMENTS

Bidders are responsible for carefully examining the plans, specifications and all other documents incorporated in the contract to determine the requirements thereof before preparing bids.

Any explanation desired by bidders regarding the meaning or interpretation of drawings and specifications must be requested in writing and with sufficient time allowed for a reply to reach them before the submission of their bids. Oral explanations or instructions given before the award of the contract will not be binding. Any interpretation made will be in the form of an addendum to the specifications or drawings and will be furnished to all bidders and its receipt by the bidder shall be acknowledged.

100.04 CONDITIONS AT SITE OF WORK

Bidders are responsible for visiting the site to ascertain pertinent local conditions such as the location, accessibility and character of the site, labor conditions, the character and extent of the existing work within or adjacent thereto, and any other work being performed thereon.

100.05 PREPARATION OF BIDS

- A. A bidder shall prepare its bid using either the Department approved bid preparation software or the Department provided bid forms or legible copies of the Department's forms.

The bid must be signed in ink or by a digital signature by the person or persons authorized to sign the Contract for the bidder. If a bidder is a corporation, the bid must be signed by a corporate officer or agent with authority to bind the corporation. If a bidder is a partnership, a partner must sign. If the bidder is a joint venture, each principal member must sign. If a bidder is a sole proprietorship, the owner must sign. Each person signing the bid must initial any changes made to entries on the bid forms.

A bidder submitting an electronic bid agrees that its digital signature constitutes a binding signature.

The bidder shall make no claim against the Department in the event it is unable to submit its bid through approved online bidding service and/or approved online bidding service is unable to submit the bid(s) to the Department. The Department reserves the right to postpone the public bid opening in the event of technical problems.

- B. The bid schedule contains empty space(s) that call for the bidder to enter its proposed price for each corresponding item which may include unit price or lump sum items and alternative, optional or supplemental price schedules or a combination thereof which will result in a total bid amount for the proposed construction.
- C. The bidder shall specify the price or prices bid in figures. On unit price contracts the bidder shall also show the products of the respective unit prices and quantities written in figures in the column provided for the purpose and the total amount of the proposal obtained by adding the amounts of the several items. All the figures shall be in ink or typed.

D. Neither conditional nor alternative bids will be considered unless called for.

100.06 BID SECURITY

All bids shall be accompanied by a bid security in the amount specified on the Invitation to Bid. The bid security shall be unconditionally payable to the State of Alaska and shall be in the form of an acceptable paper Bid Bond (Form 25D-14), an electronic bid bond payable to the State of Alaska and verified through its online bidding service, or a certified check, a cashier's check or a money order made payable to the State of Alaska.

The surety of a Bid Bond may be any corporation or partnership authorized to do business in Alaska as an insurer under AS 21.09. A legible power of attorney shall be included with each paper Bid Bond (Form 25D-14).

A paper Bid Bond must be accompanied by a legible Power of Attorney.

An individual surety will not be accepted as a bid security.

100.07 ADDENDA REQUIREMENTS

The Department will issue addenda if it determines, in its discretion, that clarifications or changes to the Contract documents or bid due date are needed. The Department may send addenda by any reasonable method such as fax, email, or may post the addenda on its website or online bidding service. Unless picked up in person or included with the bid documents, addenda or notice that an addendum has been issued will be addressed to the individual or company to whom bidding documents were issued and sent to the email address or fax number on the plan holders' list. Notwithstanding the Department's efforts to distribute addenda, bidders are responsible for ensuring that they have received all addenda affecting the Invitation To Bid. Bidders must acknowledge all addenda on the Bid Forms, by fax, or by email before the deadline stated in the Invitation to Bid.

100.08 DELIVERY OF BIDS

Bids shall be submitted electronically to the Department through its online bidding service, or shall be submitted in a sealed envelope. When bids are submitted in a sealed envelope, the envelope shall clearly indicate its contents and the address of the Department's designated contracts office, as specified on the Invitation to Bid. Bids for other work may not be included in the envelope. Emailed or faxed bids will not be considered, unless specifically called for in the Invitation to Bid.

100.09 WITHDRAWAL OR REVISION OF BIDS

Manual Bids may be withdrawn or revised in writing delivered by mail, fax, or email, provided that the Department's designated office receives the withdrawal or revision before the deadline stated in the Invitation To Bid. Withdrawal requests must be signed and submitted by the bidder's duly appointed representative who is legally authorized to bind the bidder. Revisions shall include both the modification of the unit bid price and the total modification of each item modified but shall not reveal the amount of the total original or revised bids.

Electronic Bids may be withdrawn or resubmitted through the online bidding service. Revisions to electronic bids delivered by mail, fax, or email will not be permitted. If electronic bid withdrawal is unsuccessful, electronic bids may be withdrawn in writing delivered by mail, fax, or email provided that the designated office receives the withdrawal before the deadline stated in the Invitation To Bid. Written withdrawal requests must be signed and submitted by the bidder's duly appointed representative who is legally authorized to bind the bidder.

100.010 PROTEST OF INVITATION TO BID

An interested party, as defined in AS 36.30.699, may protest an Invitation to Bid before the bid opening in accordance with AS 36.30.560 and AS 36.30.565. The interested party must submit a protest to the Contracting Officer.

100.011 RECEIPT AND OPENING OF BIDS

The Department will only consider bids, revisions, and withdrawals received before the deadline stated in the Invitation to Bid.

The Department will assemble, open, and publicly announce bids at the time and place indicated in the Invitation to Bid, or as soon thereafter as practicable. The Department is not responsible for prematurely opening or for failing to open bids that are improperly addressed or identified.

100.012 NONRESPONSIVE BIDS

1. A bid shall be rejected as nonresponsive if it:
 - a. Is not properly signed by an authorized representative of the bidder and in a legally binding manner;
 - b. Contains unauthorized additions, conditional or alternative bids, or other irregularities that make the bid incomplete, indefinite, or ambiguous;
 - c. Includes a reservation of the right to accept or reject any award, or to enter into a contract pursuant to an award;
 - d. Fails to include an acceptable bid guaranty with the bid;
 - e. Is materially unbalanced; or
 - f. Fails to meet any other material requirement of the Invitation To Bid.
2. A bid may be rejected as nonresponsive, in the Department's discretion, if it:
 - a. Is not typed or completed in ink;
 - b. Fails to include an acknowledgement of receipt of each addendum by assigned number and date of issue; or
 - c. Is missing a bid price for any pay item, except when alternate pay items are authorized.

100.013 BIDDERS INTERESTED IN MORE THAN ONE BID

A party who has quoted prices to a bidder is not thereby disqualified from quoting prices to other bidders or from submitting a bid directly for the work.

100.014 ELECTRONIC MAIL

Within its submitted bid, a bidder must include a current electronic mail (email) address of bidder's representative who possesses authority to receive, process, and respond to Department emails regarding the advertised project.

The Department may send notices and information to a bidder by using the furnished email address of the bidder's authorized representative.

A bidder shall notify the Department if the bidder requests the Department to send email notices or information to an address different from the email address initially provided in its bid forms. The bidder shall notify the Department of such change by sending a request in writing to the Contract's point of contact identified on the Invitation to Bid that is signed by a representative who is authorized and empowered to legally bind the bidder.

Delivery of an email sent by the Department is complete upon receipt in the addressee's email account. An email sent after 4:30 pm shall be deemed to have occurred at the opening of business on the next working day.

If needed, the Department may demonstrate proof of email delivery by affidavit or certification that includes the following:

1. The date and time that the Department sent the email message;
2. The email address from which the Department sent the message;
3. The name and email address to which the Department sent the message;
4. A statement that the Department sent the email message and that the person signing the affidavit or certification believes the transmission to have been complete and without error; and
5. An attached copy of the subject email.

100.015 CONSIDERATION OF BIDS

Until the Award, the Department may reject any or all bids, waive minor informalities or advertise for new bids without liability to any bidder if the Department, in its discretion, determines that to do so is in the best interests of the State.

A bidder may request withdrawal of a bid after opening and before the Award only in accordance with AS 36.30.160(b) and State procurement regulations. The bidder must submit the request to the Contracting Officer.

An interested party, as defined in AS 36.30.699, may protest a proposed Award of contract as per AS 36.30.560 and AS 36.30.565. The bidder must submit the protest to the Contracting Officer.

WHOLLY STATE-FUNDED PROJECTS. On wholly state-funded projects, determination of the low bidder will include bidder preferences as required under AS 36.30.321, according to subsections 1-3 below. Alaska Bidder Preference, Alaska Veteran Preference, and Alaska Product Preference are not applicable on projects with federal funding.

1. Alaska Bidder Preference: A bidder claiming this preference shall provide with their bid an Alaska Bidder Preference Certification, certifying they qualify as an Alaska bidder eligible for Alaska Bidder Preference according to AS 36.30.

If the bidder qualifies as an Alaska bidder, a five percent (5%) preference will be applied to the price of the bid. "Alaska bidder" means a person who:

- a. holds a current Alaska business license;
 - b. submits a bid for goods, services, or construction under the name as appearing on the person's current Alaska business license;
 - c. has maintained a place of business within the state staffed by the bidder or an employee of the bidder for a period of six months immediately preceding the date of the bid;
 - d. is incorporated or qualified to do business under the laws of the state, is a sole proprietorship and the proprietor is a resident of the state, is a limited liability company organized under AS 10.50 and all members are residents of the state, or is a partnership under former AS 32.05, AS 32.06, or AS 32.11 and all partners are residents of the state; and
 - e. If a joint venture, is composed entirely of ventures that qualify under (a) through (d), above.
2. Alaska Veteran Preference: A bidder claiming this preference shall provide an Alaska Veteran Preference Certification, certifying they qualify as an Alaska bidder eligible for Alaska Veteran preference according to AS 36.30.

If a bidder qualifies as an Alaska bidder and is a qualifying entity, an Alaska Veteran Preference of 5 percent shall be applied to the bid price. The preference may not exceed \$5,000 (AS 36.30.321). A "qualifying entity" means a:

- a. sole proprietorship owned by an Alaska veteran;
- b. partnership under AS 32.06 or AS 32.11 if a majority of the partners are Alaska veterans;
- c. limited liability company organized under AS 10.50 if a majority of the members are Alaska veterans; or

- d. corporation that is wholly owned by individuals, and a majority of the individuals are Alaska veterans.

A preference under this section is in addition to any other preference for which the bidder qualifies.

To qualify for this preference, the bidder must add value by the bidder itself actually performing, controlling, managing and supervising a significant part of the services provided or the bidder must have sold supplies of the general nature solicited to other state agencies, governments, or the general public.

An Alaska veteran is a resident of Alaska who:

- 1) served in the Armed forces of the United States, including a reserve unit of the United States armed forces; or the Alaska Territorial Guard, the Alaska Army National Guard, the Alaska Air National Guard, or the Alaska Naval Militia; and
 - 2) was separated from service under a condition that was not dishonorable.
3. Alaska Product Preference: A bidder claiming this preference shall complete and sign the Alaska Product Preference Worksheet, according to the worksheet instructions, and submit the completed worksheet with their bid.

Except for timber, lumber and manufactured lumber products used in the construction project under AS 36.30.322(b), an Alaska products preference will be given as required under AS 36.30.326 - 36.30.332 when the bidder designates the use of Alaska products.

If the successful bidder/contractor proposes to use an Alaska product and does not do so, a penalty will be assessed against the successful bidder/contractor according to AS 36.30.330(a).

Each Alaska product declared on the Alaska Product Preference Worksheet must have an "Approval" date on the Alaska Product Preference Program List, that is on or before the bid opening date for this contract, and that does not expire before the bid opening date for this contract.

100.016 RESPONSIBILITY OF BIDDERS

The Department may find a bidder is nonresponsible for any one of the following reasons, but is not limited in its responsibility analysis to the following factors:

1. Evidence of bid rigging or collusion;
2. Fraud or dishonesty in the performance of previous contracts;
3. More than one bid for the same work from an individual, firm, or corporation under the same or different name;
4. Unsatisfactory performance on previous or current contracts;
5. Failure to pay, or satisfactorily settle, all bills due for labor and material on previous contracts;

6. Uncompleted work that, in the judgment of the Department, might hinder or prevent the bidder's prompt completion of additional work, if awarded;
7. Failure to reimburse the State for monies owed on any previous contracts;
8. Default under previous contracts;
9. Failure to submit evidence of registration and licensing;
10. Failure to comply with any qualification requirements of the Department;
11. Engaging in any activity that constitutes a cause for debarment or suspension under the State Procurement Code (AS 36.30) or submitting a bid during a period of debarment;
12. Failure to satisfy the responsibility standards set out in state regulations;
13. Lack of skill, ability, financial resources, or equipment required to perform the contract;
or
14. Lack of legal capacity to contract.

Nothing contained in this section deprives the Department of its discretion in determining the lowest responsible bidder.

100.017 SUBCONTRACTOR LIST

The apparent low bidder shall submit a completed Subcontractor List, Form 25D-5, within five working days following receipt of written notification by the Department that it is the low bidder.

An apparent low bidder who fails to submit a completed Subcontractor List form within the time allowed will be declared nonresponsible and may be required to forfeit the bid security. The Department will then consider the next lowest bidder for award of the Contract.

If a bidder fails to list a subcontractor, or lists more than one subcontractor for the same portion of work, and the value of that work is in excess of one-half of one percent of the total bid amount, the bidder agrees to perform that portion of work without a subcontractor and represents that it is qualified to perform that work.

A bidder who lists as a subcontractor another contractor who, in turn, sublets the majority of the work required under the Contract, violates this subsection.

A bidder or Contractor may, without penalty, replace a listed subcontractor who:

- 1) Fails to comply with licensing and registration requirements of AS 08.18;
- 2) Fails to obtain a valid Alaska business license;
- 3) Files for bankruptcy or becomes insolvent;
- 4) Fails to execute a subcontract for performance of the work for which the subcontractor was listed, and the bidder acted in good faith;

- 5) Fails to obtain bonding acceptable to the Department;
- 6) Fails to obtain insurance acceptable to the Department;
- 7) Fails to perform the subcontract work for which the subcontractor was listed;
- 8) Must be replaced to meet the bidder's required state or federal affirmative action requirements;
- 9) Refuses to agree or abide with the bidder's labor agreement; or
- 10) Is determined by the Department to be not responsible.

In addition to the circumstances described above, a Contractor may in writing request permission from the Department to add a new subcontractor or replace a listed subcontractor. The Department will approve the request if it determines in writing that allowing the addition or replacement is in the best interest of the State.

A bidder or Contractor shall submit a written request to add a new subcontractor or replace a listed subcontractor to the Contracting Officer a minimum of five working days before the date the new subcontractor is scheduled to begin work on the construction site. The request must state the basis for the request and include supporting documentation acceptable to the Contracting Officer.

If a bidder violates this subsection, the Contracting Officer may:

- 1) Cancel the Contract after Award without any damages accruing to the Department; or
- 2) After notice and a hearing, assess a penalty on the bidder in an amount not exceeding 10 percent of the value of the subcontract at issue.

100.018 AWARD OF CONTRACT

The Department will award the Contract to the lowest responsible and responsive bidder unless it rejects all bids. The Department will notify all bidders in writing via email, fax, or U.S. Mail of its intent to award.

In order to establish a clear and definitive basis of award for contracts with additive alternates, the State has established a budgeted amount from which the order of bidders will be determined. The amount will be disclosed when timely received bids are announced. The low bid will be determined by considering the basic bid and additive alternate(s) in the order listed on the Bid Schedule up to a total not to exceed the budgeted amount. The State reserves the right to reject all bids. The State also reserves the right to award the contract above or below the budgeted amount to the low bidder based on any combination of alternate(s) or no alternate(s), providing that the low bidder remains unchanged.

The Department will notify the successful bidder in writing of its intent to award the Contract and request that certain required documents, including the Contract Form, bonds, and insurance be submitted within the time specified. The successful bidder's refusal to sign the Contract and

provide the requested documents within the time specified may result in cancellation of the notice of intent to award and forfeiture of the bid security.

If an award is made, it will be made as soon as practicable and usually within 40 days after bid opening. Award may be delayed due to bid irregularities or a bid protest, or if the award date is extended by mutual consent. Bids shall be valid for 120 days after bid opening, and may be extended by mutual consent.

100.019 RETURN OF BID SECURITY

The Department will return bid securities, other than bid bonds:

1. To all except the two lowest responsive and responsible bidders, as soon as practicable after the opening of bids; and
2. To the two lowest responsive and responsible bidders immediately after Contract award.

100.020 PERFORMANCE AND PAYMENT BONDS

The successful bidder shall furnish all required Performance and Payment Bonds on forms provided by the Department for the sums specified in the Contract. If no sum is specified, the successful bidder shall comply with AS 36.25.010. The Surety on each bond may be any corporation or partnership authorized to do business in the state as an insurer under AS 21.09 or two individual sureties approved by the Contracting Officer.

If individual sureties are used, two individual sureties must each provide the Department with security assets located in Alaska equal to the penal amount of either the performance bond or the payment bond. Any costs incurred by the Contractor and the individual Surety are subsidiary and shall be borne by the Contractor or the individual Surety. In no event will the Department be liable for these costs.

Individual sureties shall provide security by one, or a combination, of the following methods:

1. Escrow Account, with a federally insured financial institution, in the name of the Department. Acceptable securities include, but are not limited to, cash, treasury notes, bearer instruments having a specific value, or money market certificates.
2. Irrevocable letters of credit, from a financial institution approved by the Contracting Officer, with the Department named as beneficiary.
3. Cashier's or certified check made payable to the State of Alaska issued by financial institutions approved by the Contracting Officer.

These bonds and security assets, as applicable, shall remain in effect for 12 months after the date of final payment or, if longer, until all obligations and liens under this Contract are satisfied, including, but not limited to, obligations under General Conditions, Subsection 12.7.

The Department may, in its discretion, notify the bonding company or Surety of any potential default or liability.

The Contractor shall substitute, within five working days, another bond or surety acceptable to the Department if an individual Surety or the Surety on any bond furnished in connection with the Contract:

1. Becomes insolvent or is declared bankrupt;
2. Loses its right to do business in any state affecting the work;
3. Ceases to meet Contract requirements;
4. Fails to furnish reports of financial condition upon request; or
5. Otherwise becomes unacceptable to the Department.

When approved by the Contracting Officer, the Contractor may replace:

1. An individual surety with a corporate surety; or
2. Posted collateral with substitute collateral.

Failure to maintain the specified bonds or to provide substitute bonds when required under this section may be grounds for withholding contract payments until substitute bonding is obtained, and may, in the Department's discretion, be grounds for declaring the Contractor in default.



STATE OF ALASKA
DEPARTMENT OF CORRECTIONS

REQUIRED DOCUMENTS

State Funded Contracts

Yukon Kuskokwim Correctional Center (YKCC),
YKCC Mechanical Upgrades Phase II

Project Numbers: 200005089-10

REQUIRED FOR BID. Bids will not be considered responsive if the following documents are not filled out and submitted at the time of bid opening:

1. **Price Proposal (Section 00310)**
2. **Bid Schedule (Section 00312)**
3. **Contractor Technical Proposal (Section 00313), with criteria responses.**
4. **Bid Security (Section 00410)**
5. **Bid Modification (Section 00420)** (Any bid revisions must be submitted by the bidder prior to bid opening on this form.)
6. **Alaska Bidder Preference Certification (Section 00411)** (If applicable)
7. **Alaska Veteran's Preference Certification (Section 00415)** (If applicable)
8. **Alaska Product Preference Worksheet (Section 00311)** (If Applicable)

REQUIRED AFTER NOTICE OF APPARENT HIGH-SCORING PROPOSER. The apparent highest scoring proposer is required to complete and submit the following document within 5 working days after receipt of written notification:

1. **Subcontractor List (Section 00430)**

REQUIRED FOR AWARD. In order to be awarded the contract, the successful highest scoring proposer must completely fill out and submit the following documents within the time specified in the intent to award letter:

1. **Construction Contract (Section 00510, Form 25D-10A)**
2. **Payment Bond (Section 00620, Form 25D-12)**
3. **Performance Bond (Section 00610, Form 25D-13)**
4. **Certificate of Insurance** (from carrier)
5. Bidders must register annually with the Civil Rights Office in order to be eligible for award. If not registered, or if unsure, submit the following: **Bidder Registration (Section 00435)**



STATE OF ALASKA
DEPARTMENT OF CORRECTIONS

Price Proposal

for

Yukon Kuskokwim Correctional Center (YKCC) Mechanical Upgrades Phase II

Yukon Kuskokwim Correctional Center (YKCC), Bethel, Alaska

Project # 200005089-10

by

Company Name

Company Address (Street or PO Box, City, State, Zip)

Company Alaska Business License No:

Company Contractor's Registration No:

**TO THE CONTRACTING OFFICER,
DEPARTMENT OF CORRECTIONS:**

In compliance with your Request for Proposal dated **January 3, 2023** the Undersigned proposes to furnish and deliver all the materials and do all the work and labor required in the construction of the above-referenced Project,

**YKCC Mechanical Upgrade Phase II
Yukon Kuskokwim Correctional Center
Project # 200005089-10**

located at or near **Bethel, Alaska**, according to the RFP Documents, and **our Contractor's Technical Proposal (Section 00313)** and for the amount and prices named herein as indicated on the Bid Schedule consisting of one sheet, which is made a part of this Proposal.

The Undersigned declares that he has carefully examined the contract requirements and that he has made a personal examination of the site of the work; that he understands that the quantities, where such are specified in the Bid Schedule or on the plans for this project, are approximate only and subject to increase or decrease, and that he is willing to perform increased or decreased quantities of work at unit prices bid under the conditions set forth in the Contract Documents.

The Undersigned hereby agrees to execute the said contract and bonds within fifteen calendar days, or such further time as may be allowed in writing by the Contracting Officer, after receiving notification of the acceptance of this bid and it is hereby mutually understood and agreed that in case the Undersigned does not, The accompanying bid guarantee shall be forfeited to the State of Alaska, Department of Corrections as Liquidated damages and the said Contracting officer may proceed to award the contract to others.

The Undersigned agrees to commence the work within 10 calendar days and shall **substantially complete the work by October 30, 2023 and Final Completion shall be by November 15, 2023** unless extended in writing by the Contracting Officer.

The Undersigned proposes to furnish Payment Bond in the amount of **100%** (of the contract) and Performance Bond in the amount of **100%** (of the contract), as surety conditioned for the full, complete and faithful performance of this contract.

The Undersigned acknowledges receipt of the following addenda to the drawings and/or specifications (give number and date of each).

Addenda Number	Date Issued	Addenda Number	Date Issued	Addenda Number	Date Issued

NON-COLLUSION DECLARATION

The Undersigned declares, under penalty of perjury under the laws of the United States, that neither he nor the firm, association, or corporation of which he is a member, has, either directly or indirectly, entered into any agreement, participated in any collusion, or otherwise taken any action in restraint of free competitive bidding in connection with this bid.

The Undersigned has read the foregoing and hereby agrees to the conditions stated therein by affixing his signature below:

Signature of Authorized Company Representative

Typed Name and Title

()

Phone Number

()

Fax Number

Email:

Re: YKCC Mechanical Upgrades Phase II
Project # 200005089-10

(See Reverse Side for Instructions)

Bid Phase: _____ Bidder: _____

1. This worksheet accurately reports the type and quantity of product(s) that: (a) qualify for application of the Alaska Product Preference under AS 36.30.321 *et seq.* and (b) this bidder will use in performing the advertised project, if awarded the contract; and
2. All listed product(s) are specified for use on the project and will be permanently incorporated; and
3. I am the duly appointed representative of this bidder, which has authorized and empowered me to legally bind it concerning its proposal.

Date _____

TOTAL

INSTRUCTIONS FOR ALASKA PRODUCTS PREFERENCE WORKSHEET

Special Notice: All procurements, except those funded from Federal sources, shall contain Contract provisions for the preference of Alaska products. To be considered for the Alaska Product Preference, each product listed by the Bidder on this worksheet must have current certification from the Alaska Products Preference Program at the time of Bid Opening or the proposal due date. A product with expired certification at the bid opening or proposal due date will not be considered eligible. Products that are not specified for use on the project will not be considered eligible.

The Alaska Product Preference Program List of certified products is available online at:

<https://www.commerce.alaska.gov/web/dcra/AlaskaProductPreferenceProgram.aspx> or may be obtained by contacting Dept. of Commerce & Economic Development Alaska Division of Community and Regional Affairs, Alaska Products Preference Program, 550 W. 7th Ave., Suite 1650, Anchorage AK 99501-3510; Phone: (907) 269- 4501 Fax: (907) 269-4563, E-mail: madeinalaska@alaska.gov

BIDDERS INSTRUCTIONS:

A. General. The contracting Agency may request documentation to support entries made on this form. False presentations may be subject to AS 36.30.687. All Bidder's entries must conform to the requirements covering bid preparations in general. Discrepancies in price extensions shall be resolved by multiplying the declared total value times the preference percentage and adjusting any resulting computation(s) accordingly.

B. Form Completion – BASIC BIDS.

- (1) Enter project number and name, the words "Basic Bid" and the CONTRACTOR'S name in the heading of each page as provided.
- (2) The Bidder shall compare those candidate products appearing on the preference listing (see Special Notice comments above) against the requirements of the technical specifications appearing in the contract documents. If the Bidder determines that a candidate product can suitably meet the contract requirements, then that product may be included in the worksheet as follows.
- (3) For each suitable product submitted under the "Basic Bid" enter:
 - The product name, generic description and its corresponding technical specification section number under the heading "PRODUCT",
 - The company name of the Alaska producer under the heading "Manufacturer", and
 - The product class (I, II, or III) and preference percentage (3, 5, or 7% respectively) under the "CLASS/% heading.
- (4) For each product appearing on the list and to be utilized by the CONTRACTOR enter:
 - Under the heading "TOTAL DECLARED VALUE" the manufacturer's quoted price of the product, (caution: this value is to be the manufacturer's quoted price at the place of origin and shall not include costs for freight, handling or miscellaneous charges of incorporating the product into the Work,) and
 - The resulting preference – i.e. the preference percentage times the total declared value amount – under the heading "REDUCTION AMOUNT".
- (5) Continue for all "suitable" basic bid products. If the listing exceeds one page enter the words "Page # ___ SUB" in front of the word "TOTAL" and on the first line of the following pages enter "SUBTOTAL OF REDUCTION AMOUNT FROM PREVIOUS PAGE".
- (6) On the final page of the listing enter "BASIC BID PREFERENCE GRAND" immediately before the word "TOTAL".
- (7) Total the entries in the "REDUCTION AMOUNT" column for each page by commencing at the first entry for that page. If a continuation page exists, ensure that the subtotal from the previous page is computed into the running total. Number pages as appropriate.
- (8) Compute a Grand Total for the Basic Bid Preference. Enter the amount on the final page of the worksheet. (Note: When solicitations require written bids this amount should also be entered on line "C" of the Basic Bid Schedule.) Submit worksheet(s) with the Bid Schedule.

C. Form Completion – ALTERNATE BIDS.

- (1) Enter project number and name, the words "ALTERNATE BID #___", and CONTRACTOR'S name in the heading of each page as provided.
- (2) On the first entry line enter "ADDITIONAL ALASKA PRODUCTS FOR ALTERNATE BID #___", and repeat procedures 2 through 5 under part B these Bidder's instructions except that references to "Basic Bid" shall be replaced with the words "Alternate Bid #___".
- (3) Following the listing of all additional Alaska products enter the words "ADDITIONAL PRODUCTS PREFERENCE FOR ALTERNATE BID #___ - SUBTOTAL" and enter a subtotal amount for all additional products as listed. Subtotal amount to be determined by adding all additional product entries in the "REDUCTION AMOUNT" column.
- (4) Skip three lines and enter "LESS THE FOLLOWING NON-APPLICABLE ALASKA PRODUCTS:
- (5) Beginning on the next line, enter the product name and manufacturer of each Alaska Product appearing on the "Basic Bid" listing which would be deleted or reduced from the Project should the "Alternate Bid" be selected. Details of entry need only be sufficient to clearly reference the subject product. (i.e. "Pre-hung doors by Alaska Door Co., Anchorage.") Products being reduced shall specify the amount of the reduction. Should no products require deletion enter "None". When a product is listed as a "NON-APPLICABLE ALASKA PRODUCT" for this alternate bid and if under the basic bid the Bidder received a preference on his basic bid as a result of that product, then the applicable entries under the headings "TOTAL DECLARED VALUE" and "REDUCTION AMOUNT" (for each product and from the basic bid listing) shall also be entered into the corresponding headings of this form. Where only a portion of the products has been deleted, the entry (which will differ from those on the basic bid listing) may be "pro-rated" or as otherwise substantiated.
- (6) Following the listing of all non-applicable Alaska products enter the words "NON-APPLICABLE PRODUCTS PREFERENCE FROM BASIC BID ___ SUBTOTAL" and enter a subtotal amount for all non-applicable products listed. Subtotal amount to be determined by adding all non-applicable entries in the "REDUCTION AMOUNT" column.
- (7) At the bottom of the final page enter the words "ALTERNATE BID #___ PREFERENCE GRAND" immediately before the word "TOTAL".
- (8) Compute a Grand Total for the Alternate Bid Preference (for Alternate #___) by subtracting the non-applicable product preference subtotal from the additional product preference subtotal. Enter on the final page. (Note: When solicitations require written bids this amount should also be entered on line "C" of the Alternate Bid Schedule.) Submit separate worksheet(s) with each Alternate Bid

BID SCHEDULE

YKCC Mechanical Upgrades Phase II

Project No. 200005089-10

Proposers Please Note: Before preparing this bid schedule, read carefully, "Information to Proposers", and the following:

The Proposer shall insert a fixed price in figures opposite each pay item that appears in the bid schedule to furnish all labor, material, equipment, supervision and provide all work for each item listed. No price is to be entered or tendered for any item not appearing in the bid schedule.

Conditioned or qualified bids will be considered non-responsive. **Bids Due: January 3, 2023 @ 2:00 P.M. local time**

NOTICE: Bids will be compared on the Adjusted Basic Bid Amount (e) and will be evaluated in accordance with Section 00023. Contract award will be made in the amount of the unadjusted amount (a).

PAY ITEM	DESCRIPTION OF PAY ITEM	TOTAL BID PRICE, IN FIGURES
<u>Total Bid</u>	All work described in the Total Bid description in Section 01 11 13, Paragraph 1.02.A, and Project Plans for the Lump Sum Price of:	(a)\$_____
	Alaska Bidder's Preference: (5% of a.)	(b)\$_____
	Alaska Veteran-Owned Business Preference: (5% of a Not To Exceed \$5,000.00)	(c)\$_____
	Alaska Products Preference: (Attach worksheet(s))	(d)\$_____
	Adjusted Bid Amount: (a-b-c-d=e)	(e)\$_____

Contractor's Name (Printed)

Alaska Contractor's Registration #

Expires

Alaska Business License #

Expires



STATE OF ALASKA
DEPARTMENT OF CORRECTIONS

CONTRACTOR'S TECHNICAL PROPOSAL of

NAME _____

ADDRESS _____

To the CONTRACTING OFFICER, DEPARTMENT OF CORRECTIONS:

With regard to your Request for Proposals dated **January 3, 2023** for the construction of the Project: known as:

**YKCC Mechanical Upgrades Phase II
Yukon Kuskokwim Correctional Center
Project No. 200005089-10**

located at or near **Bethel, Alaska**; the Undersigned understands that a Proposal Evaluation Committee will evaluate all of the Proposals received and select for contract award the proposal which represents the best value to the State. The Undersigned offers for consideration the attached narrative proposal consisting of single-sided pages. The narrative addresses each of the evaluation criteria as described in Section 00023.

The Undersigned understands that the contract is intended to be awarded to the proposer with the highest point score considering all of the evaluation criteria described in Section 00023.

The undersigned acknowledges receipt of the following addenda to the RFP (give number and date of each).

Addenda	Date Issued	Addenda	Date Issued	Addenda	Date Issued
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____

The Undersigned has read the RFP Documents and hereby agrees to the conditions stated therein by affixing signatures below. The Undersigned also certifies the accuracy of statements made in the attached narratives.

The Undersigned has read the foregoing proposal and hereby agrees to the conditions stated therein by affixing his signature below. The Undersigned also certifies the accuracy of statements made in the attached narratives.

Name and Title of Person Signing

Signature

Telephone Number

Fax Number

Email Address



STATE OF ALASKA
DEPARTMENT OF CORRECTIONS

BID BOND

for

YKCC Mechanical Upgrades Phase II

Project # 200005089-10

Yukon Kuskokwim Correctional Center (YKCC), Bethel, Alaska

Project Name and Number

DATE BOND EXECUTED: _____

PRINCIPAL (Legal name and business address):

TYPE OF ORGANIZATION:

	<input type="checkbox"/> Individual	<input type="checkbox"/> Partnership
	<input type="checkbox"/> Joint Venture	<input type="checkbox"/> Corporation
STATE OF INCORPORATION:		

SURETY(IES) (Name and business address):

A.	B.	C.
PENAL SUM OF BOND:		DATE OF BID:

We, the PRINCIPAL and SURETY above named, are held and firmly bound to the State (State of Alaska), in the penal sum of the amount stated above, for the payment of which sum will be made, we bind ourselves and our legal representatives and successors, jointly and severally, by this instrument.

THE CONDITION OF THE FOREGOING OBLIGATION is that the Principal has submitted the accompanying bid in writing, date as shown above, on the above-referenced Project in accordance with contract documents filed in the office of the Contracting Officer, and under the Invitation for Bids therefore, and is required to furnish a bond in the amount stated above.

If the Principal's bid is accepted and he is offered the proposed contract for award, and if the Principal fails to enter into the contract, then the obligation to the State created by this bond shall be in full force and effect.

If the Principal enters into the contract, then the foregoing obligation is null and void.

PRINCIPAL

Signature(s)	1.	2.	3.
Name(s) & Title(s) (Typed)	1.	2.	3.
See Instructions on Reverse			Corporate Seal

CORPORATE SURETY(IES)

Surety A	Name of Corporation	State of Incorporation	Liability Limit \$
Signature(s)	1.	2.	Corporate Seal
Name(s) & Titles (Typed)	1.	2.	

Surety B	Name of Corporation	State of Incorporation	Liability Limit \$
Signature(s)	1.	2.	Corporate Seal
Name(s) & Titles (Typed)	1.	2.	

Surety C	Name of Corporation	State of Incorporation	Liability Limit \$
Signature(s)	1.	2.	Corporate Seal
Name(s) & Titles	1.	2.	

INSTRUCTIONS

1. This form shall be used whenever a bid bond is submitted.
2. Insert the full legal name and business address of the Principal in the space designated. If the Principal is a partnership or joint venture, the names of all principal parties must be included (e.g., "Smith Construction, Inc. and Jones Contracting, Inc. DBA Smith/Jones Builders, a joint venture"). If the Principal is a corporation, the name of the state in which incorporated shall be inserted in the space provided.
3. Insert the full legal name and business address of the Surety in the space designated. The Surety on the bond may be any corporation or partnership authorized to do business in Alaska as an insurer under AS 21.09. Individual sureties will not be accepted.
4. The penal amount of the bond may be shown either as an amount (in words and figures) or as a percent of the contract bid price (a not-to-exceed amount may be included).
5. The scheduled bid opening date shall be entered in the space marked Date of Bid.
6. The bond shall be executed by authorized representatives of the Principal and Surety. Corporations executing the bond shall also affix their corporate seal.
7. Any person signing in a representative capacity (e.g., an attorney-in-fact) must furnish evidence of authority if that representative is not a member of the firm, partnership, or joint venture, or an officer of the corporation involved.
8. The states of incorporation and the limits of liability of each surety shall be indicated in the spaces provided.
9. The date that bond is executed must not be later than the bid opening date.

Re: Project # 200005089-10, YKCC Mechanical Upgrades Phase II



STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES

ALASKA BIDDER PREFERENCE CERTIFICATION

In response to the advertised procurement for:

Project Name and Number: YKCC Mechanical Upgrades Phase II, RFP# 200005089-10

Bidder/Proposer (company name): _____

Operation of Alaska Bidder Preference

Procurement preferences under the Alaska Procurement Code are benefits that the State grants only to qualified bidders. Under AS 36.30.990(2), if a bidder is an eligible "Alaska Bidder", the Department will apply a five percent preference to the price of the bidder's proposal.

Instructions regarding Alaska Bidder Preference

A bidder that claims the Alaska Bidder Preference must review and then certify that each statement appearing under the heading "Alaska Bidder Certification" is true. The individual that signs the certification shall include his/her printed name and position within bidder's organization, *e.g.*, sole proprietor, partner, etc. If a bidder fails to submit a signed certification, the Department will not apply the claimed preference.

Alaska Bidder Certification

The bidding entity for which I am the duly authorized representative:

- (A) Holds a current Alaska business license;
- (B) Is submitting a bid or proposal for goods, services, or construction under the name appearing on the bidder's current Alaska business license;
- (C) Has maintained a place of business in the State staffed by the bidder or an employee of the bidder for a period of six months immediately preceding the date of the proposal;
- (D) Is incorporated or qualified to do business under the laws of the State, is a sole proprietorship and the proprietor is a resident of the State, is a limited liability company organized under AS 10.50 and all members are residents of the State, or is a partnership under former AS 32.05, AS 32.06, or AS 32.11 and all partners are residents of the State; and
- (E) If a joint venture, is composed entirely of ventures that qualify under the four preceding paragraphs of this Alaska Bidder Certification.

By applying my signature below, I certify under penalty of perjury that I am the duly appointed representative of this bidder, which has authorized and empowered me to legally bind it concerning its proposal, and that the foregoing statements are true and correct.

By (signature)

Date

Printed name

Alaska Business License Number

Title:



STATE OF ALASKA
DEPARTMENT OF CORRECTIONS

**ALASKA VETERAN PREFERENCE
CERTIFICATION**

In response to the advertised procurement for:

Project Name and Number _____,

Bidder (Contractor) _____

Operation of Alaska Veteran Preference

Procurement preferences under the Alaska Procurement Code are benefits that the State grants only to qualified bidders. Under AS 36.30.321, an eligible entity receives a five percent preference to the price of in the bidder's proposal if the bidder meets three requirements.

The bidder must be:

1. an "Alaska Veteran";
2. a "Qualifying Entity"; and
3. an "Alaska Bidder".

Unless a bidder satisfies all three requirements and furnishes corresponding certifications, it is not eligible for the Alaska Veteran Preference. This preference may not exceed \$5,000.

Instructions regarding Alaska Veteran Preference

A bidder that claims the Alaska Veteran Preference must review and complete the "Alaska Veteran Certification", the "Qualifying Entity Certification", and the "Alaska Bidder Certification". The individual that signs a certification shall include his/her printed name and position within bidder's organization, *e.g.*, sole proprietor, partner, etc. If a bidder fails to submit properly completed certifications, the Department will not apply the claimed preference.

Alaska Veteran Certification

(To be completed by individual(s) upon whom the bidder relies in claiming the Alaska Veteran status. If bidder is a partnership, limited liability company, or corporation, then a majority of partners, members, or shareholders who are Alaska Veterans must sign this Alaska Veteran Certification for the Bidder to be eligible for this preference.)

I hereby represent to the Department that:

I served in the armed forces of the United States, a reserve unit of the United States armed forces, the Alaska Territorial Guard, the Alaska Army National Guard, the Alaska Air National Guard, or the Alaska Naval Militia; and

I was separated from service under a condition that was not dishonorable; and

I am Alaska resident in that I am physically present in the State of Alaska with the intent to remain in the State indefinitely and to make a home in the State.

I certify under penalty of perjury that the foregoing statements are true and correct as they apply to me.

By (signature)

Date

Printed name

Title

Qualifying Entity Veteran Certification

The bidding entity for which I am the duly authorized representative is a:

(Check the appropriate box)

- ☐ sole proprietorship owned by an Alaska Veteran;
- ☐ partnership under AS 32.06 or AS 32.11 and a majority of the partners are Alaska Veterans;
- ☐ limited liability company organized under AS 10.50 and a majority of the members are Alaska Veterans;
or
- ☐ corporation that is wholly owned by individuals and a majority of the individuals are Alaska Veterans.

By applying my signature below, I certify under penalty of perjury that I am the duly appointed representative of this bidder, which has authorized and empowered me to legally bind it concerning the proposal and that the statement I have acknowledged above by checking the appropriate box is true and correct.

By (signature)

Date

Printed name

Title

Alaska Bidder Certification

(To complete your claim for the Alaska Veteran Preference, you must also submit an Alaska Bidder Certification, which the bidder can view, download, and print from the AKDOT&PF's Bid Express Proposal page.)



STATE OF ALASKA
DEPARTMENT OF CORRECTIONS

BID MODIFICATION

Yukon Kuskokwim Correctional Center (YKCC)

YKCC Mechanical Upgrades Phase II

Project # 20005089-10

Project Name and Number

Modification Number: _____

Note: Use this form to modify Manual (paper) bids only.

- Group Items and provide subtotals by bid schedule section.
- All revisions shall be made to the unadjusted bid amount(s).
- Changes to the adjusted bid amounts will be computed by the Department.

LINE NO.	ITEM NO.	PAY ITEM DESCRIPTION	REVISION TO UNIT BID PRICE +/-	REVISION TO BID AMOUNT +/-

TOTAL REVISION: \$ _____

Name of Bidding Firm

Responsible Party Signature

Date

This form may be duplicated if additional pages are needed.



STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES
Civil Rights Office – DBE Program

BIDDER REGISTRATION

All firms are required to submit a Bidder's Registration form before an Alaska Department of Transportation and Public Facilities (DOT&PF) project can be awarded. The Bidder Registration form must be submitted to the Civil Rights Officer (CRO) on an annual basis by January 1 and is valid thru December 31. Complete this form for each contractor and subcontractor. Firms will be listed on the bidder registration online directory <http://www.dot.state.ak.us/cvlrts/bidreg.shtml>.

Name of Firm: _____

Street Address: _____

Mailing Address: _____

Contact Name: _____

Telephone Number: _____

Fax number: _____

E-mail Address: _____

Date Firm was Established: _____

The firm listed above is a (check all that apply):

Prime Contractor? ☐

Subcontractor? ☐

Service Provider? ☐

Material Supplier? ☐

Manufacturer? ☐

Certified DBE? * ☐

Self-Certified SBE? * ☐

Identify specialty: _____

Identify service: _____

Identify material: _____

Identify product: _____

*DBE- Disadvantaged Business Enterprise

*SBE- Small Business Enterprise (*Complete page 2 of this form.*)

Firm's gross annual receipts:

☐ < \$500,000

☐ \$500,000- \$999,999

☐ \$1,000,000- \$4,999,999

☐ \$5,000,000- \$9,999,999

☐ \$10,000,000- \$16,999,999

☐ > \$17,000,000

Type of contracts/proposals bid by the firm (check all that apply):

☐ Highways ☐ Airports ☐ Transit ☐ AMHS

Signature of Company Representative

Title

Date

Send this completed form to:
ADOT&PF Civil Rights Office
PO Box 196900
Anchorage, Alaska 99519-6900

OR You may fax your completed form to:
(907) 269-0847

If you have any questions, please call **(907) 269-0851**.

SMALL BUSINESS ENTERPRISE PROGRAM (SBE) SELF-REGISTRATION

Fostering Small Business Participation (SBE) (49 CFR 26.39):

To meet the requirements of 49 CFR 26.39, DOT&PF has implemented a Small Business Enterprise Program. This component is only applicable to federally funded projects.

[Complete the Section below only if you are a Self-Certified SBE Firm] All businesses wishing to be eligible as a SBE are required to submit a SBE Self-Registration form. The SBE Self-Registration form must be submitted on an annual basis by January 1 and is valid thru December 31.

In order to verify your firm's compliance with business size standards under 49 CFR 26.67(2)(i) and 26.65(b), **at the time of award** you will be required to submit the following documents:

- SBE Affidavit of Certification Eligibility
- Personal Financial Statement
- Past three years of your corporations and/or individual tax returns
- If not a certified DBE, please provide documentation that you are self-certified as a small business (please contact Procurement Technical Assistance Center (PTAC) at 907-274-7232 if you require assistance on becoming a self-certified small business)

At time of award send required documentation to:

DOT&PF Civil Rights Office
Attn: Certification
PO Box 196900
Anchorage, Alaska 99519-690
Phone: (907) 269-0851
Fax: (907) 269-0847

A. SBE Directory Information

1. Can you verify at time of award that your firm (including affiliates) does not exceed the small business size standards as described by the Small Business Administration (SBA) for the last three years of gross annual receipts per 49 CFR 26.65(a)? To find more information about the SBA size standards, visit the SBA website <https://www.sba.gov/content/small-business-size-standards>. [☐]Yes [☐]No*

**If you marked "No" you do not qualify for the SBE Program*

2. Can you verify at time of award that your firm (including affiliates) does not exceed the personal net worth standards of \$1.32 million per 49 CFR 26.67(2)(i)? [☐]Yes [☐]No*

**If you marked "No" you do not qualify for the SBE Program*

3. Can you verify at time of award that each individual owner of your firm does not exceed the personal net worth standards of \$1.32 million per 49 CFR 26.67(2)(i)? [☐]Yes [☐]No*

**If you marked "No" you do not qualify for the SBE Program*

4. Contact Info.

Name of Firm

Contact Name

Telephone Number

Fax Number

Email Address

Company Website



STATE OF ALASKA
DEPARTMENT OF CORRECTIONS

CONSTRUCTION CONTRACT

YKCC Mechanical Upgrades Phase II
Yukon Kuskokwim Correctional Center (YKCC), Bethel, Alaska
Project Numbers: 200005089-10

This CONTRACT, between the STATE OF ALASKA, DEPARTMENT OF CORRECTIONS, herein called the Department, acting by and through its Contracting Officer, and

Company Name

Company Address (Street or PO Box, City, State, Zip)

a/an ☐ Individual ☐ Partnership ☐ Joint Venture ☐ Sole Proprietorship ☐ Corporation incorporated under the laws of the State of Alaska, its successors and assigns, herein called the Contractor, is effective the date of the signature of the Contracting Officer on this document.

WITNESSETH: That the Contractor, for and in consideration of the payment or payments herein specified and agreed to by the Department, hereby covenants and agrees to furnish and deliver all the materials and to do and perform all the work and labor required in the construction of the above-referenced project at the prices bid by the Contractor for the respective estimated quantities aggregating **not to exceed** the sum of \$_____ and such other items as are mentioned in the original Bid, which Bid and prices named, together with the Contract Documents are made a part of this Contract and accepted as such.

It is distinctly understood and agreed that no claim for additional work or materials, done or furnished by the Contractor and not specifically herein provided for, will be allowed by the Department, nor shall the Contractor do any work or furnish any material not covered by this Contract, unless such work is ordered in writing by the Department. In no event shall the Department be liable for any materials furnished or used, or for any work or labor done, unless the materials, work, or labor are required by the Contract or on written order furnished by the Department. Any such work or materials which may be done or furnished by the Contractor without written order first being given shall be at the Contractor's own risk, cost, and expense and the Contractor hereby covenants and agrees to make no claim for compensation for work or materials done or furnished without such written order.

The Contractor further covenants and agrees that all materials shall be furnished and delivered, and all labor shall be done and performed, in every respect, to the satisfaction of the Department, on or before: **October 30, 2023 for Substantial Completion Date and November 15, 2023 for the Final Completion Date**. It is expressly understood and agreed that in case of the failure on the part of the Contractor, for any reason, except with the written consent of the Department, to complete the furnishing and delivery of materials and the doing and performance of the work before the aforesaid date, the Department shall have the right to deduct from any money due or which may become due the Contractor, or if no money shall be due, the Department shall have the right to recover the following amounts:

LIQUIDATED DAMAGES:

- **Eight Hundred Fifty-Three Dollars & Twenty Cents (853.20)** per day for each calendar day elapsing between the time stipulated for the sub-completion date and in accordance with the terms hereof; such deduction to be made, or sum to be recovered, not as a penalty but as liquidated damages.
- **Ninety Dollars & Sixty-Four Cents (90.64)** per day for each calendar day elapsing between the time stipulated for the final completion date and in accordance with the terms hereof; such deduction to be made, or sum to be recovered, not as a penalty but as liquidated damages.

IN WITNESS WHEREOF, the parties hereto have executed this Contract and hereby agree to its terms and conditions.

CONTRACTOR

Company Name

Signature of Authorized Company Representative

Typed Name and Title

Date

(Corporate Seal)

**STATE OF ALASKA
DEPARTMENT OF CORRECTIONS**

Signature of Contracting Officer

Michael Lim

Typed Name

Date

Re: Project # 200005089-10, YKCC Mechanical Upgrades Phase II



STATE OF ALASKA
DEPARTMENT OF CORRECTIONS

PERFORMANCE BOND

Bond No. _____

For

YKCC Mechanical Upgrades Phase II
Yukon Kuskokwim Correctional Center (YKCC), Bethel, Alaska
Project # 200005089-10
Project Name and Number

KNOW ALL WHO SHALL SEE THESE PRESENTS:

That _____
of _____ as Principal,
and _____
of _____ as Surety,
firmly bound and held unto the State of Alaska in the penal sum of _____ Dollars

(\$ _____) good and lawful money of the United States of America for the payment whereof,
well and truly to be paid to the State of Alaska, we bind ourselves, our heirs, successors, executors, administrators, and assigns,
jointly and severally, firmly by these presents.

WHEREAS, the said Principal has entered into a written contract with said State of Alaska, on the _____ of _____
A.D., 20____, for construction of the above-named project, said work to be done according to the terms of said contract.

Now, THEREFORE, the conditions of the foregoing obligation are such that if the said Principal shall well and truly perform and
complete all obligations and work under said contract and if the Principal shall reimburse upon demand of the Department of
Corrections any sums paid him which exceed the final payment determined to be due upon completion of the project, then these
presents shall become null and void; otherwise they shall remain in full force and effect.

IN WITNESS WHEREOF, we have hereunto set our hands and seals at _____,
_____ this _____ day of _____ A.D., 20____.

Principal: _____

Address: _____

By: _____

Contact Name: _____

Phone: () _____

Surety: _____

Address: _____

By: _____

Contact Name: _____

Phone: () _____

The offered bond has been checked for adequacy under the applicable statutes and regulations:

Alaska Department of Corrections Authorized Representative

Date

See Instructions on Reverse 00610

INSTRUCTIONS

1. This form shall be used whenever a performance bond is required. There shall be no deviation from this form without approval from the Contracting Officer.
2. The full legal name, business address, phone number, and point of contact of the Principal and Surety shall be typed on the face of the form. Where more than a single surety is involved, a separate form shall be executed for each surety.
3. The penal amount of the bond, or in the case of more than one surety the amount of obligation, shall be typed in words and in figures.
4. Where individual sureties are involved, a completed Affidavit of Individual Surety shall accompany the bond. Such forms are available upon request from the Contracting Officer.
5. The bond shall be signed by authorized persons. Where such person is signing in a representative capacity (e.g., an attorney-in-fact), but is not a member of the firm, partnership, or joint venture, or an officer of the corporation involved, evidence of authority must be furnished.



STATE OF ALASKA
DEPARTMENT OF CORRECTIONS

PAYMENT BOND

Bond No. _____

For

YKCC Mechanical Upgrades Phase II

Project # 200005089-10

Yukon Kuskokwim Correctional Center (YKCC) Bethel, Alaska

Project Name and Number

KNOW ALL WHO SHALL SEE THESE PRESENTS:

That _____
of _____ as Principal,
and _____
of _____ as Surety,
firmly bound and held unto the State of Alaska in the penal sum of _____ Dollars

(\$ _____) good and lawful money of the United States of America for the payment whereof,
well and truly to be paid to the State of Alaska, we bind ourselves, our heirs, successors, executors, administrators, and assigns,
jointly and severally, firmly by these presents.

WHEREAS, the said Principal has entered into a written contract with said State of Alaska, on the _____ of _____
A.D., 20____, for construction of the above-referenced project, said work to be done according to the terms of said contract.

Now, THEREFORE, the conditions of the foregoing obligation are such that if the said Principal shall comply with all requirements
of law and pay, as they become due, all just claims for labor performed and materials and supplies furnished upon or for the work
under said contract, whether said labor be performed and said materials and supplies be furnished under the original contract, any
subcontract, or any and all duly authorized modifications thereto, then these presents shall become null and void; otherwise they
shall remain in full force and effect.

IN WITNESS WHEREOF, we have hereunto set our hands and seals at _____,
_____ this _____ day of _____ A.D., 20____.

Principal: _____

Address: _____

By: _____

Contact Name: _____

Phone: () _____

Surety: _____

Address: _____

By: _____

Contact Name: _____

Phone: () _____

The offered bond has been checked for adequacy under the applicable statutes and regulations:

Alaska Department of Corrections Authorized Representative

Date

INSTRUCTIONS

1. This form, for the protection of persons supplying labor and materials, shall be used whenever a payment bond is required. There shall be no deviation from this form without approval from the Contracting Officer.
2. The full legal name, business address, phone number, and point of contact of the Principal and Surety shall be typed on the face of the form. Where more than a single surety is involved, a separate form shall be executed for each surety.
3. The penal amount of the bond, or in the case of more than one surety the amount of obligation, shall be typed in words and in figures.
4. Where individual sureties are involved, a completed Affidavit of Individual Surety shall accompany the bond. Such forms are available upon request from the Contracting Officer.
5. The bond shall be signed by authorized persons. Where such persons are signing in a representative capacity (e.g., an attorney-in-fact), but is not a member of the firm, partnership, or joint venture, or an officer of the corporation involved, evidence of authority must be furnished.

**STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES
DOCUMENT 00700 -ISSUED DECEMBER 2011**

GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT FOR BUILDINGS

ARTICLE 1 - DEFINITIONS

ARTICLE 2- AUTHORITIES AND LIMITATIONS

- 2.1 Authorities and Limitations
- 2.2 Evaluations by Contracting Officer
- 2.3 Means and Methods
- 2.4 Visits to Site

ARTICLE 3- CONTRACT DOCUMENTS: INTENT, AMENDING, REUSE

- 3.1 Incomplete Contract Documents
- 3.2 Copies of Contract Documents
- 3.3 Scope of Work
- 3.4 Intent of Contract Documents
- 3.5 Discrepancy in Contract Documents
- 3.6 Clarifications and Interpretations
- 3.7 Reuse of Documents

ARTICLE 4 - LANDS AND PHYSICAL CONDITIONS

- 4.1 Availability of Lands
- 4.2 Visit to Site/Place of Business
- 4.3 Explorations and Reports
- 4.4 Utilities
- 4.5 Damaged Utilities
- 4.6 Utilities Not Shown or Indicated
- 4.7 Survey Control

ARTICLE 5- BONDS AND INSURANCE

- 5.1 Delivery of Bonds
- 5.2 Bonds
- 5.3 Replacement of Bond and Surety
- 5.4 Insurance Requirements
- 5.5 Indemnification

ARTICLE 6- CONTRACTOR'S RESPONSIBILITIES

- 6.1 Supervision of Work
- 6.2 Superintendence by CONTRACTOR
- 6.3 Character of Workers
- 6.4 CONTRACTOR to Furnish
- 6.5 Materials and Equipment
- 6.6 Anticipated Schedules
- 6.7 Finalizing Schedules
- 6.8 Adjusting Schedules
- 6.9 Substitutes or "Or-Equal" Items
- 6.10 Substitute Means and Methods
- 6.11 Evaluation of Substitution
- 6.12 Dividing the Work
- 6.13 Subcontractors
- 6.14 Use of Premises
- 6.15 Structural Loading
- 6.16 Record Documents

- 6.17 Safety and Protection
- 6.18 Safety Representative
- 6.19 Emergencies
- 6.20 Shop Drawings and Samples
- 6.21 Shop Drawing and Sample Review
- 6.22 Maintenance During Construction
- 6.23 Continuing the Work
- 6.24 Consent to Assignment
- 6.25 Use of Explosives
- 6.26 Contractor's Records
- 6.27 Load Restrictions

ARTICLE 7- LAWS AND REGULATIONS

- 7.1 Laws to be Observed
- 7.2 Permits, Licenses, and Taxes
- 7.3 Patented Devices, Materials and Processes
- 7.4 Compliance of Specifications and Drawings
- 7.5 Accident Prevention
- 7.6 Sanitary Provisions
- 7.7 Business Registration
- 7.8 Professional Registration and Certification
- 7.9 Local Building Codes
- 7.10 Air Quality Control
- 7.11 Archaeological or Paleontological Discoveries
- 7.12 Applicable Alaska Preferences
- 7.13 Wages and Hours of Labor
- 7.14 Overtime Work Hours and Compensation

ARTICLE 8- OTHER WORK

- 8.1 Related Work at Site
- 8.2 Access, Cutting, and Patching
- 8.3 Defective Work by Others
- 8.4 Coordination

ARTICLE 9 - CHANGES

- 9.1 Department's Right to Change
- 9.2 Authorization of Changes within the General Scope
- 9.3 Directive
- 9.4 Change Order
- 9.5 Shop Drawing Variations
- 9.6 Changes Outside the General Scope; Supplemental Agreement
- 9.7 Unauthorized Work
- 9.8 Notification of Surety
- 9.9 Differing Site Conditions
- 9.10 Interim Work Authorization

ARTICLE 10- CONTRACT PRICE; COMPUTATIONS AND CHANGE

- 10.1 Contract Price
- 10.2 Claim for Price Change
- 10.3 Change Order Price Determination
- 10.4 Cost of the Work
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ACKNOWLEDGMENT

"The State of Alaska, General Conditions of the Construction Contract for Buildings" is based on the "Standard General Conditions of the Construction Contract" as published by the National Society of Professional Engineers (document number 1910-8, 1983 edition) on behalf of the Engineers Joint Construction Documents Committee. Portions of the NSPE General Conditions are reprinted herein by the express permission of NSPE. Modifications to the NSPE text are made to provide for State laws, regulations, and established procedures.

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ARTICLE 1 -DEFINITIONS

Wherever used in the Contract Documents the following terms, or pronouns in place of them, are used, the intent and meaning, unless a different intent or meaning is clearly indicated, shall be interpreted as set forth below.

The titles and headings of the articles, sections, and subsections herein are intended for convenience of reference.

Terms not defined below shall have their ordinary accepted meanings within the context which they are used. Words which have a well-known technical or trade meaning when used to describe work, materials or equipment shall be interpreted in accordance with such meaning. Words defined in Article 1 are to be interpreted as defined.

Addenda- All clarifications, corrections, or changes issued graphically or in writing by the DEPARTMENT after the Advertisement but prior to the opening of Proposals.

Advertisement- The public announcement, as required by law, inviting bids for Work to be performed or materials to be furnished.

Application for Payment - The form provided by the DEPARTMENT which is to be used by the CONTRACTOR in requesting progress or final payments and which is to include such supporting documentation as is required by the Contract Documents.

Approved or Approval - 'Approved' or 'Approval' as used in this contract document shall mean that the Department has received a document, form or submittal from the contractor and that the Department has taken "No exceptions" to the item submitted. Unless the context clearly indicates otherwise, approved or approval shall not mean that the Department approves of the methods or means, or that the item or form submitted meets the requirements of the contract or constitutes acceptance of the Contractor's work. Where approved or approval means acceptance, then such approval must be set forth in writing and signed by the contracting officer or his designee.

Architect - Where used in the contract documents, "ARCHITECT" shall mean the DEPARTMENT'S ENGINEER.

Architect/Engineer - Where used in the contract documents, "ARCHITECT/ENGINEER" shall mean the DEPARTMENT'S ENGINEER.

A.S. - Initials which stand for Alaska Statute.

Award - The acceptance, by the DEPARTMENT, of the successful bid.

Bid Bond - A type of Proposal Guaranty.

Bidder - Any individual, firm, corporation or any acceptable combination thereof, or joint venture submitting a bid for the advertised Work.

Calendar Day - Every day shown on the calendar, beginning and ending at midnight.

Change Order - A written order by the DEPARTMENT directing changes to the Contract Documents, within their general scope.

Consultant - The person, firm, or corporation retained directly by the DEPARTMENT to prepare Contract Documents, perform construction administration services, or other Project related services.

Contingent Sum Work Item - When the bid schedule contains a Contingent Sum Work Item; the Work covered shall be performed only upon the written Directive of the Project Manager. Payment shall be made as provided in the Directive.

Contract - The written agreement between the DEPARTMENT and the CONTRACTOR setting forth the obligations of the parties and covering the Work to be performed, all as required by the Contract Documents.

Contract Documents - The Contract form, Addenda, the bidding requirements and CONTRACTOR's bid (including all appropriate bid tender forms), the bonds, the Conditions of the Contract and all other Contract requirements, the Specifications, and the Drawings furnished by the DEPARTMENT to the CONTRACTOR, together with all Change Orders and documents approved by the Contracting Officer, for inclusion, modifications and supplements issued on or after the Effective Date of the Contract.

Contracting Officer - The person authorized by the Commissioner to enter into and administer the Contract on behalf of the DEPARTMENT. He has authority to make findings, determinations and decisions with respect to the Contract and, when necessary, to modify or terminate the Contract. The Contracting Officer is identified on the construction Contract.

CONTRACTOR - The individual, firm, corporation or any acceptable combination thereof, contracting with the DEPARTMENT for performance of the Work.

Contract Price - The total moneys payable by the DEPARTMENT to the CONTRACTOR under the terms of the Contract Documents.

Contract Time - The number of Calendar Days following issuance of Notice-to-Proceed in which the project shall be rendered Substantially Complete, or if specified as a calendar date, the Substantial Completion date specified in the Contract Documents

Controlling Item - Any feature of the Work on the critical path of a network schedule.

Defective - Work that is unsatisfactory, faulty or deficient, or does not conform to the Contract Documents.

DEPARTMENT - The Alaska Department of Transportation and Public Facilities. References to "Owner", "State", "Contracting Agency", mean the DEPARTMENT.

Directive - A written communication to the CONTRACTOR from the Contracting Officer interpreting or enforcing a Contract requirement or ordering commencement of an item of Work.

Drawings - The Drawings which show the character and scope of the Work to be performed and which have been furnished by the DEPARTMENT or the DEPARTMENT's Consultant and are by reference made a part of the Contract Documents.

ENGINEER - The DEPARTMENT'S authorized representative of the Contracting Officer, as defined in the DEPARTMENT'S *delegation of authority letter* to be issued after notice-to-proceed, who is responsible for administration of the contract.

Equipment - All machinery together with the necessary supplies for upkeep and maintenance, and also tools and apparatus necessary for the proper construction and acceptable completion of the Work.

Final Acceptance - The DEPARTMENT's written acceptance of the Work following Final Completion and the performance of all Contract requirements by the CONTRACTOR.

Final Completion - The Project (or specified part thereof) has progressed to the point that all required Work is complete as determined by the Contracting Officer.

Furnish- To procure, transport, and deliver to the project site materials, labor, or equipment, for installation or use on the project.

General Requirements - Sections of Division 1 of the Specifications which contain administrative and procedural requirements as well as requirements for temporary facilities which apply to Specification Divisions 2 through 16.

Holidays - In the State of Alaska, Legal Holidays occur on:

1. New Year's Day- January 1
2. Martin Luther King's Birthday- Third Monday in January
3. President's Day- Third Monday in February
4. Seward's Day- Last Monday in March
5. Memorial Day- Last Monday in May
6. Independence Day- July 4
7. Labor Day- First Monday in September
8. Alaska Day- October 18
9. Veteran's Day - November 11
10. Thanksgiving Day- Fourth Thursday in November
11. Christmas Day - December 25
12. Every Sunday
13. Every day designated by public proclamation by the President of the United States or the Governor of the State as a legal Holiday.

If any Holiday listed above falls on a Saturday, Saturday and the preceding Friday are both legal Holidays. If the Holiday should fall on a Sunday, except (12) above, Sunday and the following Monday are both legal Holidays. See Title 44, Alaska Statutes.

Inspector - The Engineer's authorized representative assigned to make detailed observations relating to contract performance.

Install - Means to build into the Work, ready to be used in complete and operable condition and in compliance with Contract Documents.

Interim Work Authorization - A written order by the Engineer initiating changes to the Contract, within its general scope, until a subsequent Change Order is executed.

Invitation for Bids - A portion of the bidding documents soliciting bids for the Work to be performed.

Laboratory- The official testing laboratories of the DEPARTMENT or such other laboratories as may be designated by the Engineer or identified in the contract documents.

Materials -Any substances specified for use in the construction of the project.

Notice of Intent to Award- The written notice by the DEPARTMENT to all Bidders identifying the apparent successful Bidder and establishing the DEPARTMENT's intent to execute the Contract when all conditions required for execution of the Contract are met.

Notice to Proceed - A written notice to the CONTRACTOR to begin the Work and establishing the date on which the Contract Time begins.

Payment Bond - The security furnished by the CONTRACTOR and his Surety to guarantee payment of the debts covered by the bond.

Performance Bond - The security furnished by the CONTRACTOR and his Surety to guarantee performance and completion of the Work in accordance with the Contract.

Preconstruction Conference - A meeting between the CONTRACTOR and the Engineer, and other parties affected by the construction, to discuss the project before the CONTRACTOR begins work.

Project - The total construction, of which the Work performed under the Contract Documents, is the whole or a part, where such total construction may be performed by more than one CONTRACTOR.

Project Manager - The authorized representative of the Contracting Officer who is responsible for administration of the Contract.

Proposal - The offer of a Bidder, on the prescribed forms, to perform the Work at the prices quoted.

Proposal Guaranty - The security furnished with a Proposal to guarantee that the bidder will enter into a Contract if his Proposal is accepted by the DEPARTMENT.

Quality Assurance (QA) - Where referred to in the technical specifications (Divisions 2 through 16), Quality Assurance refers to measures to be provided by the CONTRACTOR as specified.

Quality Control (QC) - Tests and inspections by the CONTRACTOR to insure the acceptability of materials incorporated into the Work. QC test reports are used as a basis upon which to determine whether the Work conforms to the requirements of the Contract Documents and to determine its acceptability for payment.

Regulatory Requirements - Laws, rules, regulations, ordinances, codes and/or orders.

Schedule of Values - The DEPARTMENT's document, submitted by the CONTRACTOR and reviewed by the Contracting Officer, which shall serve as the basis for computing payment and for establishing the value of separate items of work which comprise the Contract Price.

Shop Drawings - All drawings, diagrams, illustrations, schedules and other data which are specifically prepared by or for the CONTRACTOR to illustrate some portion of the Work and all illustrations, brochures, standard schedules, performance charts, instructions, diagrams and other information prepared by a Supplier and submitted by the CONTRACTOR to illustrate material, equipment, fabrication, or erection for some portion of the Work. Where used in the Contract Documents, "Shop Drawings" shall also mean "Submittals".

Specifications - Those portions of the Contract Documents consisting of written technical descriptions of materials, equipment, construction systems, standards and workmanship as applied to the Work and certain administrative and procedural details applicable thereto.

Subcontractor - An individual, firm, or corporation to whom the CONTRACTOR or any other Subcontractor sublets part of the Contract.

Substantial Completion - Although not fully completed, the Work (or a specified part thereof) has progressed to the point where, in the opinion of the Contracting Officer, as evidence by the DEPARTMENT's written notice, it is sufficiently complete, in accordance with the Contract Documents, so that the Work (or specified part) can be utilized for the purposes for which it is intended. The terms "Substantially Complete" and "Substantially Completed" as applied to any Work refer to Substantial Completion thereof.

Supplemental Agreement - A written agreement between the CONTRACTOR and the DEPARTMENT covering work that is not within the general scope of the Contract.

Supplementary Conditions - The part of the Contract Documents which amends or supplements these General Conditions.

Supplier - A manufacturer, fabricator, distributor, materialman or vendor of materials or equipment.

Surety - The corporation, partnership, or individual, other than the CONTRACTOR, executing a bond furnished by the CONTRACTOR.

Traffic Control Plan (TCP) - A drawing of one or more specific plans that detail the routing of pedestrian, and/or vehicular traffic through or around a construction area.

Unit Price Work - Work to be paid for on the basis of unit prices.

Using Agency - The entity who will occupy or use the completed Project.

Utility - The privately, publicly or cooperatively owned lines, facilities and systems for producing, transmitting or distributing communications, power, electricity, light, heat, gas, oil, crude products, water, steam, waste, storm water not connected with highway or street drainage, and other similar commodities, including publicly owned fire and police signal systems, street lighting systems, and railroads which directly or indirectly serve the public or any part thereof. The term "utility" shall also mean the utility company, inclusive of any wholly owned or controlled subsidiary."

Work - Work is the act of, and the result of, performing services, furnishing labor, furnishing and incorporating materials and equipment into the Project and performing other duties and obligations, all as required by the Contract Documents. Such Work, however incremental, will culminate in the entire completed Project, or the various separately identifiable parts thereof.

ARTICLE 2- AUTHORIZATION AND LIMITATIONS

2.1 Authorities and Limitations

- 2.1.1 The Contracting Officer alone shall have the power to bind the DEPARTMENT and to exercise the rights, responsibilities, authorities and functions vested in the Contracting Officer by the Contract Documents. The Contracting Officer shall have the right to designate in writing authorized representatives to act for him. Wherever any provision of the Contract Documents specifies an individual or organization, whether governmental or private, to perform any act on behalf of or in the interest of the DEPARTMENT that individual or organization shall be deemed to be the Contracting Officer's authorized representative under this Contract but only to the extent so specified.
- 2.1.2 The CONTRACTOR shall perform the Work in accordance with any written order (including but not limited to instruction, direction, interpretation or determination) issued by an authorized representative in accordance with the authorized representative's authority to act for the Contracting Officer. The CONTRACTOR assumes all the risk and consequences of performing the Work in accordance with any order (including but not limited to instruction, direction, interpretation or determination) of anyone not authorized to issue such order, and of any order not in writing.
- 2.1.3 Should the Contracting Officer or his authorized representative designate Consultant(s) to act for the DEPARTMENT as provided for in Paragraph 2.1.1, the performance or nonperformance of the Consultant under such authority to act, shall not give rise to any contractual obligation or duty of the Consultant to the CONTRACTOR, any Subcontractor, any Supplier, or any other organization performing any of the Work or any Surety representing them.

2.2 Evaluations by Contracting Officer:

- 2.2.1 The Contracting Officer will decide all questions which may arise as to:
 - a. Quality and acceptability of materials furnished;
 - b. Quality and acceptability of Work performed;
 - c. Compliance with the schedule of progress;

- d. Interpretation of Contract Documents;
- e. Acceptable fulfillment of the Contract on the part of the CONTRACTOR.

2.2.2 In order to avoid cumbersome terms and confusing repetition of expressions in the Contract Documents the terms "as ordered", "as directed", "as required", "as approved" or terms of like effect or import are used, or the adjectives "reasonable", "suitable", "acceptable", "proper" or "satisfactory" or adjectives of like effect or import are used it shall be understood as if the expression were followed by the words "the Contracting Officer".

When such terms are used to describe a requirement, direction, review or judgment of the Contracting Officer as to the Work, it is intended that such requirement, direction, review or judgment will be solely to evaluate the Work for compliance with the Contract Documents (unless there is a specific statement indicating otherwise).

2.2.3 The use of any such term or adjective shall not be effective to assign to the DEPARTMENT any duty of authority to supervise or direct the furnishing or performance of the Work or any duty or authority to undertake responsibility contrary to the provisions of paragraphs 2.3 or 2.4.

2.3 Means & Methods:

The means, methods, techniques, sequences or procedures of construction, or safety precautions and the program incident thereto, and the failure to perform or furnish the Work in accordance with the Contract Documents are the sole responsibility of the CONTRACTOR.

2.4 Visits to Site/Place of Business:

The Contracting Officer will make visits to the site and approved remote storage sites at intervals appropriate to the various stages of construction to observe the progress and quality of the executed Work and to determine, in general, if the Work is proceeding in accordance with the Contract Documents. The Contracting Officer may, at reasonable times, inspect that part of the plant or place of business of the CONTRACTOR or Subcontractor that is related to the performance of the Contract. Such observations or the lack of such observations shall in no way relieve the CONTRACTOR from his duty to perform the Work in accordance with the Contract Documents.

ARTICLE 3- CONTRACT DOCUMENTS: INTENT, AMENDING, REUSE

3.1 Incomplete Contract Documents:

The submission of a bid by the Bidder is considered a representation that the Bidder examined the Contract Documents to make certain that all sheets and pages were provided and that the Bidder is satisfied as to the conditions to be encountered in performing the Work. The DEPARTMENT expressly denies any responsibility or liability for a bid submitted on the basis of an incomplete set of Contract Documents.

3.2 Copies of Contract Documents:

The DEPARTMENT shall furnish to the CONTRACTOR up to ten copies of the Contract Documents. Additional copies will be furnished, upon request, at the cost of reproduction.

3.3 Scope of Work:

The Contract Documents comprise the entire Contract between the DEPARTMENT and the CONTRACTOR concerning the Work. The Contract Documents are complementary; what is called for by one is as binding as if called for by all. The Contract Documents will be construed in accordance with the Regulatory Requirements of the place of the Project.

It is specifically agreed between the parties executing this Contract that it is not intended by any of the provisions of the Contract to create in the public or any member thereof a third party benefit, or to authorize anyone not a party to this Contract to maintain a suit pursuant to the terms or provisions of the Contract.

3.4 Intent of Contract Documents:

- 3.4.1 It is the intent of the Contract Documents to describe a functionally complete Project to be constructed in accordance with the Contract Documents. Any Work, materials or equipment that may reasonably be inferred from the Contract Documents as being required to produce the intended result will be supplied, without any adjustment in Contract Price or Contract Time, whether or not specifically called for.
- 3.4.2 Reference to standard specifications, manuals or codes of any technical society, organization or association, or to the Regulatory Requirements of any governmental authority, whether such reference be specific or by implication, shall mean the edition stated in the Contract Documents or if not stated the latest standard specification, manual, code or Regulatory Requirements in effect at the time of Advertisement for the Project (or, on the Effective Date of the Contract if there was no Advertisement). However, no provision of any referenced standard specification, manual or code (whether or not specifically incorporated by reference in the Contract Documents) shall be effective to change the duties and responsibilities of the DEPARTMENT and the CONTRACTOR, or any of their consultants, agents or employees from those set forth in the Contract Documents, nor shall it be effective to assign to the DEPARTMENT or any of the DEPARTMENT's Consultants, agents or employees, any duty or authority to supervise or direct the furnishing or performance of the Work or any duty or authority to undertake responsibility contrary to the provisions of paragraphs 2.3 or 2.4.

3.5 Discrepancy in Contract Documents:

- 3.5.1 Before undertaking the Work, the CONTRACTOR shall carefully study and compare the Contract Documents and check and verify pertinent figures, and dimensions shown thereon and all applicable field measurements. Work in the area by the CONTRACTOR shall imply verification of figures, dimensions and field measurements. If, during the above study or during the performance of the Work, the CONTRACTOR finds a conflict, error, discrepancy or omission in the Contract Documents, or a discrepancy between the Contract Documents and any standard specification, manual, code, or Regulatory Requirement which affects the work, the CONTRACTOR shall promptly report such discrepancy in writing to the Contracting Officer. The CONTRACTOR shall obtain a written interpretation or clarification from the Contracting Officer before proceeding with any Work affected thereby. Any adjustment made by the CONTRACTOR without this

determination shall be at his own risk and expense. However, the CONTRACTOR shall not be liable to the DEPARTMENT for failure to report any conflict, error or discrepancy in the Contract Documents unless the CONTRACTOR had actual knowledge thereof or should reasonably have known thereof.

3.5.2 Discrepancy- Order of Precedence:

When conflicts errors or discrepancies within the Contract Documents exist, the order of precedence from most governing to least governing will be as follows:

- Contents of Addenda
- Supplementary Conditions
- General Conditions
- General Requirements
- Technical Specifications
- Drawings
- Recorded dimensions will govern over scaled dimensions
- Large scale details over small scale details
- Schedules over plans
- Architectural drawings over structural drawings Structural drawings over mechanical and electrical drawings

3.6 Clarifications and Interpretations:

The Contracting Officer will issue with reasonable promptness such written clarifications or interpretations of the requirements of the Contract Documents as the Contracting Officer may determine necessary, which shall be consistent with or reasonably inferable from the overall intent of the Contract Documents. Revised: December 2011

3.7 Reuse of Documents:

Neither the CONTRACTOR nor any Subcontractor, or Supplier or other person or organization performing or furnishing any of the Work under a direct or indirect contract with the DEPARTMENT shall have or acquire any title to or ownership rights in any of the Contract Documents (or copies thereof) prepared by or for the DEPARTMENT and they shall not reuse any of the Contract Documents on extensions of the Project or any other project without written consent of the Contracting Officer.

Contract Documents prepared by the CONTRACTOR in connection with the Work shall become the property of the DEPARTMENT.

ARTICLE 4 - LANDS AND PHYSICAL CONDITIONS

4.1 Availability of Lands:

The DEPARTMENT shall furnish as indicated in the Contract Documents, the lands upon which the Work is to be performed, rights-of-way and easements for access thereto, and such other lands which are designated for use of the CONTRACTOR in connection with the Work. Easements for permanent structures or permanent changes in existing facilities will be obtained and paid for by the DEPARTMENT, unless otherwise provided in the Contract Documents. The CONTRACTOR shall provide for all additional lands and access thereto that may be required for temporary construction facilities or storage of materials and equipment. The CONTRACTOR shall provide all waste and disposal areas, including disposal areas for hazardous or contaminated materials, at no additional cost to the DEPARTMENT.

4.2 Visit to Site:

The submission of a bid by the CONTRACTOR is considered a representation that the CONTRACTOR has visited and carefully examined the site and is satisfied as to the conditions to be encountered in performing the Work and as to the requirements of the Contract Documents.

4.3 Explorations and Reports:

Reference is made to the Supplementary Conditions for identification of those reports of explorations and tests of subsurface conditions at the site that have been utilized by the DEPARTMENT in preparation of the Contract Documents. The CONTRACTOR may for his purposes rely upon the accuracy of the factual data contained in such reports, but not upon interpretations or opinions drawn from such factual data contained therein or for the completeness or sufficiency thereof. Except as indicated in the immediately preceding sentence and in paragraphs

4.4 and 9.9, CONTRACTOR shall have full responsibility with respect to surface and subsurface conditions at the site.

4.4 Utilities:

The horizontal and vertical locations of known underground utilities as shown or indicated by the Contract Documents are approximate and are based on information and data furnished to the DEPARTMENT by the owners of such underground utilities.

4.4.2 The CONTRACTOR shall have full responsibility for:

- a. Reviewing and checking all information and data concerning utilities.
- b. Locating all underground utilities shown or indicated in the Contract Documents which are affected by the work.
- c. Coordination of the Work with the owners of all utilities during construction.
- d. Safety and protection of all utilities as provided in paragraph 6.17.

e. Repair of any damage to utilities resulting from the Work in accordance with 4.4.4 and 4.5.

4.4.3 If Work is to be performed by any utility owner, the CONTRACTOR shall cooperate with such owners to facilitate the Work.

4.4.4 In the event of interruption to any utility service as a result of accidental breakage or as result of being exposed or unsupported, the CONTRACTOR shall promptly notify the utility owner and the Contracting Officer. If service is interrupted, repair work shall be continuous until the service is restored. No Work shall be undertaken around fire hydrants until provisions for continued service has been approved by the local fire authority.

4.5 Damaged Utilities:

When utilities are damaged by the CONTRACTOR, the utility owner shall have the choice of repairing the utility or having the CONTRACTOR repair the utility. In the following circumstances, the CONTRACTOR shall reimburse the utility owner for repair costs or provide at no cost to the utility owner or the DEPARTMENT, all materials, equipment and labor necessary to complete repair of the damage:

- a. When the utility is shown or indicated in the Contract Documents.
- b. When the utility has been located by the utility owner.
- c. When no locate was requested by the CONTRACTOR for utilities shown or indicated in the Contract Documents.
- d. All visible utilities.
- e. When the CONTRACTOR could have, otherwise, reasonably been expected to be aware of such utility.

4.6 Utilities Not Shown or Indicated:

If, while directly performing the Work, an underground utility is uncovered or revealed at the site which was not shown or indicated in the Contract Documents and which the CONTRACTOR could not reasonably have been expected to be aware of, the CONTRACTOR shall, promptly after becoming aware thereof and before performing any Work affected thereby (except in an emergency as permitted by paragraph 6.19) identify the owner of such underground utility and give written notice thereof to that owner and to the Contracting Officer. The Contracting Officer will promptly review the underground utility to determine the extent to which the Contract Documents and the Work should be modified to reflect the impacts of the discovered utility. The Contract Documents will be amended or supplemented in accordance with paragraph 9.2 and to the extent necessary through the issuance of a change document by the Contracting Officer. During such time, the CONTRACTOR shall be responsible for the safety and protection of such underground utility as provided in paragraph 6.17. The CONTRACTOR may be allowed an increase in the Contract Price or an extension of the Contract Time, or both, to the extent that they are directly attributable to the existence of any underground utility that was not shown or indicated in the Contract Documents and which the CONTRACTOR could not reasonably have been expected to be aware of.

4.7 Survey Control:

The DEPARTMENT will identify sufficient horizontal and vertical control data to enable the CONTRACTOR to survey and layout the Work. All survey work shall be performed under the direct supervision of a registered land surveyor when required by paragraph 7.8. Copies of all survey notes shall be provided to the DEPARTMENT at an interval determined by the Project Manager. The Project Manager may request submission on a weekly or longer period at his discretion. Any variations between the Contract Documents and actual field conditions shall be identified in the survey notes.

ARTICLE 5 -BONDS, INSURANCE, AND INDEMNIFICATION

5.1 Delivery of Bonds:

When the CONTRACTOR delivers the executed Contract to the Contracting Officer, the CONTRACTOR shall also deliver to the Contracting Officer such bonds as the CONTRACTOR may be required to furnish in accordance with paragraph 5.2.

5.2 Bonds:

The CONTRACTOR shall furnish Performance and Payment Bonds, each in an amount as shown on the Contract as security for the faithful performance and payment of all CONTRACTOR's obligations under the Contract Documents. These bonds shall remain in effect for one year after the date of Final Acceptance and until all obligations under this Contract, except special guarantees as per 12.7, have been met. All bonds shall be furnished on forms provided by the DEPARTMENT (or copies thereof) and shall be executed by such Sureties as are authorized to do business in the State of Alaska. The Contracting Officer may at his option copy the Surety with notice of any potential default or liability.

5.3 Replacement of Bond and Surety:

If the Surety on any bond furnished in connection with this Contract is declared bankrupt or becomes insolvent or its right to do business is terminated in any state where any part of the Project is located or it ceases to meet the requirements of paragraph 5.2, or otherwise becomes unacceptable to the DEPARTMENT, or if any such Surety fails to furnish reports as to his financial condition as requested by the DEPARTMENT, the CONTRACTOR shall within five days thereafter substitute another bond and Surety, both of which must be acceptable to DEPARTMENT.

An individual Surety may be replaced by a corporate Surety during the course of the Contract period. If the Surety desires to dispose of the collateral posted, the DEPARTMENT may, at its option, accept substitute collateral.

5.4 Insurance Requirements:

5.4.1 The CONTRACTOR shall provide evidence of insurance with a carrier or carriers satisfactory to the DEPARTMENT covering injury to persons and/or property suffered by the State of Alaska or a third party, as a result of operations which arise both out of and during the course of this Contract by the CONTRACTOR or by any Subcontractor. This coverage will also provide protection against injuries to all employees of the CONTRACTOR and the employees of any Subcontractor engaged in Work under this Contract. The delivery to the DEPARTMENT of a written 30 day notice is required before cancellation of any coverage or reduction in any limits of liability. Insurance carriers shall have an acceptable financial rating.

5.4.2 The CONTRACTOR shall maintain in force at all times during the performance of the Work under this agreement the following policies and minimum limits of liability. Failure to maintain insurance may, at the option of the Contracting Officer, be deemed Defective Work and remedied in accordance with the Contract. Where specific limits and coverages are shown, it is understood that they shall be the minimum acceptable. The requirements of this paragraph shall not limit the CONTRACTOR's responsibility to indemnify under paragraph 5.5. Additional insurance requirements specific to this Contract are contained in the Supplementary Conditions, when applicable.

a. Workers' Compensation Insurance: The Contractor shall provide and maintain, for all employees of the Contractor engaged in work under this contract, Workers' Compensation Insurance as required by AS 23.30.045. The Contractor shall be responsible for Workers' Compensation Insurance for any subcontractor who provides services under this contract, to include:

1. Waiver of subrogation against the State and Employer's Liability Protection in the amount of \$500,000 each accident / \$500,000 each disease.

2. If the Contractor directly utilizes labor outside of the State of Alaska in the prosecution of the Work, "Other States" endorsement shall be required as a condition of the contract.
 3. Whenever the Work involves activity on or about navigable waters, the Workers' Compensation policy shall contain a United States Longshoreman's and Harbor Worker's Act endorsement, and when appropriate, a Maritime Employer's Liability (Jones Act) endorsement with a minimum limit of \$1,000,000.
- b. Comprehensive or Commercial General Liability Insurance: Such insurance shall cover all operations by or on behalf of the CONTRACTOR and provide insurance for bodily injury and property damage liability including coverage for:

Premises and operations; products and completed operations; contractual liability insuring obligations assumed under paragraph 5.5, Indemnification; broad form property damage; and personal injury liability.

The minimum limits of liability shall be:

1. If the CONTRACTOR carries a *Comprehensive General Liability* policy, the limits of liability shall not be less than a Combined Single Limit for bodily injury, property damage and Personal Injury Liability of:
\$1,000,000 each occurrence
\$2,000,000 aggregate
2. If the CONTRACTOR carries a *Commercial General Liability* policy, the limits of liability shall not be less than:

\$1,000,000 each occurrence (Combined Single Limit for bodily injury and property damage)
\$1,000,000 for Personal Injury Liability

\$2,000,000 aggregate for Products-Completed Operations
\$2,000,000 general aggregate

The State of Alaska, DEPARTMENT of Transportation and Public Facilities shall be named as an "Additional Insured" under all liability coverages listed above.

- c. Automobile Liability Insurance:
Such insurance shall cover all owned, hired and non-owned vehicles and provide coverage not less than that of the Business Automobile Policy in limits not less than the following:

\$1,000,000 each occurrence
(Combined Single Limit for bodily injury and property damage.)

- d. Builder's Risk Insurance:
Coverage shall be on an "All Risk" completed value basis including "quake and flood" and protect the interests of the DEPARTMENT, the CONTRACTOR and his Subcontractors. Coverage shall include all materials, supplies and equipment that are intended for specific installation in the Project while such materials, supplies and equipment are located at the Project site, in transit from port of arrival to job site and while temporarily located away from the Project site.

In addition to providing the above coverages the CONTRACTOR shall ensure that Subcontractors provide insurance coverages as noted in clauses a., b., and c. of this subparagraph. Builders Risk Insurance will only be required of subcontractors if so stated in the Supplementary Conditions.

- e. Other Coverages:
As specified in the Supplementary Conditions.

- 5.4.3 In addition to providing the above coverages the Contractor shall, in any contract or agreement with subcontractors performing work, require that all indemnities and waivers of subrogation it obtains, and that any stipulation to be named as an additional insured it obtains, also be extended to waive rights of subrogation against the State of Alaska and to add the State of Alaska as additional named indemnitee and as additional insured.

Evidence of insurance shall be furnished to the Department prior to the award of the contract. Such evidence, executed by the carrier's representative and issued to the Department, shall consist of a certificate of insurance or the policy declaration page with required endorsements attached thereto which denote the type, amount, class of operations covered, effective (and retroactive) dates, and dates of expiration. Acceptance by the Department of deficient evidence does not constitute a waiver of contract requirements.

When a certificate of insurance is furnished, it shall contain the following statement:

"This is to certify that the policies described herein comply with all aspects of the insurance requirements of (Project Name and Number)"

5.5 Indemnification:

The CONTRACTOR shall indemnify, save harmless, and defend the DEPARTMENT, its agents and its employees from any and all claims, actions, or liabilities for injuries or damages sustained by any person or property arising directly or indirectly from the construction or the CONTRACTOR's performance of this Contract; however, this provision has no effect if, but only if, the sole proximate cause of the injury or damage is the DEPARTMENT's negligence.

ARTICLE 6 - CONTRACTOR'S RESPONSIBILITIES

6.1 Supervision of Work:

The CONTRACTOR shall supervise and direct the Work competently and efficiently, devoting such attention thereto and applying such skills and expertise as may be necessary to perform the Work in accordance with the Contract Documents. All Work under this Contract shall be performed in a skillful and workmanlike manner. The CONTRACTOR shall be solely responsible for the means, methods, techniques, sequences and procedures of construction.

6.2 Superintendence by CONTRACTOR:

The CONTRACTOR shall keep on the Work at all times during its progress a competent resident superintendent. The Contracting Officer shall be advised in writing of the superintendent's name, local address, and telephone number. This written advice is to be kept current until Final Acceptance by the DEPARTMENT. The superintendent will be the CONTRACTOR's representative at the site and shall have full authority to act and sign documents on behalf of the CONTRACTOR.

All communications given to the superintendent shall be as binding as if given to the CONTRACTOR. The CONTRACTOR shall cooperate with the Contracting Officer in every way possible.

6.3 Character of Workers:

The CONTRACTOR shall provide a sufficient number of competent, suitably qualified personnel to survey and lay out the Work and perform construction as required by the Contract Documents. The CONTRACTOR shall at all times maintain good discipline and order at the site. The Contracting Officer may, in writing, require the CONTRACTOR to remove from the Work any employee the Contracting Officer deems incompetent, careless, or otherwise detrimental to the progress of the Work, but the Contracting Officer shall have no duty to exercise this right.

6.4 CONTRACTOR to Furnish:

Unless otherwise specified in the General Requirements, the CONTRACTOR shall furnish and assume full responsibility for all materials, equipment and machinery, tools, appliances, fuel, power, light, heat, telephone, water, sanitary facilities, temporary facilities and all other facilities and incidentals necessary for the furnishing, performance testing, start-up and completion of the Work.

6.5 Materials and Equipment:

All materials and equipment shall be of specified quality and new, except as otherwise provided in the Contract Documents. If required by the Contracting Officer, the CONTRACTOR shall furnish satisfactory evidence (including reports of required tests) as to the kind and quality of materials and equipment. All materials and equipment shall be applied, installed, connected, erected, used, cleaned, and conditioned in accordance with the instructions of the applicable Supplier except as otherwise provided in the Contract Documents; but no provision of any such instructions will be effective to assign to the DEPARTMENT or any of the DEPARTMENT's Consultants, agents or employees, any duty or authority to supervise or direct the furnishing or performance of the Work or any duty or authority to undertake responsibility contrary to the provisions of paragraphs 2.3 or 2.4.

6.6 Anticipated Schedules:

- 6.6.1 Within fourteen (14) calendar days after the date of the Notice to Proceed, the CONTRACTOR shall submit to the Contracting Officer for review an anticipated progress schedule indicating the starting and completion dates of the various stages of the Work. No individual stage of work shall exceed fourteen (14) calendar days.
- 6.6.2 Within twenty one (21) days after the date of the Notice to Proceed, the CONTRACTOR shall submit to the Contracting Officer for review an anticipated schedule of Shop Drawing submissions
- 6.6.3 Prior to submitting the CONTRACTOR's first Application for Payment, the CONTRACTOR shall submit for review and approval:

Anticipated Schedule of Values for all of the Work which will include quantities and prices of items aggregating the Contract Price and will subdivide the Work into component parts in sufficient detail to serve as the basis for progress payments during construction. Such prices will include an appropriate amount of overhead and profit applicable to each item of Work which will be confirmed in writing by the CONTRACTOR at the time of submission.

6.7 Finalizing Schedules:

Prior to processing the first Application for Payment the Contracting Officer and the CONTRACTOR will finalize schedules required by paragraph 6.6. The finalized progress schedule will be acceptable to the DEPARTMENT as providing information related to the orderly progression of the Work to completion within the Contract Time; but such acceptance will neither impose on the DEPARTMENT nor relieve the CONTRACTOR from full responsibility for the progress or scheduling of the Work. If accepted, the finalized schedule of Shop Drawing and other required submissions will be acknowledgment by the DEPARTMENT as providing a workable arrangement for processing the submissions. If accepted, the finalized Schedule of Values will be acknowledgment by the DEPARTMENT as an approximation of anticipated value of Work accomplished over the anticipated Contract Time. Receipt and acceptance of a schedule submitted by the CONTRACTOR shall not be construed to assign responsibility for performance or contingencies to the DEPARTMENT or relieve the CONTRACTOR of his responsibility to adjust his forces, equipment, and work schedules as may be necessary to insure completion of the Work within prescribed Contract Time. Should the prosecution of the Work be discontinued for any reason, the CONTRACTOR shall notify the Contracting Officer at least 24 hours in advance of resuming operations.

6.8 Adjusting Schedules:

Upon substantial changes to the schedule or upon request the CONTRACTOR shall submit to the Contracting Officer for acceptance (to the extent indicated in paragraph 6.7 and the General Requirements) adjustments in the schedules to reflect the actual present and anticipated progress of the Work.

6.9 Substitutes or "Or-Equal" Items:

- 6.9.1 Whenever materials or equipment are specified or described in the Contract Documents by using the name of a proprietary item or the name of a particular Supplier the naming of the item is intended to establish the type, function and quality required. Unless the name is followed by words indicating that substitution is limited or not permitted, materials or equipment of other Suppliers may be accepted by the Contracting Officer only if sufficient information is submitted by the CONTRACTOR which clearly demonstrates to the Contracting Officer that the material or equipment proposed is equivalent or equal in all aspects to that named. The procedure for review by the Contracting Officer will include the following as supplemented in the General Requirements.
- 6.9.2 Requests for review of substitute items of material and equipment will not be accepted by the Contracting Officer from anyone other than the CONTRACTOR.
- 6.9.3 If the CONTRACTOR wishes to furnish or use a substitute item of material or equipment, the CONTRACTOR shall make written application to the Contracting Officer for Approval thereof, certifying that the proposed substitute will perform adequately the functions and achieve the results called for by the general design, be similar and of equal substance to that specified and be suited to the same use as the specified. The application will state that the evaluation and Approval of the proposed substitute will not delay the CONTRACTOR's timely achievement of Substantial or Final Completion, whether or not acceptance of the substitute for use in the Work will require a change in any of the Contract Documents (or in the provisions of any other direct contract with the DEPARTMENT for Work on the Project) to adapt the design to the proposed substitute and whether or not incorporation or use of the substitute in connection with the Work is subject to payment of any license fee or royalty.
- 6.9.4 All variations of the proposed substitute from that specified will be identified in the application and available maintenance, repair and replacement service will be indicated. The application will also contain an itemized estimate of all costs that will result directly or indirectly from acceptance of such substitute, including costs of redesign and claims of other contractors affected by the resulting change, all of which shall be considered by the DEPARTMENT in evaluating the proposed substitute. The DEPARTMENT may require the CONTRACTOR to furnish at the CONTRACTOR's expense additional data about the proposed substitute. The Contracting Officer may reject any substitution request which the Contracting Officer determines is not in the best interest of the DEPARTMENT.
- 6.9.5 Substitutions shall be permitted during or after the bid period as allowed and in accordance with Document 00020- Invitation for Bids, Document 00700-General Conditions, and Document 01630- Product Options and Substitutions.

6.10 Substitute Means and Methods:

If a specific means, method, technique, sequence or procedure of construction is indicated in or required by the Contract Documents, the CONTRACTOR may furnish or utilize a substitute means, method, sequence, technique or procedure of construction acceptable to the Contracting Officer, if the CONTRACTOR submits sufficient information to allow the Contracting Officer to determine that the substitute proposed is equivalent to that indicated or required by the Contract Documents. The procedure for review by the Contracting Officer will be similar to that provided in paragraph 6.9 as applied by the Contracting Officer and as may be supplemented in the General Requirements.

6.11 Evaluation of Substitution:

The Contracting Officer will be allowed a reasonable time within which to evaluate each proposed substitute. The Contracting Officer will be the sole judge of acceptability, and no substitute will be ordered, installed or utilized without the Contracting Officer's prior written Approval which will be evidenced by either a Change Order or a Shop Drawing Approved in accordance with Sections 6.20 and 6.21. The Contracting Officer may require the CONTRACTOR to furnish at the CONTRACTOR's expense a special performance guarantee or other Surety with respect to any substitute.

6.12 Dividing the Work:

The divisions and sections of the Specifications and the identifications of any Drawings shall not control the CONTRACTOR in dividing the Work among Subcontractors or Suppliers or delineating the Work to be performed by any specific trade.

6.13 Subcontractors:

The CONTRACTOR may utilize the services of appropriately licensed Subcontractors on those parts of the Work which, under normal contracting practices, are performed by Subcontractors, in accordance with the following conditions:

- 6.13.1 The CONTRACTOR shall not award any Work to any Subcontractor without prior written Approval of the Contracting Officer. This Approval will not be given until the CONTRACTOR submits to the Contracting Officer a written statement concerning the proposed award to the Subcontractor which shall contain required Equal Employment Opportunity documents, evidence of insurance whose limits are acceptable to the CONTRACTOR, and an executed copy of the subcontract. All subcontracts shall contain provisions for prompt payment, release of retainage, and interest on late payment amounts and retainage as specified in A.S. 36.90.210. Contracts between subcontractors, regardless of tier, must also contain these provisions. No acceptance by the Contracting Officer of any such Subcontractor shall constitute a waiver of any right of the DEPARTMENT to reject Defective Work.
- 6.13.2 The CONTRACTOR shall be fully responsible to the DEPARTMENT for all acts and omissions of the Subcontractors, Suppliers and other persons and organizations performing or furnishing any of the Work under a direct or indirect contract with CONTRACTOR just as CONTRACTOR is responsible for CONTRACTOR's own acts and omissions.
- 6.13.3 All Work performed for CONTRACTOR by a Subcontractor will be pursuant to an appropriate written agreement between CONTRACTOR and the Subcontractor which specifically binds the Subcontractor to the applicable terms and conditions of the Contract Documents for the benefit of the DEPARTMENT and contains waiver provisions as required by paragraph 13.17 and termination provisions as required by Article 14.
- 6.13.4 Nothing in the Contract Documents shall create any contractual relationship between the DEPARTMENT and any such Subcontractor, Supplier or other person or organization, nor shall it create any obligation on the part of the DEPARTMENT to pay or to see to the payment of any moneys due any such Subcontractor, Supplier or other person or organization except as may otherwise be required by Regulatory Requirements. The DEPARTMENT will not undertake to settle any differences between or among the CONTRACTOR, Subcontractors, or Suppliers.
- 6.13.5 The CONTRACTOR and Subcontractors shall coordinate their work and cooperate with other trades so to facilitate general progress of Work. Each trade shall afford other trades every reasonable opportunity for installation of their work and storage of materials. If cooperative work of one trade must be altered due to lack of proper supervision or failure to make proper provisions in time by another trade, such conditions shall be remedied by the CONTRACTOR with no change in Contract Price or Contract Time.
- 6.13.6 The CONTRACTOR shall include on his own payrolls any person or persons working on this Contract who are not covered by written subcontract, and shall ensure that all Subcontractors include on their payrolls all persons performing Work under the direction of the Subcontractor.

6.14 Use of Premises:

The CONTRACTOR shall confine construction equipment, the storage of materials and equipment and the operations of workers to the Project limits and approved remote storage sites and lands and areas identified in and permitted by Regulatory Requirements, rights-of-way, permits and easements, and shall not unreasonably encumber the premises with construction equipment or other materials or equipment. The CONTRACTOR shall assume full responsibility for any damage to any such land or area, or to the owner or occupant thereof or of any land or areas contiguous thereto, resulting from the performance of the Work. Should any claim be made against the DEPARTMENT by any such owner or occupant because of the performance of the Work, the CONTRACTOR shall

hold the DEPARTMENT harmless.

6.15 Structural Loading:

The CONTRACTOR shall not load nor permit any part of any structure to be loaded in any manner that will endanger the structure, nor shall the CONTRACTOR subject any part of the Work or adjacent property to stresses or pressures that will endanger it.

6.16 Record Documents:

The CONTRACTOR shall maintain in a safe place at the site one record copy of all Drawings, Specifications, Addenda, Directives, Change Orders, Supplemental Agreements, and written interpretations and clarifications (issued pursuant to paragraph 3.6) in good order and annotated to show all changes made during construction. These record documents together with all Approved samples and a counterpart of all Approved Shop Drawings will be available to the Contracting Officer for reference and copying. Upon completion of the Work, the annotated record documents, samples and Shop Drawings will be delivered to the Contracting Officer. Record documents shall accurately record variations in the Work which vary from requirements shown or indicated in the Contract Documents.

6.17 Safety and Protection:

The CONTRACTOR alone shall be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the Work. The CONTRACTOR shall take all necessary precautions for the safety of, and shall provide the necessary protection to prevent damage, injury or loss to:

- 6.17.1 All employees on the Work and other persons and organizations who may be affected thereby;
- 6.17.2 All the Work and materials and equipment to be incorporated therein, whether in storage on or off the site; and
- 6.17.3 Other property at the site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures, and utilities not designated for removal, relocation or replacement in the course of construction.

The CONTRACTOR shall comply with all applicable Regulatory Requirements of any public body having jurisdiction for the safety of persons or property or to protect them from damage, injury or loss; and shall erect and maintain all necessary safeguards for such safety and protection. The CONTRACTOR shall notify owners of adjacent property and utility owners when prosecution of the Work may affect them, and shall cooperate with them in the protection, removal, relocation and replacement of their property. All damage, injury or loss to any property caused, directly or indirectly, in whole or in part, by the CONTRACTOR, any Subcontractor, Supplier or any other person or organization directly or indirectly employed by any of them to perform or furnish any of the Work or anyone for whose acts any of them may be liable, shall be remedied by the CONTRACTOR with no change in Contract Price or Contract Time except as stated in 4.6, except damage or loss attributable to unforeseeable causes beyond the control of and without the fault or negligence of the CONTRACTOR, including but not restricted to acts of God, of the public enemy or governmental authorities. The CONTRACTOR's duties and responsibilities for the safety and protection of the Work shall continue until Final Acceptance (except as otherwise expressly provided in connection with Substantial Completion).

6.18 Safety Representative:

The CONTRACTOR shall designate a responsible safety representative at the site. This person shall be the CONTRACTOR's superintendent unless otherwise designated in writing by the CONTRACTOR to the Contracting Officer.

6.19 Emergencies:

In emergencies affecting the safety or protection of persons or the Work or property at the site or adjacent thereto, the CONTRACTOR, without special instruction or authorization from the DEPARTMENT, is obligated to act to prevent threatened damage, injury or loss. The CONTRACTOR shall give the Contracting Officer prompt written

notice if the CONTRACTOR believes that any significant changes in the Work or variations from the Contract Documents have been caused thereby. If the DEPARTMENT determines that a change in the Contract Documents is required because of the action taken in response to an emergency, a change will be authorized by one of the methods indicated in Paragraph 9.2, as determined appropriate by the Contracting Officer.

6.20 Shop Drawings and Samples:

- 6.20.1 After checking and verifying all field measurements and after complying with applicable procedures specified in the General Requirements, the CONTRACTOR shall submit to the Contracting Officer for review and Approval in accordance with the accepted schedule of Shop Drawing submissions the required number of all Shop Drawings, which will bear a stamp or specific written indication that the CONTRACTOR has satisfied CONTRACTOR's responsibilities under the Contract Documents with respect to the review of the submission. All submissions will be identified as the Contracting Officer may require. The data shown on the Shop Drawings will be complete with respect to quantities, dimensions, specified performance and design criteria, materials and similar data to enable the Contracting Officer to review the information as required.
- 6.20.2 The CONTRACTOR shall also submit to the Contracting Officer for review and Approval with such promptness as to cause no delay in Work, all samples required by the Contract Documents. All samples will have been checked by and accompanied by a specific written indication that the CONTRACTOR has satisfied CONTRACTOR's responsibilities under the Contract Documents with respect to the review of the submission and will be identified clearly as to material, Supplier, pertinent data such as catalog numbers and the use for which intended.
- 6.20.3 Before submission of each Shop Drawing or sample the CONTRACTOR shall have determined and verified all quantities, dimensions, specified performance criteria, installation requirements, materials, catalog numbers and similar data with respect thereto and reviewed or coordinated each Shop Drawing or sample with other Shop Drawings and samples and with the requirements of the Work and the Contract Documents.
- 6.20.4 At the time of each submission the CONTRACTOR shall give the Contracting Officer specific written notice of each variation that the Shop Drawings or samples may have from the requirements of the Contract Documents, and, in addition, shall cause a specific notation to be made on each Shop Drawing submitted to the Contracting Officer for review and Approval of each such variation. All variations of the proposed Shop Drawing from that specified will be identified in the submission and available maintenance, repair and replacement service will be indicated. The submittal will also contain an itemized estimate of all costs that will result directly or indirectly from acceptance of such variation, including costs of redesign and claims of other Contractors affected by the resulting change, all of which shall be considered by the DEPARTMENT in evaluating the proposed variation. If the variation may result in a change of Contract Time or Price, or Contract responsibility, and is not minor in nature; the CONTRACTOR must submit a written request for Change Order with the variation to notify the DEPARTMENT of his intent. The DEPARTMENT may require the CONTRACTOR to furnish at the CONTRACTOR's expense additional data about the proposed variation. The Contracting Officer may reject any variation request which the Contracting Officer determines is not in the best interest of the DEPARTMENT.

6.21 Shop Drawing and Sample Review:

- 6.21.1 The Contracting Officer will review with reasonable promptness Shop Drawings and samples, but the Contracting Officer's review will be only for conformance with the design concept of the Project and for compliance with the information given in the Contract Documents and shall not extend to means, methods, techniques, sequences or procedures of construction (except where a specific means, method, technique, sequence or procedure of construction is indicated in or required by the Contract Documents) or to safety precautions or programs incident thereto. The review of a separate item as such will not indicate acceptance of the assembly in which the item functions. The CONTRACTOR shall make corrections required by the Contracting Officer and shall return the required number of corrected copies of Shop Drawings and submit as required new samples for review. The CONTRACTOR shall direct specific attention in writing to revisions other than the corrections called for by the Contracting Officer on previous submittals.
- 6.21.2 The Contracting Officer's review of Shop Drawings or samples shall not relieve CONTRACTOR from responsibility for any variation from the requirements of the Contract Documents unless the CONTRACTOR

has in writing advised the Contracting Officer of each such variation at the time of submission as required by paragraph 6.20.4. The Contracting Officer if he so determines, may give written Approval of each such variation by Change Order, except that, if the variation is minor and no Change Order has been requested a specific written notation thereof incorporated in or accompanying the Shop Drawing or sample review comments shall suffice as a modification. Approval by the Contracting Officer will not relieve the CONTRACTOR from responsibility for errors or omissions in the Shop Drawings or from responsibility for having complied with the provisions of paragraph 6.20.3.

6.21.3 The DEPARTMENT shall be responsible for all DEPARTMENT review costs resulting from the initial submission and the forms resubmittal. The CONTRACTOR shall, at the discretion of the Contracting Agency, pay all review costs incurred by the DEPARTMENT as a result of any additional re-submittals.

6.21.4 Where a Shop Drawing or ample is required by the Specifications, any related Work performed prior to the Contracting Officer's review and Approval of the pertinent submission will be the sole expense and responsibility of the CONTRACTOR.

6.22 Maintenance During Construction:

The CONTRACTOR shall maintain the Work during construction and until Substantial Completion, at which time the responsibility for maintenance shall be established in accordance with paragraph 13.10.

6.23 Continuing the Work:

The CONTRACTOR shall carry on the Work and adhere to the progress schedule during all disputes or disagreements with the DEPARTMENT. No Work shall be delayed or postponed pending resolution of any disputes, disagreements, or claims except as the CONTRACTOR and the Contracting Officer may otherwise agree in writing.

6.24 Consent to Assignment:

The CONTRACTOR shall obtain the prior written consent of the Contracting Officer to any proposed assignment of any interest in, or part of this Contract. The consent to any assignment or transfer shall not operate to relieve the CONTRACTOR or his Sureties of any of his or its obligations under this Contract or the Performance Bonds. Nothing herein contained shall be construed to hinder, prevent, or affect an assignment of monies due, or to become due hereunder, made for the benefit of the CONTRACTOR's creditors pursuant to law.

6.25 Use of Explosives:

6.25.1 When the use of explosives is necessary for the prosecution of the Work, the CONTRACTOR shall exercise the utmost care not to endanger life or property, including new Work and shall follow all Regulatory Requirements applicable to the use of explosives. The CONTRACTOR shall be responsible for all damage resulting from the use of explosives.

6.25.2 All explosives shall be stored in a secure manner in compliance with all Regulatory Requirements, and all such storage places shall be clearly marked. Where no Regulatory Requirements apply, safe storage shall be provided not closer than 1,000 feet from any building, camping area, or place of human occupancy.

6.25.3 The CONTRACTOR shall notify each public utility owner having structures in proximity to the site of his intention to use explosives. Such notice shall be given sufficiently in advance to enable utility owners to take such steps as they may deem necessary to protect their property from injury. However, the CONTRACTOR shall be responsible for all damage resulting from the use of the explosives, whether or not, utility owners act to protect their property.

6.26 CONTRACTOR's Records:

6.26.1 Records of the CONTRACTOR and Subcontractors relating to personnel, payrolls, invoices of materials, and any and all other data relevant to the performance of this Contract, must be kept on a generally recognized accounting system. Such records must be available during normal work hours to the Contracting Officer for purposes of investigation to ascertain compliance with Regulatory Requirements and provisions of the Contract

Documents.

- 6.26.2 Payroll records must contain the name and address of each employee, his correct classification, rate of pay, daily and weekly number of hours of work, deductions made, and actual wages paid. The CONTRACTOR and Subcontractors shall make employment records available for inspection by the Contracting Officer and representatives of the U.S. and/or State Department of Labor and will permit such representatives to interview employees during working hours on the Project.
- 6.26.3 Records of all communications between the DEPARTMENT and the CONTRACTOR and other parties, where such communications affected performance of this Contract, must be kept by the CONTRACTOR and maintained for a period of three years from Final Acceptance. The DEPARTMENT or its assigned representative may perform an audit of these records during normal work hours after written notice to the CONTRACTOR.

6.27 Load Restrictions

The CONTRACTOR shall comply with all load restrictions as set forth in the "Administrative Permit Manual", and Title 17, Chapter 25, of the Alaska Administrative Code in the hauling of materials on public roads, beyond the limits of the project, and on all public roads within the project limits that are scheduled to remain in use upon completion of the project.

Overload permits may, at the discretion of the State, be issued for travel beyond the project limits for purposes of mobilization and/or demobilization. Issuance of such a permit will not relieve the CONTRACTOR of liability for damage which may result from the moving of equipment.

The operation of equipment of such weight or so loaded as to cause damage to any type of construction will not be permitted. No overloads will be permitted on the base course or surface course under construction. No loads will be permitted on a concrete pavement, base or structure before the expiration of the curing period. The CONTRACTOR shall be responsible for ail damage done by his equipment.

ARTICLE 7- LAWS AND REGULATIONS

7.1 Laws to be Observed

The CONTRACTOR shall keep fully informed of all federal and state Regulatory Requirements and all orders and decrees of bodies or tribunals having any jurisdiction or authority, which in any manner affect those engaged or employed on the Work, or which in any way affect the conduct of the Work. The CONTRACTOR shall at all times observe and comply with all such Regulatory Requirements, orders and decrees; and shall protect and indemnify the DEPARTMENT and its representatives against claim or liability arising from or based on the violation of any such Regulatory Requirement, order, or decree whether by the CONTRACTOR, Subcontractor, or any employee of either. Except where otherwise expressly required by applicable Regulatory Requirements, the DEPARTMENT shall not be responsible for monitoring CONTRACTOR's compliance with any Regulatory Requirements.

7.2 Permits, Licenses, and Taxes

- 7.2.1 The CONTRACTOR shall procure all permits and licenses, pay all charges, fees and taxes, and give all notices necessary and incidental to the due and lawful prosecution of the Work. As a condition of performance of this Contract, the CONTRACTOR shall pay all federal, state and local taxes incurred by the CONTRACTOR, in the performance of this Contract. Proof of payment of these taxes is a condition precedent to final payment by the DEPARTMENT under this Contract.
- 7.2.2 The CONTRACTOR's certification that taxes have been paid (as contained in the *Release of Contract*) will be verified with the Department of Revenue and Department of Labor, prior to final payment.
- 7.2.3 If any federal, state or local tax is imposed, charged, or repealed after the date of bid opening and is made applicable to and paid by the CONTRACTOR on the articles or supplies herein contracted for, then the Contract shall be increased or decreased accordingly by a Change Order.

7.3 Patented Devices, Materials and Processes

If the CONTRACTOR employs any design, device, material, or process covered by letters of patent, trademark or copyright, the CONTRACTOR shall provide for such use by suitable legal agreement with the patentee or owner. The CONTRACTOR and the Surety shall indemnify and save harmless the DEPARTMENT, any affected third party, or political subdivision from any and all claims for infringement by reason of the use of any such patented design, device, material or process, or any trademark or copyright, and shall indemnify the DEPARTMENT for any costs, expenses, and damages which it may be obliged to pay by reason of any infringement, at any time during the prosecution or after the completion of the Work.

7.4 Compliance of Specifications and Drawings:

If the CONTRACTOR observes that the Specifications and Drawings supplied by the DEPARTMENT are at variance with any Regulatory Requirements, CONTRACTOR shall give the Contracting Officer prompt written notice thereof, and any necessary changes will be authorized by one of the methods indicated in paragraph 9.2. as determined appropriate by the Contracting Officer. If the CONTRACTOR performs any Work knowing or having reason to know that it is contrary to such Regulatory Requirements, and without such notice to the Contracting Officer, the CONTRACTOR shall bear all costs arising therefrom; however, it shall not be the CONTRACTOR's primary responsibility to make certain that the Specifications and Drawings supplied by the DEPARTMENT are in accordance with such Regulatory Requirements.

7.5 Accident Prevention:

The CONTRACTOR shall comply with AS 18.60.075 and all pertinent provisions of the Construction Code Occupational Safety and Health Standards issued by the Alaska Department of Labor.

7.6 Sanitary Provisions:

The CONTRACTOR shall provide and maintain in a neat and sanitary condition such accommodations for the use of his employees and DEPARTMENT representatives as may be necessary to comply with the requirements of the State and local Boards of Health, or of other bodies or tribunals having jurisdiction.

7.7 Business Registration:

Comply with AS 08.18.011, as follows: "it is unlawful for a person to submit a bid or work as a contractor until he has been issued a certificate of registration by the Department of Commerce. A partnership or joint venture shall be considered registered if one of the general partners or venturers whose name appears in the name under which the partnership or venture does business is registered."

7.8 Professional Registration and Certification:

All craft trades, architects, engineers and land surveyors, electrical administrators, and explosive handlers employed under the Contract shall specifically comply with applicable provisions of AS 08.18, 08.48, 08.40, and 08.52. Provide copies of individual licenses within seven days following a request from the Contracting Officer.

7.9 Local Building Codes:

The CONTRACTOR shall comply with AS 35.10.025 which requires construction in accordance with applicable local building codes to include the obtaining of required permits.

7.10 Air Quality Control:

The CONTRACTOR shall comply with all applicable provisions of AS 46.03.04 as pertains to Air Pollution Control.

7.11 Archaeological or Paleontological Discoveries:

When the CONTRACTOR's operation encounters prehistoric artifacts, burials, remains of dwelling sites, or paleontological remains, such as shell heaps, land or sea mammal bones or tusks, the CONTRACTOR shall cease operations immediately and notify the Contracting Officer. No artifacts or specimens shall be further disturbed or removed from the ground and no further operations shall be performed at the site until so directed. Should the Contracting Officer order suspension of the CONTRACTOR's operations in order to protect an archaeological or historical finding, or order the CONTRACTOR to perform extra Work, such shall be covered by an appropriate Contract change document.

7.12 Applicable Alaska Preferences:

- 7.12.1 In determining the low bidder for State funded projects, a 5% bid preference has been given to "Alaska bidders", as required under AS 36.30.170. "Alaska bidder" means a person who:
- (1) holds a current Alaska business license;
 - (2) submits a bid for goods, services, or construction under the name as appearing on the person's current Alaska business license
 - (3) has maintained a place of business within the state staffed by the bidder or an employee of the bidder for a period of six months immediately preceding the date of the bid;
 - (4) is incorporated or qualified to do business under the laws of the state, is a sole proprietorship, and the proprietor is a resident of the state or is a partnership, and all partners are residents of the state; and
 - (5) if a joint venture, is composed entirely of ventures that qualify under (1) through (4), above.
- 7.12.2 In determining the low bidder for State funded projects, an "Alaska products" preference has been given as required under AS 36.30.326 - 36.30.332, when the bidder designates the use of Alaska products. The Bidder shall complete the Alaska Products Preference Worksheet per its instructions and submit it with the Bid Proposal. If the successful Bidder/CONTRACTOR proposes to use an Alaska product and does not do so, a penalty will be assessed against the successful Bidder/CONTRACTOR in an amount equal to the product preference percentage granted to the successful Bidder/CONTRACTOR plus one percent multiplied by the total declared value of the Alaska products proposed but not used.
- 7.12.3 Pursuant to AS 36.15.050 and AS 36.30.322, "agricultural/wood" products harvested in Alaska shall be used in State funded projects whenever they are priced no more than seven percent above agricultural/wood products harvested outside the state and are of a like quality as compared with agricultural/wood products harvested outside the state, when such products are not utilized, the CONTRACTOR shall document the efforts he made towards obtaining agricultural/wood products harvested in Alaska and include in this documentation a written statement that he contacted the manufacturers and suppliers identified on the Department of Commerce and Economic Development's list of suppliers of Alaska forest products concerning the availability of agricultural/wood products harvested in Alaska and, if available, the product prices. The CONTRACTOR's use of agricultural/wood products that fail to meet the requirements of this section shall be subject to the provisions of paragraphs 12.6 through 12.9 relating to Defective Work.
- 7.12.4 The CONTRACTOR shall maintain records, in a format acceptable to the Contracting Officer, which establish the type and extent of "agricultural/wood" and "Alaska" products utilized. All record keeping and documentation associated with the requirements 7.12.2 and 7.12.3 of this paragraph must be provided to the DEPARTMENT upon written request or as otherwise provided within the Contract Documents.

7.13 Wages and Hours of Labor:

- 7.13.1 One certified copy of all payrolls shall be submitted weekly to the State Department of Labor and, upon request, to the Contracting Officer to assure compliance with AS 36.05.040, *Filing Schedule of Employees Wages Paid and Other Information*. The CONTRACTOR shall be responsible for the submission of certified copies of payrolls of all Subcontractors. The certification shall affirm that the payrolls are current and complete, that the wage rates contained therein are not less than the applicable rates referenced in these Contract Documents, and that the classification set forth for each laborer or mechanic conforms with the Work he performed. The CONTRACTOR and his Subcontractors shall attend all hearings and conferences and produce such books, papers, and documents all as requested by the Department of Labor. Should federal funds

be involved, the appropriate federal agency shall also receive a copy of the CONTRACTOR's certified payrolls. Regardless of project funding source, copies of all certified payrolls supplied to the State Department of Labor by the CONTRACTOR shall be supplied also to the Project Manager upon request, including submittals made by, or on behalf of, subcontractors.

7.13.2 The following labor provisions shall also apply to this Contract:

- a. The CONTRACTOR and his Subcontractors shall pay all employees unconditionally and not less than once a week;
- b. wages may not be less than those stated under AS 36.05.010, regardless of the contractual relationship between the CONTRACTOR or Subcontractors and laborers, mechanics, or field surveyors;
- c. the scale of wages to be paid shall be posted by the CONTRACTOR in a prominent and easily accessible place at the site of the Work;
- d. the DEPARTMENT shall withhold so much of the accrued payments as is necessary to pay to laborers, mechanics, or field surveyors employed by the CONTRACTOR or Subcontractors the difference between
 1. the rates of wages required by the Contract to be paid laborers, mechanics, or field surveyors on the Work, and
 2. the rates of wages in fact received by laborers, mechanics or field surveyors.

7.13.3 Within three calendar days of award of a construction contract, the CONTRACTOR shall file a "Notice of Work" with the Department of Labor and shall pay all related fees. The Contracting Officer will not issue Notice to Proceed to the CONTRACTOR until such notice and fees have been paid to the State Department of Labor. Failure of the CONTRACTOR to file the Notice of Work and pay fees within this timeframe shall not constitute grounds for an extension of contract time or adjustment of contract price.

7.14 Overtime Work Hours and Compensation:

Pursuant to 40 U.S.C. 327-330 and AS 23.10.060-.110, the CONTRACTOR shall not require nor permit any laborer or mechanic in any workweek in which he is employed on any Work under this Contract to work in excess of eight hours in any Calendar Day or in excess of forty hours in such workweek on Work subject to the provisions of the *Contract Work Hours and Safety Standards Act* unless such laborer or mechanic receives compensation at a rate not less than one and one half times his basic rate of pay for all such hours worked in excess of eight hours in any Calendar Day or in excess of forty hours in such workweek whichever is the greater number of overtime hours. In the event of any violation of this provision, the CONTRACTOR shall be liable to any affected employee for any amounts due and penalties and to the DEPARTMENT for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic employed in violation of this provision in the sum of \$10.00 for each Calendar Day on which such employee was required or permitted to be employed on such Work in excess of eight hours or in excess of the standard workweek of forty hours without payment of the overtime wages required by this paragraph.

ARTICLE 8 -OTHER WORK

8.1 Related Work at Site:

- 8.1.1 The DEPARTMENT reserves the right at any time to contract for and perform other or additional work on or near the Work covered by the Contract.
- 8.1.2 When separate contracts are let within the limits of the Project, the CONTRACTOR shall conduct his Work so as not to interfere with or hinder the Work being performed by other contractors. The CONTRACTOR when working on the same Project with other contractors shall cooperate with such other contractors. The CONTRACTOR shall join his Work with that of the others in an acceptable manner and shall perform it in

proper sequence to that of others.

- 8.1.3 If the fact that other such work is to be performed is identified or shown in the Contract Documents the CONTRACTOR shall assume all liability, financial or otherwise, in connection with this Contract and indemnify and save harmless the DEPARTMENT from any and all damages or claims that may arise because of inconvenience, delay, or loss experienced by the CONTRACTOR because of the presence and operations of other contractors.
- 8.1.4 If the fact that such other work is to be performed was not identified or shown in the Contract Documents, written notice thereof will be given to the CONTRACTOR prior to starting any such other work. If the CONTRACTOR believes that such performance will require an increase in Contract Price or Contract Time, the CONTRACTOR shall notify the Contracting Officer of such required increase within fifteen (15) calendar days following receipt of the Contracting Officer's notice. Should the Contracting Officer find such increase(s) to be justified, a Change Order will be executed.

8.2 Access, Cutting, and Patching:

The CONTRACTOR shall afford each utility owner and any other contractor who is a party to such a direct contract with the DEPARTMENT (or the DEPARTMENT, if the DEPARTMENT is performing the additional work with the DEPARTMENT's employees) proper and safe access to the site and a reasonable opportunity for the introduction and storage of materials and equipment and the execution of such work, and shall properly connect and coordinate the Work with the Work of others. The CONTRACTOR shall do all cutting, fitting and patching of the Work that may be required to make its several parts come together properly and integrate with such other work, the CONTRACTOR shall not endanger any work of others by cutting, excavating or otherwise altering their work and will only cut or alter such other work with the written consent of the Contracting Officer. The duties and responsibilities of the CONTRACTOR under this paragraph are for the benefit of other contractors to the extent that there are comparable provisions for the benefit of the CONTRACTOR in said direct contracts between the DEPARTMENT and other contractors.

8.3 Defective Work by Others:

If any part of the CONTRACTOR's Work depends for proper execution or results upon the Work of any such other contractor, utility owner, or the DEPARTMENT, the CONTRACTOR shall inspect and promptly report to the Contracting Officer in writing any delays, defects or deficiencies in such work that render it unavailable or unsuitable for such proper execution and results. The CONTRACTOR's failure to so report will constitute an acceptance of the other work as fit and proper for integration with CONTRACTOR's Work except for latent or nonapparent defects and deficiencies in the other work.

8.4 Coordination:

If the DEPARTMENT contracts with others for the performance of other work at the site, Contracting Officer will have authority and responsibility for coordination of the activities among the various prime contractors.

ARTICLE 9- CHANGES

9.1 DEPARTMENT's Right to Change:

Without invalidating the Contract and without notice to any Surety, the DEPARTMENT may, at any time or from time to time, order additions, deletions or revisions in the Work within the general scope of the Contract, including but not limited to changes:

- 9.1.1 In the Contract Documents;
- 9.1.2 In the method or manner of performance of the Work;
- 9.1.3 In State-furnished facilities, equipment, materials, services, or site;

9.1.4 Directing acceleration in the performance of the Work

9.2 Authorization of Changes within the General Scope:

Additions, deletions, or revisions in the Work within the general scope of the Contract as specified in 9.1 shall be authorized by one or more of following ways:

9.2.1 Directive (pursuant to paragraph 9.3)

9.2.2 A Change Order (pursuant to paragraph 9.4)

9.2.3 DEPARTMENT's acceptance of Shop Drawing variations from the Contract Documents as specifically identified by the CONTRACTOR as required by paragraph 6.20.4.

9.3 Directive:

9.3.1 The Contracting Officer shall provide written clarification or interpretation of the Contract Documents (Pursuant to paragraph 3.6).

9.3.2 The Contracting Officer may authorize minor variations in the Work from the requirements of the Contract Documents which do not involve an adjustment in the Contract Price or the Contract Time and are consistent with the overall intent of the Contract Documents.

9.3.3 The Contracting Officer may order the Contractor to correct Defective Work or methods which are not in conformance with the Contract Documents.

9.3.4 The Contracting Officer may direct the commencement or suspension of Work or emergency related Work (as provided in paragraph 6.19).

9.3.5 Upon the issuance of a Directive to the CONTRACTOR by the Contracting Officer, the CONTRACTOR shall proceed with the performance of the Work as prescribed by such Directive.

9.3.6 If the CONTRACTOR believes that the changes noted in a Directive may cause an increase in the Contract Price or an extension of Contract Time, the CONTRACTOR shall immediately provide written notice to the Contracting Officer depicting such increases before proceeding with the Directive, except in the case of an emergency. If the Contracting Officer finds the increase in Contract Price or the extension of Contract Time justified, a Change Order will be issued. If however, the Contracting Officer does not find that a Change Order is justified, the Contracting Officer may direct the CONTRACTOR to proceed with the Work. The CONTRACTOR shall cooperate with the Contracting Officer in keeping complete daily records of the cost of such Work. If a Change Order is ultimately determined to be justified, in the absence of agreed prices and unit prices, payment for such Work will be made on a "cost of the Work basis" as provided in 10.4

9.4 Change Order:

A change in Contract Time, Contract Price, or responsibility may be made for changes within the scope of the Work by Change Order. Upon receipt of an executed Change Order, the CONTRACTOR shall promptly proceed with the Work involved which will be performed under the applicable conditions of the Contract Documents except as otherwise specifically provided. Changes in Contract Price and Contract Time shall be made in accordance with Articles 10 and 11. A Change Order shall be considered executed when it is signed by the DEPARTMENT.

9.5 Shop Drawing Variations:

Variations by shop drawings shall only be eligible for consideration under 9.4 when the conditions affecting the price, time, or responsibility are identified by the CONTRACTOR in writing and a request for a Change Order is submitted as per 6.20.4.

9.6 Changes Outside the General Scope; Supplemental Agreement:

Any change which is outside the general scope of the Contract, as determined by the Contracting Officer, must be authorized by a Supplemental Agreement signed by the appropriate representatives of the DEPARTMENT and the CONTRACTOR.

9.7 Unauthorized Work:

The CONTRACTOR shall not be entitled to an increase in the Contract Price or an extension of the Contract Time with respect to any work performed that is not required by the Contract Documents as amended, modified and supplemented as provided in this Article 9, except in the case of an emergency as provided in paragraph 6.19 and except in the case of uncovering Work as provided in paragraph 12.4.2.

9.8 Notification of Surety:

If notice of any change affecting the general scope of the Work or the provisions of the Contract Documents (including, but not limited to, Contract Price or Contract Time) is required by the provisions of any bond to be given to a Surety, the giving of any such notice will be the CONTRACTOR's responsibility, and the amount of each applicable bond will be adjusted accordingly.

9.9 Differing Site Conditions:

9.9.1 The CONTRACTOR shall promptly, and before such conditions are disturbed (except in an emergency as permitted by paragraph 6.19), notify the Contracting Officer in writing of: (1) subsurface or latent physical conditions at the site differing materially from those indicated in the Contract, and which could not have been discovered by a careful examination of the site, or (2) unknown physical conditions at the site, of an unusual nature, differing materially from those ordinarily encountered and generally recognized as inherent in work of the character provided for in this Contract. The Contracting Officer shall promptly investigate the conditions, and if the Contracting Officer finds that such conditions do materially so differ and cause an increase or decrease in the CONTRACTOR's cost of, or time required for, performance of this Contract, an adjustment shall be made and the Contract modified in writing accordingly. An adjustment in compensation shall be computed under Article 10.

9.9.2 Any claim for additional compensation by the CONTRACTOR under this clause shall be made in accordance with Article 15. In the event that the Contracting Officer and the CONTRACTOR are unable to reach an agreement concerning an alleged differing site condition, the CONTRACTOR will be required to keep an accurate and detailed record which will indicate the actual "cost of the Work" done under the alleged differing site condition. Failure to keep such a record shall be a bar to any recovery by reason of such alleged differing site conditions. The Contracting Officer shall be given the opportunity to supervise and check the keeping of such records.

9.10 Interim Work Authorization:

An Interim Work Authorization may be used to establish a change within the scope of the Work; however, only a Change Order shall establish associated changes in Contract Time and Price. Work authorized by Interim Work Authorization shall be converted to a Change Order. The basis of payment shall be as stated in the Interim Work Authorization, unless it states that the basis of payment has not been established and is to be negotiated, in which case the Cost of the Work shall be documented pursuant to Article 10.4, to establish a basis for negotiating a lump sum price for the Change Order.

ARTICLE 10- CONTRACT PRICE; COMPUTATION AND CHANGE

10.1 Contract Price:

The Contract Price constitutes the total compensation (subject to authorized adjustments) payable to the

CONTRACTOR for performing the Work. All duties, responsibilities and obligations assigned to or undertaken by the CONTRACTOR shall be at his expense without change in the Contract Price. The Contract Price may only be changed by a Change Order or Supplemental Agreement.

10.2 Claim for Price Change:

Any claim for an increase or decrease in the Contract Price shall be submitted in accordance with the terms of Article 15, and shall not be allowed unless notice requirements of this Contract have been met.

10.3 Change Order Price Determination:

The value of any Work covered by a Change Order for an increase or decrease in the Contract Price shall be determined in one of the following ways:

- 10.3.1 Where the Work involved is covered by unit prices contained in the Contract Documents, by application of unit prices to the quantities of the items involved (subject to the provisions of subparagraphs 10.9.1 through 10.9.3, inclusive).
- 10.3.2 By mutual acceptance of a lump sum (fixed price) which includes overhead and profit. The lump sum (fixed price) shall be negotiated based on the estimated "cost of the Work" in accordance with Articles 10.4 and 10.5. The following maximum rates of cost markup (to cover both overhead and profit of the CONTRACTOR) shall be used in the negotiation of a Lump Sum Change Order:
 - a. For costs incurred under paragraphs 10.4.1 and 10.4.2, the CONTRACTOR's fee shall be twenty percent;
 - b. For costs incurred under paragraph 10.4.3, the CONTRACTOR's fee shall be ten percent; and if a subcontract is on the basis of "cost of the work" plus a fee, the maximum allowable to CONTRACTOR on account of overhead and profit for itself and all Subcontractors and multiple tiers thereof shall be fifteen percent of the cost incurred by the subcontractor actually performing the Work;
 - c. No fee shall be payable on the basis of costs itemized under paragraphs 10.4.4, 10.4.5 and 10.5;
 - d. The amount of credit to be allowed by the CONTRACTOR to the DEPARTMENT for any such change which results in a net decrease in cost will be the amount of the actual net decrease plus a deduction in CONTRACTOR's fee by an amount equal to twenty percent of the net decrease; and
 - e. When both additions and credits are involved in any one change, the adjustment in CONTRACTOR's fee shall be computed on the basis of the net change in accordance with paragraphs 10.3.2.a through 10.3.2.d, inclusive
- 10.3.3 When 10.3.1 and 10.3.2 are inapplicable, on the basis of the "cost of the Work" (determined as provided in paragraphs 10.4 and 10.5) plus a CONTRACTOR's fee for overhead and profit (determined as provided in paragraph 10.6).
- 10.3.4 Before a Change Order or Supplemental Agreement is Approved, the CONTRACTOR shall submit cost or pricing data regarding the changed or extra Work. The CONTRACTOR shall certify that the data submitted is, to his best knowledge and belief, accurate, complete and current as of a mutually determined specified date and that such data will continue to be accurate and complete during the performance of the changed or extra Work.

10.4 Cost of the Work:

The term "cost of the Work" means the sum of all costs necessarily incurred and paid by the CONTRACTOR in the proper performance of the Work. Except as otherwise may be agreed to in writing by the DEPARTMENT, such costs shall be in amount no higher than those prevailing in the locality of the Project, shall include only the following items and shall not include any of the costs itemized in subparagraph 10.5:

- 10.4.1 Payroll costs for employees in the direct employ of the CONTRACTOR in the performance of the Work under schedules of job classifications agreed upon by the DEPARTMENT and the CONTRACTOR. Payroll costs for employees not employed full time on the Work shall be apportioned on the basis of their time spent on the Work. Payroll costs shall be limited to, salaries and wages plus the cost of fringe benefits which shall include social security contributions, unemployment, excise and payroll taxes, workers' or workmen's compensation, health and retirement benefits, bonuses, sick leave, vacation and holiday pay applicable thereto. Such employees shall include manual workers up through the level of foreman but shall not include general foremen, superintendents, and non-manual employees. The expenses of performing Work after regular working hours, on Saturday, Sunday or legal holidays shall be included in the above to the extent authorized by the DEPARTMENT.
- 10.4.2 Cost of all materials and equipment furnished and incorporated or consumed in the Work, including costs of transportation and storage thereof, and Suppliers' field services required in connection therewith. All cash discounts shall accrue to the CONTRACTOR unless the DEPARTMENT deposits funds with the CONTRACTOR with which to make payments, in which case the cash discounts shall accrue to the DEPARTMENT. All trade discounts, rebates and refunds and all returns from sale of surplus materials and equipment shall accrue to the DEPARTMENT, and the CONTRACTOR shall make provisions so that they may be obtained.
- 10.4.3 Payments made by the CONTRACTOR to Subcontractors for Work performed by Subcontractors. If required by the DEPARTMENT, CONTRACTOR shall obtain competitive quotes from Subcontractors or Suppliers acceptable to the CONTRACTOR and shall deliver such quotes to the DEPARTMENT who will then determine which quotes will be accepted. If a subcontract provides that the Subcontractor is to be paid on the basis of "cost of the Work" plus a fee, the Subcontractor' "cost of the Work" shall be determined in the same manner as the CONTRACTOR's "cost of work" as described in paragraphs 10.4 through 10.5; and the Subcontractor's fee shall be established as provided for under subparagraph 10.6.2 clause b. All subcontracts shall be subject to the other provisions of the Contract Documents insofar as applicable.
- 10.4.4 Costs of special consultants (including but not limited to engineers, architects, testing laboratories, and surveyors) employed for services necessary for the completion of the Work.
- 10.4.5 Supplemental costs including the following:
- a. The proportion of necessary transportation, travel and subsistence expenses of the CONTRACTOR's employees incurred in discharge of duties connected with the Work.
 - b. Cost, including transportation and maintenance, of all materials, supplies, equipment, machinery, appliances, office and temporary facilities at the site and hand tools not owned by the Workers, which are consumed in the performance of the Work, and cost less market value of such items used but not consumed which remain the property of the CONTRACTOR.
 - c. Rentals of all construction equipment and machinery and the parts thereof whether rented from the CONTRACTOR or others in accordance with rental agreements Approved by the DEPARTMENT and the costs of transportation, loading, unloading, installation, dismantling and removal thereof- all in accordance with terms of said rental agreements. The rental of any such equipment, machinery or parts shall cease when the use thereof is no longer necessary for the Work.

For any machinery or special equipment (other than small tools) which has been authorized by the Project

Manager, the CONTRACTOR shall receive the rental rates in the current edition and appropriate volume of the

"Rental Rate Blue Book for Construction Equipment", published by Dataquest, Inc., 1290 Ridder Park Drive, San Jose, CA 95131. Hourly rental rates shall be determined as follows:

The established hourly rental rate shall be equal to the adjusted monthly rate for the basic equipment plus the adjusted monthly rate for applicable attachments, both divided by 176, and multiplied by the area adjustment factor, plus the estimated hourly operating cost.

The adjusted monthly rate is that resulting from application of the rate adjustment formula in order to eliminate replacement cost allowances in machine depreciation and contingency cost allowances.

Attachments shall not be included unless required for the time and materials work.

For equipment not listed in The Blue Book, the CONTRACTOR shall receive a rental rate as agreed upon before such work is begun. If agreement cannot be reached, the DEPARTMENT reserves the right to establish a rate based on similar equipment in the Blue Book or prevailing commercial rates in the area.

These rates shall apply for equipment used during the CONTRACTOR's regular shift of 10 hours per day. Where the equipment is used more than 10 hours per day, either on the CONTRACTOR's normal work or on time and materials, and either on single or multiple shifts, an overtime rate, computed as follows, shall apply:

The hourly overtime rate shall be equal to the adjusted monthly rate for the basic equipment plus the adjusted monthly rate for applicable attachments, both divided by 352, and multiplied by the area adjustment factor, plus the estimated hourly operating cost.

Equipment which must be rented or leased specifically for work required under this section shall be authorized in writing by the Project Manager. The CONTRACTOR shall be paid invoice price plus 15%.

When it is necessary to obtain equipment from sources beyond the project limits exclusively for time and materials, work, the actual cost of transferring the equipment to the site of the Work and return will be allowed as an additional item of expense. Where the move is made by common carrier, the move-in allowance will be limited to the amount of the freight bill or invoice. If the CONTRACTOR hauls the equipment with his own forces, the allowance will be limited to the rental rate for the hauling unit plus operator wages. In the event that the equipment is transferred under its own power, the moving allowance will be limited to one-half of the normal hourly rental rate plus operator's wages. In the event that the move-out is to a different location, payment will in no instance exceed the amount of the move-in. Move-in allowance shall not be made for equipment brought to the project for time and materials work which is subsequently retained on the project and utilized for completion of contract items, camp maintenance, or related work. .

Equipment ordered to be on a stand-by basis shall be paid for at the stand-by rental rate for the number of hours in the CONTRACTOR'S normal work shift, but not to exceed 8 hours per day. The stand-by rental rate shall be computed as follows:

The hourly stand-by rate shall be equal to the adjusted monthly rate for the basic equipment plus the adjusted monthly rate for applicable attachments, both divided by 352, all multiplied by the area adjustment factor.

Time will be recorded to the nearest one-quarter hour for purposes of computing compensation to the CONTRACTOR for equipment utilized under these rates.

The equipment rates as determined above shall be full compensation, including overhead and profit, for providing the required equipment and no additional compensation will be made for other costs such as, but not limited to, fuels, lubricants, replacement parts or maintenance costs. Cost of repairs, both major and minor, as well as charges for mechanic's time utilized in servicing equipment to ready it for use prior to moving to the project and similar charges will not be allowed.

d. Sales, consumer, use or similar taxes related to the Work, and for which the CONTRACTOR is liable, imposed

by Regulatory Requirements.

- e. Deposits lost for causes other than negligence of the CONTRACTOR, any Subcontractor or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, and royalty payments and fees for permits and licenses.
- f. Losses and damages (and related expenses), not compensated by insurance or otherwise, to the Work or otherwise sustained by the CONTRACTOR in connection with the performance and furnishing of the Work provided they have resulted from causes other than the negligence of the CONTRACTOR, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable. Such losses shall include settlements made with the written consent and Approval of the DEPARTMENT. No such losses, damages and expenses shall be included in the "cost of the Work" for the purpose of determining the CONTRACTOR's fee. If, however, any such loss or damage requires reconstruction and the CONTRACTOR is placed in charge thereof, the CONTRACTOR shall be paid for services a fee proportionate to that stated in paragraphs 10.6.2.a and 10.6.2.b.
- g. The cost of utilities, fuel and sanitary facilities at the site.
- h. Minor expenses such as telegrams, long distance telephone calls, telephone service at the site, expressage and similar petty cash items in connection with the Work.
- i. Cost of premiums for additional bonds and insurance required because of changes in the Work and premiums for property insurance coverage within the limits of the deductible amounts established by the DEPARTMENT in accordance with Article 5.

10.5 Excluded Costs:

The term "cost of the Work" shall not include any of the following:

- 10.5.1 Payroll costs and other compensation of CONTRACTOR's officers, executives, principals (of partnership and sole proprietorships), general managers, engineers, architects, estimators, attorneys, auditors, accountants, purchasing and contracting agency, expeditors, timekeepers, clerks and other personnel employed by CONTRACTOR whether at the site or in CONTRACTOR's principal or a branch office for general administration of the Work and not specifically included in the agreed upon schedule of job classifications referred to in paragraph 10.4.1 or specifically covered by paragraph 10.4.4 all of which are to be considered administrative costs covered by the CONTRACTOR's fee.
- 10.5.2 Expenses of CONTRACTOR's principal and branch offices other than CONTRACTOR's office at the site.
- 10.5.3 Any part of CONTRACTOR's capital expenses including interest on CONTRACTOR's capital employed for the Work and charges against CONTRACTOR for delinquent payments.
- 10.5.4 Cost of premiums for all bonds and for all insurance whether or not CONTRACTOR is required by the Contract Documents to purchase and maintain the same (except for the cost of premiums covered by subparagraph 10.4.5. 1 above).
- 10.5.5 Costs due to the negligence of CONTRACTOR, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, including but not limited to, the correction of Defective Work, disposal of materials or equipment wrongly supplied and making good any damage to property.
- 10.5.6 Other overhead or general expense costs of any kind and the costs of any item not specifically and expressly included in paragraph 10.4.

10.6 CONTRACTOR's Fee:

The CONTRACTOR's fee allowed to CONTRACTOR for overhead and profit shall be determined as follows.

- 10.6.1 A mutually acceptable fixed fee; or if none can be agreed upon.
- 10.6.2 A fee based on the following percentages of the various portions of the "cost of the Work":
 - a. For costs incurred under paragraphs 10.4.1 and 10.4.2, the CONTRACTOR's fee shall be fifteen percent;
 - b. For costs incurred under paragraph 10.4.3, the CONTRACTOR's fee shall be ten percent; and if a subcontract is on the basis of "cost of the Work" plus a fee, the maximum allowable to CONTRACTOR on account of overhead and profit for itself and all Subcontractors and multiple tiers thereof shall be fifteen percent of the cost incurred by the subcontractor actually performing the Work;
 - c. No fee shall be payable on the basis of costs itemized under paragraphs 10.4.4, 10.4.5 and 10.5;
 - d. The amount of credit to be allowed by the CONTRACTOR to the DEPARTMENT for any such change which results in a net decrease in cost will be the amount of the actual net decrease plus a deduction in CONTRACTOR's fee by an amount equal to fifteen percent of the net decrease; and
 - e. When both additions and credits are involved in any one change, the adjustment in CONTRACTOR's fee shall be computed on the basis of the net change in accordance with paragraphs 10.6.2.a through 10.6.2.d, inclusive.

10.7 Cost Breakdown:

Whenever the cost of any Work is to be determined pursuant to paragraphs 10.4 and 10.5, the CONTRACTOR will submit in a form acceptable to the DEPARTMENT an itemized cost breakdown together with supporting data.

10.8 Cash Allowances:

It is understood that CONTRACTOR has included in the Contract Price all allowances so named in the Contract Documents and shall cause the Work so covered to be done by such Subcontractors or Suppliers and for such sums within the limit of the allowances as may be acceptable to the Contracting Officer. CONTRACTOR agrees that:

- 10.8.1 The allowances include the cost to CONTRACTOR (less any applicable trade discounts) of materials and equipment required by the allowances to be delivered at the site, and all applicable taxes; and
- 10.8.2 CONTRACTOR's cost for unloading and handling on the site, labor, installation costs, overhead, profit and other expenses contemplated for the allowances have been included in the Contract Price and not in the allowances. No demand for additional payment on account of any thereof will be valid.

Prior to final payment, an appropriate Change Order will be issued to reflect actual amounts due the CONTRACTOR on account of Work covered by allowances, and the Contract Price shall be correspondingly adjusted.

10.9 Unit Price Work:

- 10.9.1 Where the Contract Documents provide that all or part of the Work is to be Unit Price Work, initially the Contract Price will be deemed to include for all Unit Price Work an amount equal to the sum of the established unit prices for each separately identified item of Unit Price Work times the estimated quantity of each item as indicated in the Contract. The estimated quantities of items of Unit Price Work are not guaranteed and are solely for the purpose of comparison of bids and determining an initial Contract Price. Determinations of the actual quantities and classifications of Unit Price Work performed by the CONTRACTOR will be made by the

DEPARTMENT in accordance with paragraph 10.10.

- 10.9.2 Each unit price will be deemed to include an amount considered by the CONTRACTOR to be adequate to cover the CONTRACTOR's overhead and profit for each separately identified item. If the "Basis of Payment" clause in the Contract Documents relating to any unit price in the bid schedule requires that the said unit price cover and be considered compensation for certain work or material essential to the item, this same work or material will not also be measured or paid for under any other pay item which may appear elsewhere in the Contract Documents.
- 10.9.3 Payment to the CONTRACTOR shall be made only for the actual quantities of Work performed and accepted or materials furnished, in conformance with the Contract Documents. When the accepted quantities of Work or materials vary from the quantities stated in the bid schedule, or change documents, the CONTRACTOR shall accept as payment in full, payment at the stated unit prices for the accepted quantities of Work and materials furnished, completed and accepted; except as provided below:
- a. When the quantity of Work to be done or material to be furnished under any item, for which the total cost of the item exceeds 10% of the total Contract Price, is increased by more than 25 percent of the quantity stated in the bid schedule, or change documents, either party to the Contract, upon demand, shall be entitled to an equitable unit price adjustment on that portion of the Work above 125 percent of the quantity stated in the bid schedule.
 - b. When the quantity of Work to be done or material to be furnished under any major item, for which the total cost of the item exceeds 10% of the total Contract Price, is decreased by more than 25 percent of the quantity stated in the bid schedule, or change documents either party to the Contract, upon demand, shall be entitled to an equitable price adjustment for the quantity of Work performed or material furnished, limited to a total payment of not more than 75 percent of the amount originally bid for the item.

10.10 Determinations for Unit Prices:

The Contracting Officer will determine the actual quantities and classifications of Unit Price Work performed by the CONTRACTOR. The Contracting Officer will review with the CONTRACTOR preliminary determinations on such matters before finalizing the costs and quantities on the Schedule of Values. The Contracting Officer's acknowledgment thereof will be final and binding on the CONTRACTOR, unless, within 10 days after the date of any such decisions, the CONTRACTOR delivers to the Contracting Officer written notice of intention to appeal from such a decision.

ARTICLE 11- CONTRACT TIME; COMPUTATION AND CHANGE

11.1 Commencement of Contract Time; Notice to Proceed:

The Contract Time will commence to run on the day indicated in the Notice to Proceed.

11.2 Starting the Work:

No Work on Contract items shall be performed before the effective date of the Notice to Proceed. The CONTRACTOR shall notify the Contracting Officer at least 24 hours in advance of the time actual construction operations will begin. The CONTRACTOR may request a limited Notice to Proceed after Award has been made, to permit them to order long lead materials which could cause delays in Project completion. However, granting is within the sole discretion of the Contracting Officer, and refusal or failure to grant a limited Notice to Proceed shall not be a basis for claiming for delay, extension of time, or alteration of price.

11.3 Computation of Contract Time:

- 11.3.1 When the Contract Time is specified on a Calendar Day basis, all Work under the Contract shall be completed within the number of Calendar Days specified. The count of Contract Time begins on the day following receipt of the Notice to Proceed by the CONTRACTOR, if no starting day is stipulated therein.

Calendar Days shall continue to be counted against Contract Time until and including the date of Substantial Completion of the Work.

11.3.2 When the Contract completion time is specified as a fixed calendar date, it shall be the date of Substantial Completion.

11.3.3 The Contract Time shall be as stated on form 25D-9, Proposal.

11.4 Time Change:

The Contract Time may only be changed by a Change Order or Supplemental Agreement.

11.5 Extension Due to Delays:

The right of the CONTRACTOR to proceed shall not be terminated nor the CONTRACTOR charged with liquidated or actual damages because of delays to the completion of the Work due to unforeseeable causes beyond the control and without the fault or negligence of the CONTRACTOR, including, but not restricted to the following: acts of God or of the public enemy, acts of the DEPARTMENT in its contractual capacity, acts of another contractor in the performance of a contract with the DEPARTMENT, floods, fires, epidemics, quarantine restrictions, strikes, freight embargoes, unusually severe weather and delays of Subcontractors or Suppliers due to such causes. Any delay in receipt of materials on the site, caused by other than one of the specifically mentioned occurrences above, does not of itself justify a time extension, provided that the CONTRACTOR shall within twenty four (24) hours from the beginning of any such delay (unless the Contracting Officer shall grant a further period of the time prior to the date of final settlement of the Contract), notify the Contracting Officer in writing of the cause of delay. The Contracting Officer shall ascertain the facts and the extent of the delay and extend the time for completing the Work when the findings of fact justify such an extension.

11.6 Essence of Contract:

All time limits stated in the Contract Documents are of the essence of the Contract.

11.7 Reasonable Completion Time:

It is expressly understood and agreed by and between the CONTRACTOR and the DEPARTMENT that the date of beginning and the time for Substantial Completion of the Work described herein are reasonable times for the completion of the Work.

11.8 Delay Damages:

Whether or not the CONTRACTOR's right to proceed with the Work is terminated, he and his Sureties shall be liable for damages resulting from his refusal or failure to complete the Work within the specified time.

Liquidated and actual damages for delay shall be paid by the CONTRACTOR or his Surety to the DEPARTMENT in the amount as specified in the Supplementary Conditions for each Calendar Day the completion of the Work or any part thereof is delayed beyond the time required by the Contract, or any extension thereof. If a listing of incidents resulting from a delay and expected to give rise to actual or liquidated damages is not established by the Contract Documents, then the CONTRACTOR and his Surety shall be liable to the DEPARTMENT for any actual damages occasioned by such delay. The CONTRACTOR acknowledges that the liquidated damages established herein are not a penalty but rather constitute an estimate of damages that the DEPARTMENT will sustain by reason of delayed completion. These liquidated and actual damages are intended as compensation for losses anticipated to arise, and include those items enumerated in the Supplementary Conditions.

These damages will continue to run both before and after termination in the event of default termination. These liquidated damages do not cover excess costs of completion or DEPARTMENT costs, fees, and charges related to repurchase. If a default termination occurs, the CONTRACTOR or his Surety shall pay in addition to these damages, all excess costs and expenses related to completion as provided by Article 14.2.5.

ARTICLE 12 - QUALITY ASSURANCE

12.1 Warranty and Guaranty:

The CONTRACTOR warrants and guarantees to the DEPARTMENT that all Work will be in accordance with the Contract Documents and will not be Defective. Prompt notice of all defects shall be given to the CONTRACTOR. All Defective Work, whether or not in place, may be rejected, corrected or accepted as provided for in this article.

12.2 Access to Work:

The DEPARTMENT and the DEPARTMENT's representatives, testing agencies and governmental agencies with jurisdiction interests will have access to the Work at reasonable times for their observation, inspecting and testing. The CONTRACTOR shall provide proper and safe conditions for such access.

12.3 Tests and Inspections:

- 12.3.1 The CONTRACTOR shall give the Contracting Officer timely notice of readiness of the Work for all required inspections, tests or Approvals.
- 12.3.2 If Regulatory Requirements of any public body having jurisdiction require any Work (or part thereof) to specifically be inspected, tested or approved, the CONTRACTOR shall assume full responsibility therefor, pay all costs in connection therewith and furnish the Contracting Officer the required certificates of inspection, testing or approval. The CONTRACTOR shall also be responsible for and shall pay all costs in connection with any inspection or testing required in connection with DEPARTMENT's acceptance of a Supplier of materials or equipment proposed to be incorporated in the Work, or of materials or equipment submitted for Approval prior to the CONTRACTOR's purchase thereof for incorporation in the Work. The cost of all inspections, tests and approvals in addition to the above which are required by the Contract Documents shall be paid by the CONTRACTOR. The DEPARTMENT may perform additional tests and inspections which it deems necessary to insure quality control. All such failed tests or inspections shall be at the CONTRACTOR's expense.
- 12.3.4 If any Work (including the Work of others) that is to be inspected, tested or approved is covered without written concurrence of the Contracting Officer, it must, if requested by the Contracting Officer, be uncovered for observation. Such uncovering shall be at the CONTRACTOR's expense unless the CONTRACTOR has given the Contracting Officer timely notice of CONTRACTOR's intention to cover the same and the Contracting Officer has not acted with reasonable promptness in response to such notice.
- 12.3.5 Neither observations nor inspections, tests or Approvals by the DEPARTMENT or others shall relieve the CONTRACTOR from the CONTRACTOR's obligations to perform the Work in accordance with the Contract Documents.

12.4 Uncovering Work:

- 12.4.1 If any Work is covered contrary to the written request of the Contracting Officer, it must, if requested by the Contracting Officer, be uncovered for the Contracting Officer's observation and replaced at the CONTRACTOR's expense.
- 12.4.2 If the Contracting Officer considers it necessary or advisable that covered Work be observed inspected or tested, the CONTRACTOR, at the Contracting Officer's request, shall uncover, expose or otherwise make available for observation, inspection or testing as the Contracting Officer may require, that portion of the Work in question, furnishing all necessary labor, material and equipment. If it is found that such Work is Defective, the CONTRACTOR shall bear all direct, indirect and consequential costs of such uncovering, exposure, observation, inspection and testing and of satisfactory reconstruction, (including but not limited to fees and charges of engineers, architects, attorneys and other professionals) and the DEPARTMENT shall be entitled to an appropriate decrease in the Contract Price. If, however, such Work is not found to be Defective, the CONTRACTOR shall be allowed an increase in the Contract Price or an extension of the Contract Time, or both, directly attributable to such uncovering, exposure, observation, inspection, testing and reconstruction.

12.5 DEPARTMENT May Stop the Work:

If the Work is Defective, or the CONTRACTOR fails to supply suitable materials or equipment, or fails to furnish or perform the Work in such a way that the completed Work will conform to the Contract Documents, the Contracting Officer may order the CONTRACTOR to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, this right of the Contracting Officer to stop the Work shall not give rise to any duty on the part of the Contracting Officer to exercise this right for the benefit of the CONTRACTOR or any other party.

12.6 Correction or Removal of Defective Work:

If required by the Contracting Officer, the CONTRACTOR shall promptly, as directed, either correct all Defective Work, whether or not fabricated, installed or completed, or, if the Work has been rejected by the Contracting Officer, remove it from the site and replace it with Work which conforms to the requirements of the Contract Documents. The CONTRACTOR shall bear all direct, indirect and consequential costs of such correction or removal (including but not limited to fees and charges of engineers, architects, attorneys and other-professionals) made necessary thereby.

12.7 One Year Correction Period:

If within one year after the date of Substantial Completion of the relevant portion of the Work or such longer period of time as may be prescribed by Regulatory Requirements or by the terms of any applicable special guarantee required by the Contract Documents or by any specific provision of the Contract Documents, any Work is found to be Defective, the CONTRACTOR shall promptly, without cost to the DEPARTMENT and in accordance with the Contracting Officer's written instructions, either correct such Defective Work, or, if it has been rejected by the Contracting Officer, remove it from the site and replace it with conforming Work. If the CONTRACTOR does not promptly comply with the terms of such instructions, or in an emergency where delay would cause serious risk of loss or damage, the DEPARTMENT may have the Defective Work corrected or the rejected Work removed and replaced, and all direct, indirect and consequential costs of such removal and replacement (including but not limited to fees and charges of engineers, architects, attorneys and other professionals) will be paid by the CONTRACTOR. In special circumstances where a particular item of equipment is placed in continuous service for the benefit of the DEPARTMENT before Substantial Completion of all the Work, the correction period for that item may begin on an earlier date if so provided in the Specifications or by Change Order. Provisions of this paragraph are not intended to shorten the statute of limitations for bringing an action.

12.8 Acceptance of Defective Work:

Instead of requiring correction or removal and replacement of Defective Work, the Contracting Officer may accept Defective Work, the CONTRACTOR shall bear all direct, indirect and consequential costs attributable to the Contracting Officer's evaluation of and determination to accept such Defective Work (costs to include but not be limited to fees and charges of engineers, architects, attorneys and other professionals). If any such acceptance occurs prior to final payment, a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the Work; and the DEPARTMENT shall be entitled to an appropriate decrease in the Contract Price. If the DEPARTMENT has already made final payment to the CONTRACTOR, an appropriate amount shall be paid by the CONTRACTOR or his Surety to the DEPARTMENT.

12.9 DEPARTMENT May Correct Defective Work:

If the CONTRACTOR fails within a reasonable time after written notice from the Contracting Officer to proceed to correct Defective Work or to remove and replace rejected Work as required by the Contracting Officer in accordance with paragraph 12.6, or if the CONTRACTOR fails to perform the Work in accordance with the Contract Documents, or if the CONTRACTOR fails to comply with any other provision of the Contract Documents, the DEPARTMENT may, after 7 days' written notice to the CONTRACTOR, correct and remedy any such deficiency. In exercising the rights and remedies under this paragraph the DEPARTMENT shall proceed expeditiously. To the extent necessary to complete corrective and remedial action, the Contracting Officer may exclude the CONTRACTOR from all or part of the site, take possession of all or part of the Work, and suspend the CONTRACTOR's services related thereto, take possession of the CONTRACTOR's tools, appliances, construction equipment and machinery at the site and incorporate in the Work all materials-and equipment stored at the site or

approved remote storage sites or for which the DEPARTMENT has paid the CONTRACTOR but which are stored elsewhere. The CONTRACTOR shall allow the Contracting Officer and his authorized representatives such access to the site as may be necessary to enable the Contracting Officer to exercise the rights and remedies under this paragraph. All direct, indirect and consequential costs of the DEPARTMENT in exercising such rights and remedies will be charged against the CONTRACTOR, and a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the Work; and the DEPARTMENT shall be entitled to an appropriate decrease in the Contract Price. Such direct, indirect and consequential costs will include but not be limited to fees and charges of engineers, architects, attorneys and other professionals, all court and arbitration costs and all costs of repair and replacement of work of others destroyed or damaged by correction, removal or replacement of the CONTRACTOR's Defective Work. The CONTRACTOR shall not be allowed an extension of time because of any delay in performance of the Work attributable to the exercise, by the Contracting Officer, of the DEPARTMENT's rights and remedies hereunder.

ARTICLE 13 -PAYMENTS TO CONTRACTOR AND COMPLETION

13.1 Schedule of Values:

The Schedule of Values established as provided in paragraph 6.6 will serve as the basis for progress payments and will be incorporated into a form of Application for Payment acceptable to the Contracting Officer. Progress payments on account of Unit Price Work will be based on the number of units completed.

13.2 Preliminary Payments:

Upon approval of the Schedule of Values the CONTRACTOR may be paid for direct costs substantiated by paid invoices and other prerequisite documents required by the General Requirements. Direct costs shall include the cost of bonds, insurance, approved materials stored on the site or at approved remote storage sites, deposits required by a Supplier prior to fabricating materials, and other approved direct mobilization costs substantiated as indicated above. These payments shall be included as a part of the total Contract Price as stated in the Contract.

13.3 Application for Progress Payment:

The CONTRACTOR shall submit to the Contracting Officer for review an Application for Payment filled out and signed by the CONTRACTOR covering the Work completed as of the date of the Application for Payment and accompanied by such supporting documentation as is required by the Contract Documents. Progress payments will be made as the Work progresses on a monthly basis.

13.4 Review of Applications for Progress Payment:

Contracting Officer will either indicate in writing a recommendation of payment or return the Application for Payment to the CONTRACTOR indicating in writing the Contracting Officer's reasons for refusing to recommend payment. In the latter case, the CONTRACTOR may make the necessary corrections and resubmit the Application for Payment.

13.5 Stored Materials and Equipment:

If payment is requested on the basis of materials and equipment not incorporated in the Work but delivered and suitably stored at the site or at another location agreed to in writing, the Application for Payment shall also be accompanied by a bill of sale, paid invoice or other documentation warranting that the DEPARTMENT has received the materials and equipment free and clear of all charges, security interests and encumbrances and evidence that the materials and equipment are covered by appropriate property insurance and other arrangements to protect the DEPARTMENT's interest therein, all of which will be Satisfactory to the Contracting Officer. No payment will be made for perishable materials that could be rendered useless because of long storage periods. No progress payment will be made for living plant materials until planted.

13.6 CONTRACTOR's Warranty of Title:

The CONTRACTOR warrants and guarantees that title to all Work, materials and equipment covered by any
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Application for Payment, whether incorporated in the Project or not, will pass to the DEPARTMENT no later than the time of payment free and clear of any claims, liens, security interests and further obligations.

13.7 Withholding of Payments:

The DEPARTMENT may withhold or refuse payment for any of the reasons listed below provided it gives written notice of its intent to withhold and of the basis for withholding:

- 13.7.1 The Work is Defective, or completed Work has been damaged requiring correction or replacement, or has been installed without Approval of Shop Drawings, or by an unapproved Subcontractor, or for unsuitable storage of materials and equipment.
- 13.7.2 The Contract Price has been reduced by Change Order,
- 13.7.3 The DEPARTMENT has been required to correct Defective Work or complete Work in accordance with paragraph 12.9.
- 13.7.4 The DEPARTMENT's actual knowledge of the occurrence of any of the events enumerated in paragraphs 14.2.l. a through 14.2.1.k inclusive.
- 13.7.5 Claims have been made against the DEPARTMENT or against the funds held by the DEPARTMENT on account of the CONTRACTOR's actions or inactions in performing this Contract, or there are other items entitling the DEPARTMENT to a set off.
- 13.7.6 Subsequently discovered evidence or the results of subsequent inspections or test, nullify any previous payments for reasons stated in subparagraphs 13.7.1 through 13.7.5.
- 13.7.7 The CONTRACTOR has failed to fulfill or is in violation of any of his obligations under any provision of this Contract.

13.8 Retainage:

At any time the DEPARTMENT finds that satisfactory progress is not being made it may in addition to the amounts withheld under 13.7 retain a maximum amount equal to 10% of the total amount earned on all subsequent progress payments. This retainage may be released at such time as the Contracting Officer finds that satisfactory progress is being made.

13.9 Request for Release of Funds:

If the CONTRACTOR believes the basis for withholding is invalid or no longer exists, immediate written notice of the facts and Contract provisions on which the CONTRACTOR relies, shall be given to the DEPARTMENT, together with a request for release of funds and adequate documentary evidence proving that the problem has been cured. In the case of withholding which has occurred at the request of the Department of Labor, the CONTRACTOR shall provide a letter from the Department of Labor stating that withholding is no longer requested. Following such a submittal by the CONTRACTOR, the DEPARTMENT shall have a reasonable time to investigate and verify the facts and seek additional assurances before determining whether release of withheld payments is justified.

13.10 Substantial Completion:

When the CONTRACTOR considers the Work ready for its intended use the CONTRACTOR shall notify the Contracting Officer in writing that the Work or a portion of Work which has been specifically identified in the Contract Documents is substantially complete (except for items specifically listed by the CONTRACTOR as incomplete) and request that the DEPARTMENT issue a certificate of Substantial Completion. Within a reasonable time thereafter, the Contracting Officer, the CONTRACTOR and appropriate Consultant(s) shall make an inspection of the Work to determine the status of completion. If the Contracting Officer does not consider the Work substantially complete, the Contracting Officer will notify the CONTRACTOR in writing giving the reasons therefor. If the Contracting Officer considers the Work substantially complete, the Contracting Officer will within fourteen days execute and deliver to the CONTRACTOR a certificate of Substantial Completion with tentative list of items to be

completed or corrected. At the time of delivery of the certificate of Substantial Completion the Contracting Officer will deliver to the CONTRACTOR a written division of responsibilities pending Final Completion with respect to security, operation, safety, maintenance, heat, utilities, insurance and warranties which shall be consistent with the terms of the Contract Documents.

The DEPARTMENT shall be responsible for all DEPARTMENT costs resulting from the initial inspection and the first re-inspection, the CONTRACTOR shall pay all costs incurred by the DEPARTMENT resulting from re-inspections, thereafter.

13.11 Access Following Substantial Completion:

The DEPARTMENT shall have the right to exclude the CONTRACTOR from the Work after the date of Substantial Completion, but the DEPARTMENT shall allow CONTRACTOR reasonable access to complete or correct items on the tentative list.

13.12 Final Inspection:

Upon written notice from the CONTRACTOR that the entire Work or an agreed portion thereof is complete, the Contracting Officer will make a final inspection with the CONTRACTOR and appropriate Consultant(s) and will notify the CONTRACTOR in writing of all particulars in which this inspection reveals that the Work is incomplete or Defective. The CONTRACTOR shall immediately take such measures as are necessary to remedy such deficiencies. The CONTRACTOR shall pay for all costs incurred by the DEPARTMENT resulting from re-inspections.

13.13 Final Completion and Application for Payment:

After the CONTRACTOR has completed all such corrections to the satisfaction of the Contracting Officer and delivered all schedules, guarantees, bonds, certificates of payment to all laborers, Subcontractors and Suppliers, and other documents - all as required by the Contract Documents; and after the Contracting Officer has indicated in writing that the Work has met the requirements for Final Completion, and subject to the provisions of paragraph 13.18, the CONTRACTOR may make application for final payment following the procedure for progress payments. The final Application for Payment shall be accompanied by all remaining certificates, warranties, guarantees, releases, affidavits, and other documentation required by the Contract Documents.

13.14 Final Payment:

- 13.14.1 If on the basis of the Contracting Officer's observation of the Work during construction and final inspection, and the Contracting Officer's review of the final Application for Payment and accompanying documentation- all as required by the Contract Documents; and the Contracting Officer is satisfied that the Work has been completed and the CONTRACTOR's other obligations under the Contract Documents have been fulfilled, the DEPARTMENT will process final Application for Payment. Otherwise, the Contracting Officer will return the Application for Payment to the CONTRACTOR, indicating in writing the reasons for refusing to process final payment, in which case the CONTRACTOR shall make the necessary corrections and resubmit the final Application for Payment.
- 13.14.2 If, through no fault of the CONTRACTOR, Final Completion of the Work is significantly delayed, the Contracting Officer shall, upon receipt of the CONTRACTOR's final Application for Payment, and without terminating the Contract, make payment of the balance due for that portion of the Work fully completed and accepted. If the remaining balance to be held by the DEPARTMENT for Work not fully completed or corrected is less than the retainage provided for in paragraph 13.9, and if bonds have been furnished as required in paragraph 5.1, the written consent of the Surety to the payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by the CONTRACTOR to the DEPARTMENT with the application for such payment. Such payment shall be made under the terms and conditions governing final payment, except that it shall not constitute a waiver of claims.

13.15 Final Acceptance:

Following certification of payment of payroll and revenue taxes, and final payment to the CONTRACTOR, the

DEPARTMENT will issue a letter of Final Acceptance, releasing the CONTRACTOR from further obligations under the Contract, except as provided in paragraph 13.17.

13.16 CONTRACTOR's Continuing Obligation:

The CONTRACTOR's obligation to perform and complete the Work and pay all laborers, Subcontractors, and materialmen in accordance with the Contract Documents shall be absolute. Neither any progress or final payment by the DEPARTMENT, nor the issuance of a certificate of Substantial Completion, nor any use or occupancy of the Work or any part thereof by the DEPARTMENT or Using Agency, nor any act of acceptance by the DEPARTMENT nor any failure to do so, nor any review and Approval of a Shop Drawing or sample submission, nor any correction of Defective Work by the DEPARTMENT will constitute an acceptance of Work not in accordance with the Contract Documents or a release of the CONTRACTOR's obligation to perform the Work in accordance with the Contract Documents.

When it is anticipated that restarting, testing, adjusting, or balancing of systems will be required following Final Acceptance and said requirements are noted in Section(s) 01650, such Work shall constitute a continuing obligation under the Contract.

13.17 Waiver of Claims by CONTRACTOR:

The making and acceptance of final payment will constitute a waiver of all claims by the CONTRACTOR against the DEPARTMENT other than those previously made in writing and still unsettled.

13.18 No Waiver of Legal Rights:

The DEPARTMENT shall not be precluded or be estopped by any payment, measurement, estimate, or certificate made either before or after the completion and acceptance of the Work and payment therefor, from showing the true amount and character of the Work performed and materials furnished by the CONTRACTOR, nor from showing that any payment, measurement, estimate or certificate is untrue or is incorrectly made, or that the Work or materials are Defective. The DEPARTMENT shall not be precluded or estopped, notwithstanding any such measurement, estimate, or certificate and payment in accordance therewith, from recovering from the CONTRACTOR or his Sureties, or both, such damages as it may sustain by reason of his failure to comply with requirements of the Contract Documents. Neither the acceptance by the DEPARTMENT, or any representative of the DEPARTMENT, nor any payment for or acceptance of the whole or any part of the Work, nor any extension of the Contract Time, nor any possession taken by the DEPARTMENT, shall operate as a waiver of any portion of the Contract or of any power herein reserved, or of any right to damages. A waiver by the DEPARTMENT of any breach of the Contract shall not be held to be a waiver of any other subsequent breach.

ARTICLE 14- SUSPENSION OF WORK, DEFAULT AND TERMINATION

14.1 DEPARTMENT May Suspend Work:

- 14.1.1 The DEPARTMENT may, at any time, suspend the Work or any portion thereof by notice in writing to the CONTRACTOR. If the Work is suspended without cause the CONTRACTOR shall be allowed an increase in the Contract Price or an extension of the Contract Time, or both, directly attributable to any suspension if the CONTRACTOR makes an Approved claim therefor as provided in Article 15. However, no adjustment shall be made under this clause for any suspension, delay, or interruption to the extent that suspension is due to the fault or negligence of the CONTRACTOR, or that suspension is necessary for Contract compliance, or that performance would have been so suspended, delayed, or interrupted by any other cause, including the fault or negligence of the CONTRACTOR.
- 14.1.2 In case of suspension of Work, the CONTRACTOR shall be responsible for preventing damage to or loss of any of the Work already performed and of all materials whether stored on or off the site or Approved remote storage sites.

14.2 Default of Contract:

- 14.2.1 The Contracting Officer may give the CONTRACTOR and its surety a written Notice to Cure Default if the CONTRACTOR:

- a. fails to begin work in the time specified,
 - b. fails to use sufficient resources to assure prompt completion of the Work,
 - c. performs the Work unsuitably or neglects or refuses to remove and replace rejected materials or work,
 - d. stops work,
 - e. fails to resume stopped work after receiving notice to do so,
 - f. becomes insolvent (except that if the CONTRACTOR declares bankruptcy, termination will be under Title 11 US Code 362 and/or 365. The CONTRACTOR'S bankruptcy does not relieve the surety of any obligations to assume the Contract and complete the Work in a timely manner.
 - g. Allows any final judgment to stand against him unsatisfied for period of 60 days, or
 - h. Makes an assignment for the benefit of creditors without the consent of the Contracting Officer, or
 - i. Disregards Regulatory Requirements of any public body having jurisdiction, or
 - j. Otherwise violates in any substantial way any provisions of the Contract Documents, or
 - k. fails to comply with Contract minimum wage payments or civil rights requirements, or
 - l. is a party to fraud, deception, misrepresentation, or
 - m. for any cause whatsoever, fails to carry on the Work in an acceptable manner.
- 14.2.2 The Notice to Cure Default will detail the conditions determined to be in default, the time within which to cure the default and may, in the Contracting Officer's discretion, specify the actions necessary to cure the default. Failure to cure the delay, neglect or default within the time specified in the Contracting Officer's written notice to cure authorizes the DEPARTMENT to terminate the contract. The Contracting Officer may allow more time to cure than originally stated in the Notice to Cure Default if he deems it to be in the best interests of the DEPARTMENT. The DEPARTMENT will provide the CONTRACTOR or its surety with a written Notice of Default Termination that details the default and the failure to cure it.
- 14.2.3 If the CONTRACTOR or its Surety, within the time specified in the above notice of default, shall not proceed in accordance therewith, then the DEPARTMENT may, upon written notification from the Contracting Officer of the fact of such delay, neglect or default and the CONTRACTOR's failure to comply with such notice, have full power and authority without violating the Contract, to take the prosecution of the Work out of the hands of the CONTRACTOR. The DEPARTMENT may terminate the services of the CONTRACTOR, exclude the CONTRACTOR from the site and take possession of the Work and of all the CONTRACTOR's tools, appliances, construction equipment and machinery at the site and use the same to the full extent they could be used by the CONTRACTOR (without liability to the CONTRACTOR for trespass or conversion), incorporate in the Work all materials and equipment stored at the site or for which the DEPARTMENT has paid the CONTRACTOR but which are stored elsewhere, and finish the Work as the DEPARTMENT may deem expedient. The DEPARTMENT may enter into an agreement for the completion of said Contract according to the terms and provisions thereof, or use such other methods that in the opinion of the Contracting Officer are required for the completion of said Contract in an acceptable manner.
- 14.2.4 The Contracting Officer may, by written notice to the CONTRACTOR and its Surety or its representative, transfer the employment of the Work from the CONTRACTOR to the Surety, or if the CONTRACTOR abandons the Work undertaken under the Contract, the Contracting Officer may, at its option with written notice to the Surety and without any written notice to the CONTRACTOR, transfer the employment for said Work directly to the Surety. The Surety shall submit its plan for completion of the Work, including any contracts or agreements with third parties for such completion, to the DEPARTMENT for approval prior to beginning completion of the Work. Approval of such contracts shall be in accordance with all applicable requirements and procedures for approval of subcontracts as stated in the Contract Documents.
- 14.2.5 After the notice of termination is issued, the DEPARTMENT may take over the Work and complete it by contract or otherwise and may take possession of and use materials, appliances, equipment or plant on the Work site necessary for completing the Work.
- 14.2.6 Rather than taking over the Work itself, the DEPARTMENT may transfer the obligation to perform the Work from the CONTRACTOR to its surety. The surety must submit its plan for completion of the Work, including any contracts or agreements with third parties for completion, to the DEPARTMENT for approval prior to

beginning work. The surety must follow the Contract requirements for approval of subcontracts, except that the limitation on percent of work subcontracted will not apply.

- 14.2.7 On receipt of the transfer notice, the surety must take possession of all materials, tools, and appliances at the Work site, employ an appropriate work force, and complete the Contract work, as specified. The Contract specifications and requirements shall remain in effect. However the DEPARTMENT will make subsequent Contract payments directly to the Surety for work performed under the terms of the Contract. The CONTRACTOR shall forfeit any right to claim for the same work or any part thereof. The CONTRACTOR shall not be entitled to receive any further balance of the amount to be paid under the Contract.
- 14.2.8 Upon receipt of the notice terminating the services of the CONTRACTOR, the Surety shall enter upon the premises and take possession of all materials, tools, and appliances thereon for the purpose of completing the Work included under the Contract and employ by contract or otherwise any person or persons to finish the Work and provide the materials therefore, without termination of the continuing full force and effect of this Contract. In case of such transfer of employment to the Surety, the Surety shall be paid in its own name on estimates covering Work subsequently performed under the terms of the Contract and according to the terms thereof without any right of the CONTRACTOR to make any claim for the same or any part thereof.
- 14.2.9 If the Contract is terminated for default, the CONTRACTOR and the Surety shall be jointly and severally liable for damages for delay as provided by paragraph 11.8, and for the excess cost of completion, and all costs and expenses incurred by the DEPARTMENT in completing the Work or arranging for completion of the Work, including but not limited to costs of assessing the Work to be done, costs associated with advertising, soliciting or negotiating for bids or proposals for completion, and other procurement costs. Following termination the CONTRACTOR shall not be entitled to receive any further balance of the amount to be paid under the Contract until the Work is fully finished and accepted, at which time if the unpaid balance exceeds the amount due the DEPARTMENT and any amounts due to persons for whose benefit the DEPARTMENT has withheld funds, such excess shall be paid by the DEPARTMENT to the CONTRACTOR. If the damages, costs, and expenses due the DEPARTMENT exceed the unpaid balance, the CONTRACTOR and its Surety shall pay the difference.
- 14.2.10 If, after notice of termination of the CONTRACTOR's right to proceed under the provisions of this clause, it is determined for any reason that the CONTRACTOR was not in default under the provisions of this clause, or that the delay was excusable under the provisions of this clause, or that termination was wrongful, the rights and obligations of the parties shall be determined in accordance with the clause providing for convenience termination.

14.3 Rights or Remedies:

Where the CONTRACTOR's services have been so terminated by the DEPARTMENT, the termination will not affect any rights or remedies of the DEPARTMENT against the CONTRACTOR then existing or which may thereafter accrue. Any retention or payment of moneys due the CONTRACTOR by the DEPARTMENT will not release the CONTRACTOR from liability.

14.4 Convenience Termination:

- 14.4.1 The performance of the Work may be terminated by the DEPARTMENT in accordance with this section in whole or in part, whenever, for any reason the Contracting Officer shall determine that such termination is in the best interest of the DEPARTMENT. Any such termination shall be effected by delivery to the CONTRACTOR of a Notice of Termination, specifying termination is for the convenience of the DEPARTMENT the extent to which performance of Work is terminated, and the date upon which such termination becomes effective.
- 14.4.2 Immediately upon receipt of a Notice of Termination and except as otherwise directed by the Contracting Officer, the CONTRACTOR shall:
- a. Stop Work on the date and to the extent specified in the Notice of Termination;
 - b. Place no further orders or subcontracts for materials, services, or facilities except as may be necessary for completion of such portion of the Work as is not terminated;
 - c. Terminate all orders and subcontracts to the extent that they relate to the performance of Work terminated by the Notice of Termination;

- d. With the written Approval of the Contracting Officer, to the extent he may require, settle all outstanding liabilities and all claims arising out of such termination of orders and subcontracts, the cost of which would be reimbursable, in whole, or in part, in accordance with the provisions of the Contract;
- e. Submit to the Contracting Officer a list, certified as to quantity and quality, of any or all items of termination inventory exclusive of items the disposition of which had been directed or authorized by the Contracting Officer;
- f. Transfer to the Contracting Officer the completed or partially completed record drawings, Shop Drawings, information, and other property which, if the Contract had been completed, would be required to be furnished to the DEPARTMENT;
- g. Take such action as may be necessary, or as the Contracting Officer may direct, for the protection and preservation of the property related to the Contract which is in the possession of the CONTRACTOR and in which the DEPARTMENT has or may acquire any interest.

The CONTRACTOR shall proceed immediately with the performance of the above obligations.

14.4.3 When the DEPARTMENT orders termination of the Work effective on a certain date, all Work in place as of that date will be paid for in accordance with Article 13 of the Contract. Materials required for completion and on hand but not incorporated in the Work will be paid for at invoice cost plus 15% with materials becoming the property of the DEPARTMENT- or the CONTRACTOR may retain title to the materials and be paid an agreed upon lump sum. Materials on order shall be cancelled, and the DEPARTMENT shall pay reasonable factory cancellation charges with the option of taking delivery of the materials in lieu of payment of cancellation charges. The CONTRACTOR shall be paid 10% of the cost; freight not included, of materials cancelled, and direct expenses only for CONTRACTOR chartered freight transport which cannot be cancellation without charges, to the extent that the CONTRACTOR can establish them. The extra costs due to cancellation of bonds and insurance and that part of job start-up and phase-out costs not amortized by the amount of Work accomplished shall be paid by the DEPARTMENT. Charges for loss of profit or consequential damages shall not be recoverable except as provided above.

- a. The following costs are not payable under a termination settlement agreement or Contracting Officer's determination of the termination claim:
 - 1. Loss of anticipated profits or consequential or compensatory damages
 - 2. Unabsorbed home office overhead (also termed "General & Administrative Expense") related to ongoing business operations
 - 3. Bidding and project investigative costs
 - 4. Direct costs of repairing equipment to render it operable for use on the terminated work

14.4.4 The termination claim shall be submitted promptly, but in no event later than 90 days from the effective date of termination, unless extensions in writing are granted by the Contracting Officer upon written request of the CONTRACTOR made within the 90-day period. Upon failure of the CONTRACTOR to submit his termination claim within the time allowed, the Contracting Officer may determine, on the basis of information available to him, the amount, if any, due to the CONTRACTOR by reason of the termination and shall thereupon pay to the CONTRACTOR the amount so determined.

14.4.5 The CONTRACTOR and the Contracting Officer may agree upon whole or any part of the amount or amounts to be paid to the CONTRACTOR by reason of the total or partial termination of Work pursuant to this section. The Contract shall be amended accordingly, and the CONTRACTOR shall be paid the agreed amount.

14.4.6 In the event of the failure of the CONTRACTOR and the Contracting Officer to agree in whole or in part, as provided heretofore, as to the amounts with respect to costs to be paid to the CONTRACTOR in connection with the termination of the Work the Contracting Officer shall determine, on the basis of information available to him, the amount, if any, due to the CONTRACTOR by reason of the termination and shall pay to the CONTRACTOR the amount determined as follows:

- a. All costs and expenses reimbursable in accordance with the Contract not previously paid to the CONTRACTOR for the performance of the Work prior to the effective date of the Notice of Termination;
- b. So far as not included under "a" above, the cost of settling and paying claims arising out of the termination

of the Work under subcontracts or orders which are properly chargeable to the terminated portions of the Contract;

- c. So far as practicable, claims by the CONTRACTOR for idled or stand-by equipment shall be made as follows: Equipment claims will be reimbursed as follows:
 1. Contractor-owned equipment usage, based on the CONTRACTOR'S ownership and operating costs for each piece of equipment as determined from the CONTRACTOR'S accounting records. Under no circumstance, may the CONTRACTOR base equipment claims on published rental rates.
 2. Idle or stand-by time for Contractor-owned equipment, based on the CONTRACTOR'S internal ownership and depreciation costs. Idle or stand-by equipment time is limited to the actual period of time equipment is idle or on stand-by as a direct result of the termination, not to exceed 30 days. Operating expenses will not be included for payment of idle or stand-by equipment time.
 3. Rented equipment, based on reasonable, actual rental costs. Equipment leased under "capital leases" as defined in Financial Accounting Standard No. 13 will be considered Contractor-owned equipment. Equipment leased from an affiliate, division, subsidiary or other organization under common control with the CONTRACTOR will be considered Contractor-owned equipment, unless the lessor has an established record of leasing to unaffiliated lessees at competitive rates consistent with the rates the CONTRACTOR has agreed to pay and no more than forty percent of the lessor's leasing business, measured in dollars, is with organizations affiliated with the lessor.
- 14.4.7 The CONTRACTOR shall have the right of appeal under the DEPARTMENT's claim procedures, as defined in Article 15, for any determination made by the Contracting Officer, except if the CONTRACTOR has failed to submit his claim within the time provided and has failed to request extension of such time, CONTRACTOR shall have no such right of appeal. In arriving at the amount due the CONTRACTOR under this section, there shall be deducted:
 - a. All previous payments made to the CONTRACTOR for the performance of Work under the Contract prior to termination;
 - b. Any claim for which the DEPARTMENT may have against the CONTRACTOR;
 - c. The agreed price for, or the proceeds of sale of, any materials, supplies, or other things acquired by the CONTRACTOR or sold pursuant to the provisions of this section and not otherwise recovered by or credited to the DEPARTMENT; and,
 - d. All progress payments made to the CONTRACTOR under the provisions of this section.
- 14.4.8 Where the Work has been terminated by the DEPARTMENT said termination shall not affect or terminate any of the rights of the DEPARTMENT against the CONTRACTOR or his Surety then existing or which may thereafter accrue because of such default. Any retention or payment of monies by the DEPARTMENT due to the CONTRACTOR under the terms of the Contract shall not release the CONTRACTOR or its Surety from liability.
- 14.4.9 The CONTRACTOR's termination claim may not include claims that pre dated the notice for termination for convenience. Those claims shall be prosecuted by the CONTRACTOR under Article 15.
- 14.4.10 The CONTRACTOR'S termination claim may not exceed the total dollar value of the contract as awarded plus agreed upon change orders less the amounts that have been paid for work completed.
 - a. Unless otherwise provided for in the Contract Documents, or by applicable statute, the CONTRACTOR, from the effective date of termination and for a period of three years after final settlement under this Contract, shall preserve and make available to the DEPARTMENT at all reasonable times at the office of the CONTRACTOR, all its books, records, documents, and other evidence bearing on the cost and expenses of the CONTRACTOR under his Contract and relating to the Work terminated hereunder.
 - b. Definitions. In this Subsection 108-1.09, the term "cost" and the term "expense" mean a monetary amount in U.S. Dollars actually incurred by the CONTRACTOR, actually reflected in its contemporaneously maintained accounting or other financial records and supported by original source documentation.
 - c. Cost Principles. The DEPARTMENT may use the federal cost principles at 48 CFR §§ 31.201-1 to 31.205-52 (or succeeding cost principles for fixed price contracts) as guidelines in determining allowable costs under this Subsection to the extent they are applicable to construction contracts and consistent with the specifications of this Contract. The provisions of this contract control where they are more restrictive than, or

inconsistent with, these federal cost principles."

ARTICLE 15 - CLAIMS FOR ADJUSTMENT AND DISPUTES

15.1 Notification

- 15.1.1 The CONTRACTOR shall notify the DEPARTMENT in writing as soon as the CONTRACTOR becomes aware of any act or occurrence which may form the basis of a claim for additional compensation or an extension of Contract Time or of any dispute regarding a question of fact or interpretation of the Contract. The DEPARTMENT has no obligation to investigate any fact or occurrence that might form the basis of a claim or to provide any additional compensation or extension of Contract Time unless the CONTRACTOR has notified the DEPARTMENT in writing in a timely manner of all facts the CONTRACTOR believes form the basis for the claim.
- 15.1.2 If the CONTRACTOR believes that he is entitled to an extension of Contract Time, then the CONTRACTOR must state the contract section on which he basis his extension request, provide the DEPARTMENT with sufficient information to demonstrate that the CONTRACTOR has suffered excusable delay, and show the specific amount of time to which the CONTRACTOR is entitled. The DEPARTMENT will not grant an extension of Contract Time if the CONTRACTOR does not timely submit revised schedules under Section 13.10.
- 15.1.3 If the matter is not resolved by agreement within 7 days, the CONTRACTOR shall submit an Intent to Claim, in writing, to the DEPARTMENT within the next 14 days.
- 15.1.4 If the CONTRACTOR believes additional compensation or time is warranted, then he must immediately begin keeping complete, accurate, and specific daily records concerning every detail of the potential claim including actual costs incurred. The CONTRACTOR shall provide the DEPARTMENT access to any such records and furnish the DEPARTMENT copies, if requested. Equipment costs must be based on the CONTRACTOR's internal rates for ownership, depreciation, and operating expenses and not on published rental rates. In computing damages, or costs claimed for a change order, or for any other claim against the DEPARTMENT for additional time, compensation or both, the CONTRACTOR must prove actual damages based on internal costs for equipment, labor or efficiencies. Total cost, modified total cost or jury verdict forms of presentation of damage claims are not permissible to show damages. Labor inefficiencies must be shown to actually have occurred and can be proven solely based on job records. Theoretical studies are not a permissible means of showing labor inefficiencies. Home office overhead will not be allowed as a component of any claim against the DEPARTMENT.
- 15.1.5 If the claim or dispute is not resolved by the DEPARTMENT, then the CONTRACTOR shall submit a written Claim to the Contracting Officer within 90 days after the CONTRACTOR becomes aware of the basis of the claim or should have known the basis of the claim, whichever is earlier. The Contracting Officer will issue written acknowledge of the receipt of the Claim.
- 15.1.6 The CONTRACTOR waives any right to claim if the DEPARTMENT was not notified properly or afforded the opportunity to inspect conditions or monitor actual costs or if the Claim is not filed on the date required.

15.2 Presenting the Claim

- 15.2.1 The Claim must include all of the following:
 - a. The act, event, or condition the claim is based on
 - b. The Contract provisions which apply to the claim and provide relief
 - c. The item or items of Contract work affected and how they are affected
 - d. The specific relief requested, including Contract Time if applicable, and the basis upon which it was calculated
 - e. A statement certifying that the claim is made in good faith, that the supporting cost and pricing data are accurate and complete to the best of your knowledge and belief, and that the amount requested accurately reflects the Contract adjustment which the CONTRACTOR believes is due.

15.3 Claim Validity, Additional Information, and DEPARTMENT's Action

15.3.1 The Claim, in order to be valid, must not only show that the CONTRACTOR suffered damages or delay but that it was caused by the act, event, or condition complained of and that the Contract provides entitlement to relief for such act, event, or condition.

15.3.2 The DEPARTMENT can make written request to the CONTRACTOR at any time for additional information relative to the Claim. The CONTRACTOR shall provide the DEPARTMENT the additional information within 30 days of receipt of such a request. Failure to furnish the additional information may be regarded as a waiver of the Claim.

15.4 Contracting Officer's Decision

The CONTRACTOR will be furnished the Contracting Officer's Decision within 90 days, unless the Contracting Officer requests additional information or gives the CONTRACTOR notice that the time for issuing a decision is being extended for a specified period under AS 36.30.620. The Contracting Officer's decision is final and conclusive unless, within 14 days of receipt of the decision, the CONTRACTOR delivers a Notice of Appeal to the Appeals Officer. Procedures for appeals are covered under AS 36.30.625 and AS 36.30.630.

15.5 Fraud and Misrepresentation in Making Claims

Criminal and Civil penalties authorized under AS 36.30.687 (including, but not limited to, forfeiture of all claimed amounts) may be imposed on the CONTRACTOR if the CONTRACTOR makes or uses a misrepresentation in support of a claim or defraud or attempt to defraud the DEPARTMENT at any stage of prosecuting a claim under this Contract.

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**STATE OF ALASKA
DEPARTMENT OF CORRECTIONS**

DOCUMENT 00800 – SUPPLEMENTARY CONDITIONS TO:

**MODIFICATIONS TO THE GENERAL CONDITIONS OF
THE CONSTRUCTION CONTRACT FOR BUILDINGS**

The following supplements modify, change, delete from, or add to Section 00700 "General Conditions of the Construction Contract for Buildings", revised December 2011. Where any article of the General Conditions is modified, or a Paragraph, Subparagraph, or Clause thereof is modified or deleted by these Supplementary Conditions, the unaltered provisions of that Article, Paragraph, Subparagraph, or Clause shall remain in effect.

SC-1- DEFINITIONS

A. At General Conditions Article 1, definition of:

1. **CFR** - Initials that stand for the Code of Federal Regulations.
2. **OWNER**- The State of Alaska, Department of Corrections.
3. **QUALITY ASSURANCE ACCEPTANCE TESTING**- This is all sampling and testing performed by the DEPARTMENT to determine at what level the product or service will be accepted for payment. Qualified personnel and laboratories will perform sampling and testing. The DEPARTMENT pays for this testing.
4. **QUALITY ASSURANCE PROGRAM (QA PROGRAM)**- An FHWA required program developed by the DEPARTMENT (see Section 01400). The QA program assures that materials and workmanship incorporated into each Federal-aid highway construction project conforms to the Contract Plans and Specifications, including changes. This QA Program consists of all those planned and systematic actions necessary to provide adequate confidence that the product or service will satisfy given requirements for quality. The QA Program includes the CONTRACTOR'S Quality Control Plan, acceptance testing, verification testing, independent assurance testing, and quality level analysis.
5. **QUALITY CONTROL PROGRAM (QC PROGRAM)** – The CONTRACTOR'S, Subcontractor's or Supplier's operational techniques and activities that maintain control of the manufacturing process to fulfill the Contract requirements. This may include materials handling, construction procedures, calibration and maintenance of equipment, production process control, material sampling, testing and inspection, and data analysis.
6. **RESIDENT ENGINEER OR INSPECTOR**- The Engineer's authorized representative assigned to make detailed observations relating to contract performance.

SC-2.4 - VISITS TO SITE/PLACE OF BUSINESS

At General Conditions Article 2.4, delete the first four words of the first sentence ("The Contracting Officer will ...") and replace with the following words "The Contracting Officer has the right to, but is not obligated to..."

SC-4.2 - VISIT TO SITE

At General Conditions Article 4.2, delete this article in its entirety and replace with the following article:

- 4.2.1. No pre-bid site visit will be provided unless the bidder requests it.
- 4.2.2. The submission of a bid by the CONTRACTOR is considered a representation that the CONTRACTOR has reviewed and carefully examined the site and is satisfied as to the conditions to be encountered in performing the Work and as to the requirements of the Contract Documents."

SC-4.3 - EXPLORATIONS AND REPORTS

At General Conditions Article 4.3, add the following paragraph:

"All reports and other records (if available) are provided for informational purposes only to all plan holders listed with the DEPARTMENT as General Contractors and are available to other planholder's upon request. They are made available, so Bidders have access to the same information available to the DEPARTMENT. The reports and other records are not intended as a substitute for independent investigation, interpretation, or judgment of the Bidder. The DEPARTMENT is not responsible for any interpretation or conclusion drawn from its records by the Bidder. While referenced by or provided with the Contract Documents; the recommendations, engineering details, and other information contained in these reports of explorations shall not be construed to supersede or constitute conditions of the Contract Documents."

SC-5.4.1 - INSURANCE REQUIREMENTS

At General Condition Article 5.4.1, delete the second to the last sentence and replace with the following: "The delivery to the DEPARTMENT of a written notice in accordance with the policy provisions is required before cancellation of any coverage or reduction in any limits of liability."

SC-5.4.2a-WORKERS COMPENSATION INSURANCE

At General Condition Article 5.4.2a, delete paragraph "a" in its entirety and replace with the following:

- a. Workers' Compensation Insurance: The Contractor shall provide and maintain, for all employees of the Contractor engaged in work under this contract, Workers' Compensation Insurance as required by AS 23.30.045. The Contractor shall be responsible for Workers' Compensation Insurance for any subcontractor who provides services under this contract. Coverage shall include:
 - 1. Waiver of subrogation against the State.
 - 2. Employer's Liability Protection in the amount of \$500,000 each accident / \$500,000 each disease.
 - 3. If the Contractor directly utilizes labor outside of the State of Alaska in the prosecution of the work, "Other States" endorsement shall be required as a condition of the contract.
 - 4. Whenever the work involves activity on or about navigable waters, the Workers' Compensation policy shall contain a United States Longshoreman's and Harbor

Worker's Act endorsement, and when appropriate, a Maritime Employer's Liability (Jones Act) endorsement with a minimum limit of \$1,000,000."

SC-5.4.2b1- MINIMUM LIMITS of LIABILITY

At General Conditions Article 5.4.2b1, delete "\$2,000,00" and replace with "\$2,000,000".

SC-5.4.2d - BUILDERS RISK INSURANCE (SUBCONTRACTORS)

At General Conditions Article 5.4.2d, delete the subsection in its entirety.

SC-6.9 – SUBSTITUTES OR "OR-EQUAL" ITEMS

In Paragraph 6.95 delete "Document 01630 – Product Options and Substitutions" and replace with "Document 01 60 00 – Material and Equipment"

SC-6.13 - SUBCONTRACTORS

A. Add the following paragraph:

6.13.7 The CONTRACTOR may, without penalty, replace a Subcontractor who:

1. Fails to comply with the licensing and registration requirements of AS 08.18;
2. Fails to obtain or maintain a valid Alaska Business License;
3. Files for bankruptcy or becomes insolvent;
4. Fails to execute a subcontract or performance of the work for which the Subcontractor was listed, and the CONTRACTOR has acted in good faith;
5. Fails to obtain bonding acceptable to the DEPARTMENT;
6. Fails to obtain insurance acceptable to the DEPARTMENT;
7. Fails to perform subcontract work for which the Subcontractor was listed;
8. Must be replaced to meet the CONTRACTOR'S required state or federal affirmative action requirements.
9. Refuses to agree to abide by the CONTRACTOR'S labor agreement; or
10. Is determined by the DEPARTMENT to be not responsible.

In addition to the circumstances described above, a Contractor may in writing request permission from the Department to add a new Subcontractor or replace a listed Subcontractor. The DEPARTMENT will approve the request if it determines in writing that allowing the addition or replacement is in the best interest of the state.

The contractor shall submit a written request to add a new Subcontractor or replace a listed Subcontractor to the Contracting Officer a minimum of five working days prior to the date the new Subcontractor is scheduled to begin work on the construction site. The request must state the basis for the request and include supporting documentation acceptable to the Contracting Officer.

If a CONTRACTOR violates this article, the Contracting Officer may:

1. Cancel the Contract after Award without any damages accruing to the department; or
2. After notice and hearing, assess a penalty on the bidder in an amount not exceeding 10 percent of the value of the subcontract at issue."

SC-6.17 – SAFETEEY AND PROTECTION

Add the following paragraph at the end of the existing text:

6.17.4 The Contractor is responsible for ensuring all workers are adequately protected. The Contractor shall have a safety and health management program that complies with AKOSH requirements, and includes:

1. A worksite hazard analysis;
2. A hazard prevention and control plan including personal protective equipment and safe work procedures required for specific tasks;
3. New employee training and periodic worker training regarding safety and health;
4. Regular safety meetings with written documentation of attendance, safety topics discussed, worker safety complaints, and corrective actions taken, and
5. A designated safety officer, employed by the Contractor, who monitors the construction site and is responsible for implementing the safety and health management program.
6. Measures to comply with Executive Order 13513 – Federal leadership on reducing text messaging while driving, dated October 1, 2009. And DOT Order 3902.10 – Text messaging while driving, dated December 30, 2009
7. Measures to comply with Alaska Statue 28.35.161 – Driving a motor vehicle with a screen device operating; unlawful installation of television, monitor, or similar device.

SC-6.18 – SAFETY REPRESENTATIVE

At General Conditions Article 6.18, delete this article in its entirety and replace with the following article:

The CONTRACTOR shall designate a responsible safety representative at the site. This person shall be the CONTRACTOR's superintendent unless otherwise designated in writing by the CONTRACTOR to the Contracting Officer. The responsible safety person must maintain OSHA 29 CRF 30-Hour Construction Safety training certificate. Training must have been completed within the past 5 years. Training card must be provided prior to starting any site construction activities.

SC-7.2 - PERMITS, LICENSES, AND TAXES

A. In Paragraph 7.2.1, add the following subparagraphs:

The terms, conditions, and stipulations in permits obtained either by the DEPARTMENT or by the CONTRACTOR is made part of this Contract.

1. The CONTRACTOR shall procure all other permits and licenses required to complete the project, pay all charges, fees and taxes, and give all notices necessary and incidental to the due and lawful prosecution of the Work.
2. The CONTRACTOR shall obtain the State of Alaska Fire Marshal plan review.

SC-7.12-APPLICABLE ALASKA PREFERENCES

At General Condition Article 7.12. add the following paragraph:

"7.12.5 Alaska Veteran's Preference (AS 36.30.321). In determining the low bidder for State funded projects, a 5% bid preference has been given to a bidder who qualifies under AS 36.30.321 (f) as an Alaska bidder and is a Qualifying Entity. This preference may not exceed \$5,000.00. In this subsection a "Qualifying Entity" means a:

1. Sole proprietorship owned by an Alaska Veteran;
2. Partnership under AS 32.06 or AS 32.11 if a majority of the Members are Alaska veterans;

3. Limited liability Company organized under AS 10.50 and if a majority of the members are Alaska veterans; or
4. Corporation that is wholly owned by individuals and a majority of the individuals are Alaska veterans.

A preference under this section is in addition to any other preference for which the bidder qualifies. To qualify for this preference, the bidder must add value by the bidder actually performing, controlling, managing and supervising a significant part of the services provided or the bidder must have sold supplies or the general nature solicited to other state agencies, government, or the general public. An Alaska veteran shall be a resident of this state and an individual who served in the Armed forces of the United States, including a reserve unit of the United States armed forces; or Alaska Territorial Guard, the Alaska Army National Guard, or the Alaska Navel Militia; and was separated from service under a condition that was not dishonorable.

The bidder shall provide an Alaskan Veteran's Preference Affidavit on Form 2SD-17, certifying they qualify as an Alaska bidder eligible for Alaska Veteran's preference according to AS 36.30.

SC-7.13-WAGES AND HOURS OF LABOR (Federal Wages/Hours not required)

- A. In paragraph 7.13.3, delete this paragraph in its entirety and replace with the following paragraphs: 7.13.3 Notice of Work and Completion; Withholding of Payment

- A. Within three calendar days of award of a construction contract, the CONTRACTOR Shall file a "Notice of Work" with the Department of Labor and Workforce Development (DOLWD) fees per AS 36.08.045. The CONTRACTOR lists all their Subcontractors who will perform any portion of work on the contract and the contract price being paid to each subcontractor. The primary contractor shall pay all filing fees for each subcontractor performing work on the contract, including a filing fee based on the contract price being paid for work performed by the primary contractor's employees. The filing fee payable shall be the sum of all fees calculated for each subcontractor. The filing fee shall be one percent of each contractor's contract price. The total filing fee payable by the primary contractor under this subsection may not exceed \$5,000. **The "Notice of Work" is available at <http://www.labor.state.ak.us/lss/forms/notice-of-work.pdf>**
- B. The Contracting Officer will not issue Notice to Proceed to the CONTRACTOR until such notice and fees have been paid to DOLWD. Failure of the CONTRACTOR to file the Notice of Work and pay fees within this timeframe shall not constitute grounds for an extension of contract time or adjustment of contract price.
- C. Upon completion of all work, the primary contractor shall file with DOLWD a "Notice of Completion" together with payment of any additional filing fees owed due to increased contract amounts. Within 30 days after DOLWD's receipt of the primary contractor's notice of completion, DOLWD shall inform the DEPARTMENT of the amount, if any, to be withheld from the final payment. **The " Notice of Completion Form" is available at; <http://www.labor.state.ak.us/lss/forms/not-comp-pub-wrks.pdf>**

SC-9.1-DEPARTMENTS RIGHT TO CHANGE

At General Condition Article 9.1, ADD THE FOLLOWING SENTENCE;

Without invalidating the Contract and without notice to any Surety, the DEPARTMENT may, at any time or from time to time, order additions, deletions or revisions in the Work within the general scope of the Contract, including but not limited to changes:

SC-9.4 – CHANGE ORDER

At General Conditions Article 9.4, add the following sentence:

"The DEPARTMENT will issue Change Orders for the CONTRACTOR to sign. A Change Order shall be considered executed when the DEPARTMENT signs it. The CONTRACTOR'S signature indicates that they either accept the Change Order or acknowledge it. Acknowledgement of a Change Order does not surrender the CONTRACTOR's right to claim."

SC-11.8-DELAY DAMAGES

At General Condition Article 11.8, add the following paragraphs:

Liquidated Damages:

- **Eight Hundred Fifty-Three Dollars & Twenty Cents** (\$853.20) per day for each calendar day elapsing between the time stipulated for the sub-completion date and in accordance with the terms hereof; such deduction to be made, or sum to be recovered, not as a penalty but as liquidated damages.
- **Nighty Dollars & Sixty-Four Cents** (\$90.64) per day for each calendar day elapsing between the time stipulated for the final completion date and in accordance with the terms hereof; such deduction to be made, or sum to be recovered, not as a penalty but as liquidated damages.

SC-12.1-WARRANTY AND GUARANTEE

At General Condition Article 12.1, add the following sentence:

"The failure of the DEPARTMENT to strictly enforce the Contract in one or more instances does not waive its right to do so in other or future instances."

SC-15.1-NOTIFICATION

In Paragraph 15.1.2, delete, "Section 01310" and replace with Section 01 32 00.

**END OF
SECTION 00800**

1.01 Laborers' & Mechanics' Minimum Rates of Pay

Bidders are to refer to the Department of Labor & Workforce Development website for current Pamphlet No. 600. Please note there may be a new Pamphlet issued prior to the bid date for this project.

<http://labor.state.ak.us/lss/pamp600.htm>

SECTION 00850
DRAWING INDEX

GENERAL

COVER SHEET

MECHANICAL

M 0.1	MECHANICAL LEGEND AND ABBREVIATIONS
M 0.2	MECHANICAL SCHEDULES
M 0.3	MECHANICAL SCHEDULES
M 1.1	CRAWLSPACE HEATING DEMOLITION PLAN
M 1.2	CRAWLSPACE DOMESTIC WATER HEATING DEMOLITION PLAN
M 1.3	CRAWLSPACE VENTILATION DEMOLITION PLAN
M 1.4	FIRST FLOOR VENTILATION AND HEATING DEMOLITION PLAN - EAST
M 1.4	FIRST FLOOR VENTILATION AND HEATING DEMOLITION PLAN - WEST
M 2.1	CRAWLSPACE HEATING REMODEL PLAN
M 2.2	CRAWLSPACE DOMESTIC WATER HEATING REMODEL PLAN
M 3.1	CRAWLSPACE VENTILATION REMODEL PLAN
M 3.2	ENLARGED CRAWLSPACE VENTILATION REMODEL PLAN
M 4.1	FIRST FLOOR VENTILATION AND HEATING REMODEL PLAN - EAST
M 4.2	FIRST FLOOR VENTILATION AND HEATING REMODEL PLAN - WEST
M 5.1	ENLARGED BOILER ROOM PLANS
M 5.2	ENLARGED CRAWLSPACE AHU-2 VENTILATION PLAN
M 6.1	MECHANICAL SCHEMATICS & DETAILS
M 6.2	MECHANICAL SCHEMATICS & DETAILS

ELECTRICAL

E0.1	ELECTRICAL LEGEND, FIXTURE SCHEDULE, & LOAD CALCULATION
E1 .1	ENLARGED BOILER ROOM DEMOLITION & REMODEL PLANS
E1 .2	CRAWL SPACE DEMOLITION PLAN
E1 .3	CRAWL SPACE REMODEL PLAN

END OF SECTION



State of Alaska
Department of Corrections
REQUEST FOR CLEARANCE

Contractor/Contract Staff Background
Check

Date: _____
Applicant Name: _____
Mailing Address: _____
Purpose of this check: _____
Date of Birth: _____ Social Security #: _____
Alaska driver's license #: _____
Other states applicant has resided in and the dates: _____

Prior criminal history (including the state the offense occurred in): _____

Is applicant currently on probation or parole? _____ If yes, where? _____

Does applicant have any relatives or acquaintances presently incarcerated in Alaska or under the Dept. of Corrections supervision? _____ If yes, state the person's name/location: _____

Clearance requested by (Contractor): _____
Address: _____ Phone: _____

The information that I have provided is true and accurate to the best of my knowledge. I authorize the Department of Corrections to perform a background investigation for any and all prior convictions or current warrants.

Signature of applicant: _____ Date: _____

Contractor's signature: _____ Date: _____

DO NOT WRITE BELOW THIS SECTION

* * * * *

APSIN/WANTS: Clear: _____ Wants: _____ See Attached: _____
NCIC/WANTS: Clear: _____ Wants: _____ See Attached: _____
Criminal History Check (AK) No record found: _____ See Attached: _____
Criminal History Check (other states) No record found: _____ See Attached: _____

Request Granted: _____ Request Denied: _____

Reason for denial: _____

Director/Superintendent (or designee): _____ Date: _____

ALL SEXUAL BEHAVIOR IS PROHIBITED
ZERO-TOLERANCE POLICY
PRISON RAPE ELIMINATION ACT (PREA)


1. Alaska Department of Corrections Policy and Procedure 808.19 Prisoner Rights, Sexual Abuse / Sexual Assault and Reporting establishes a **zero-tolerance** policy toward sexual misconduct and provides guidelines and procedures consistent with the Prison Rape Elimination Act (PREA) to reduce the risk of sexual misconduct within the correctional setting.
2. Sexual assault, sexual misconduct, and sexual harassment, or any type of sexual behaviors are PROHIBITED.
3. Types of Sexual Assault, Misconduct, and Harassment
 - Prisoner-on-employee/contract worker/volunteer
 - Employee/contract worker/volunteer-on-prisoner
 - Prisoner on prisoner
4. Acts of Sexual Assault, Misconduct, and Harassment
 - **There is NO allowable consensual agreement between DOC employees, contract workers, volunteers, or offenders to engage in ANY sexual behavior or act.**
 - The physical act
 - The attempt of the physical act, including inappropriate touching and exhibitionism.
 - Threats, intimidation, and actions/communications meant to coerce or pressure another to engage in the inappropriate act.
 - Retaliation against individuals reporting prohibited sexual behavior is prohibited and punishable.
5. All Department personnel, contractors or volunteers who receive information concerning prisoner sexual misconduct or have reasonable belief to suspect a prisoner is a victim of sexual misconduct or observe an incident or behavior shall immediately report the information to the most appropriate supervisory staff. The information shall be documented on an Incident Report form 809.03A.
6. Prisoners may report allegations of conduct prohibited by Policy and Procedures 808.09, including threats of sexual misconduct to any Department employee, contractor, or volunteer. The such allegation may be reported verbally, in writing, or may be made by a third party.
7. All reports of prohibited sexual behavior will be referred to a law enforcement agency for investigation and referral to the Alaska State Troopers by the Department of Corrections.
8. Privileged communications between ordained clergy, medical or mental health staff, and clients does not extend to the matter that threatens the safety of the institution, staff, or prisoners; if it contains a threat to public safety or if it is specifically addressed by state statutes.
9. Confidentiality: All information related to a victim of sexual abuse or sexual harassment shall be considered confidential and shall be released only to those who need the information to perform their official duties.

I HAVE READ, UNDERSTOOD, AND AGREE WITH THE ABOVE RULES.

*** I also acknowledge that I have been informed of my Prison Rape Elimination Act Responsibilities.***

Name (print and sign)

Date

STATE OF ALASKA Department of Corrections FACILITIES	SUBSTITUTION REQUEST FORM	
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Project: YKCC Mechanical Upgrade Phase II Project No.: 200005089-10

Contractor: _____

Specified item for which substitution is requested (reference the specification section and paragraph):

The following product is submitted for substitution (describe proposed substitution and attach applicable catalog cuts):

I certify the following:

- | Yes | No | |
|--------------------------|--------------------------|--|
| <input type="checkbox"/> | <input type="checkbox"/> | The substitute will perform adequately and achieve the results called for by the general design. |
| <input type="checkbox"/> | <input type="checkbox"/> | The substitute is similar, of equal substance, suited to the same use, and will provide the same warranty as the product specified. |
| <input type="checkbox"/> | <input type="checkbox"/> | The evaluation and approval of the proposed substitute will not delay the Substantial or Final Completion of the project. |
| <input type="checkbox"/> | <input type="checkbox"/> | Any change in the design necessitated by the proposed substitution will not delay the Substantial or Final Completion of the project. |
| <input type="checkbox"/> | <input type="checkbox"/> | The cost of any change in the design necessitated by the proposed substitution will be paid by the contractor at no cost to the State. |
| <input type="checkbox"/> | <input type="checkbox"/> | The cost of any license fee or royalty necessitated by the proposed substitution will be paid by the contractor at no cost to the State. |

Signed: _____ Date: _____
 Authorized Contractor Signature

Architect/Engineer Recommendation:

- ☐ Accepted
 ☐ Accepted as Noted
 ☐ Not Accepted
 ☐ Received Too Late

Remarks:

Architect/Engineer Signature: _____ Date: _____

- ☐ Recommend Acceptance
☐ Recommend Rejection _____ Date: _____
 Resident Engineer

- ☐ Accepted
☐ Rejected _____ Date: _____
 Project Manager

SECTION 01 11 13
SUMMARY OF WORK

PART 1 - GENERAL

1.01 RELATED REQUIREMENTS

- A. All Contract Documents are related to this Section.
- B. Section 01 57 10 – Erosion, Sediment and Pollution Control

1.02 WORK COVERED BY CONTRACT DOCUMENTS

- A. Work under this Contract includes all Work required for the project in Bethel, Alaska, all in accordance with the terms and conditions of the Contract Documents.
- B. The scope of Work includes upgrades to mechanical systems at the Yukon-Kuskokwim Correctional Center in Bethel, Alaska. Upgrades include duct cleaning, boiler replacements, air handling units, and other mechanical component replacements and upgrades.

1.03 CONTRACT

- A. General: Construct all Work through a single construction contract in accordance with the Contract Documents.
- B. Not Used

1.04 WORK BY OTHERS

- A. Not Used

1.05 WORK SEQUENCE AND MILESTONES

- A. Upon receipt of Notice to Proceed (NTP) the CONTRACTOR will be expected to prepare submittals and begin the purchase of critical materials.
- B. The CONTRACTOR shall submit a preliminary Schedule of Values and an Anticipated Construction Schedule at the pre-construction conference. The CONTRACTOR shall submit a final Schedule of Values within 3 weeks of the Notice-to-Proceed.
- C. Work sequencing requirements shall include:
 - 1. Not Used

1.06 PARKING

- A. Parking shall be limited to designated areas only. If insufficient area exists, the CONTRACTOR shall make other arrangements.
- B. Not Used

1.07 SHUTOFFS AND DISRUPTIONS TO UTILITY SERVICE

- A. At least two (2) weeks prior to the first planned outage, submit a schedule showing all proposed utility outages. Upon request, submit a written plan describing the justification for the outages and possible impacts to the Using Agency. The CONTRACTOR shall revise the schedule to show any planned changes and shall submit the revised schedule promptly to the DEPARTMENT.
- B. Plan work to minimize down time. Work with DEPARTMENT to schedule disruption for time periods that minimize impacts to the Using Agency. Shutoffs and disruption to service shall not be allowed during designated critical operating hours.
- C. Building heating system maybe partially or fully shutdown between June 15 and August 15 or when the weather forecast 24 hours ahead of the proposed shutdown predicts a daily high of at 65 degrees F. Building hot water system maybe partially or fully shutdown from time to time between 10:00 am and 6:00 am the following day with appropriate integration into the workplan and notifications. Building hot water may be partially or fully shutdown for a maximum of 72 consecutive hours beginning at 10:00 am only when approved by the Engineer through a work plan and with proper notification. Provide temporary space heating in accordance with Section 00700, 6.4 and Section 01 31 13, 1.04 B.8, through secured heat registers into inmate occupied spaces if interior temperature falls below 65 degrees F. Temporary heating equipment shall not be placed directly into inmate occupied spaces.
- D. Building ventilation system may be partially or fully shutdown when weather forecast 24 hours ahead of the proposed shutdown is for daily highs below 65 degrees F with appropriate integration into the work plan and notifications. Provide temporary ventilation to inmate occupied areas in accordance with Division 01, providing a minimum of 10 cubic feet per minute per occupant of fresh or filtered recirculated air. Provide ventilation through secured ventilation registers in inmate occupied areas. Temporary fans or other ventilation maybe completely disabled in any occupied space for a maximum of 4 hours. Inmates will be removed from a single dorm at a time for up to nine hours, between 8:00 am and 5:00 pm or between 10:00 am and 7:00 pm in accordance with the approved work plan. Ventilation may be completed shutdown to dorms while no inmates are present. Contractor is responsible to maintain conditions appropriate for the health and safety of workers. Each inmate occupied space must be cleared and secured prior to inmates returning, including securing ventilation registers or grilles. Reference Section 01 54 00."

1.08 CONTRACTOR'S USE OF PREMISES

- A. Coordinate use of the premises under direction of DEPARTMENT.
- B. Assume full responsibility for protection and safekeeping of furnished products.

- C. Assume full responsibility for the protection of roads and grounds in the project vicinity from construction related activities.
- D. Obtain and pay for use of additional storage, Work, or parking areas needed for construction operations.
- E. Do not stop or otherwise impede vehicle traffic without prior written approval from the DEPARTMENT. The CONTRACTOR shall make all necessary provisions, including but not limited to detours, bypasses, and permits, to maintain traffic flow. Submit traffic control plan and schedule for approval no less than twenty (20) working days prior to anticipated traffic disruptions.
- F. Work and Staging Areas - With the exception of vehicle movement for access to and from Work and Staging Areas, restrict all Work to within the limits of construction designated on the plans.
- G. On-site work shall be 7 days a week, from 7:00AM until 5:00 PM.

1.09 USING AGENCY OCCUPANCY

- A. The using agency at the project location is the Department of Corrections.
- B. Upon the issuance of a Certificate of Substantial Completion by the DEPARTMENT, the Using Agency shall take ownership of the facility and may occupy it.
- C. Refer to the General Conditions for access following substantial completion.
- D. Yukon-Kuskokwim Correctional Center is in operation 24 hours per day 7 days and will be occupied throughout the duration of the project. Contractor shall follow security protocols as specified elsewhere in this contract to accommodate continuous occupation requirements.

1.10 PERMITS

- A. Where a building permit is required by the Authority Having Jurisdiction, the plan review fee and the building permit fee have been paid by the DEPARTMENT. The CONTRACTOR shall obtain the building permit in its name and shall procure all other permits and licenses, pay all charges, fees and taxes and give all notices necessary and incidental to the due and lawful prosecution of the work.
- B. Not Used

1.11 HAUL ROUTES

- A. Contractor shall determine the requirements for and shall comply with applicable local, municipal, and DOT/PF haul requirements, routes and restrictions.
- B. Obtain required approvals for the use of haul routes, and submit to the DEPARTMENT upon request.

C. Not Used

1.12 STORMWATER PREVENTION POLLUTION PLAN (SWPPP)

A. If a SWPPP is specified elsewhere and made part of the Contract Documents, the CONTRACTOR shall prepare the SWPPP and shall submit it to the DEPARTMENT for review.

B. Not Used

PART 2 - PRODUCTS

Not Used

PART 3 - EXECUTION

Not Used

END OF SECTION

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SECTION 01 12 19
CONTRACTOR'S CERTIFICATION OF SUBCONTRACTS

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Procedures for preparing, submitting and accepting subcontracts.

1.02 RELATED REQUIREMENTS

- A. Section 00100 - Instructions to Proposer
- B. Section 00430 - Subcontractor List
- C. Section 00700 - General Conditions: Subcontractor Certification and Approval
- D. Section 00800 – Supplementary Conditions: Subcontract Provisions
- E. Section 01 33 00 - Submittals: Submittal Procedures

1.03 PREPARATION OF CERTIFICATION

- A. Certification Forms: Use forms provided by DEPARTMENT.
- B. CONTRACTOR shall prepare certification form and submit to the DEPARTMENT prior to the start of work. Where required, attach additional information to the certification form.
- C. Substitute certification forms will not be considered.

1.04 SUBMITTAL OF CERTIFICATION

- A. The CONTRACTOR shall submit certification forms for all subcontractors for review and approval by the DEPARTMENT.

1.05 CONSIDERATION OF CERTIFICATION

- A. Following receipt of submitted subcontractor certification forms, the DEPARTMENT will review for the following, at minimum:
 - 1. Completeness of forms and attachments
 - 2. Proper execution (signatures) of forms and attachments
- B. Incomplete or improperly executed subcontractor certification forms will be returned to the CONTRACTOR for revision and resubmittal.
- C. CONTRACTOR shall remove its subcontractor from the project site until its subcontractor certification form is submitted, reviewed, and approved.

- D. The DEPARTMENT will not process payments for work performed by a non-certified subcontractor.

1.06 ACKNOWLEDGMENT OF CERTIFICATION

- A. Submittals which have been examined by the DEPARTMENT and are determined to be complete and properly executed shall be acknowledged as such by the Project Engineer's signature.

PART 2 - PRODUCTS

Not Used

PART 3 - EXECUTION

Not Used

END OF SECTION

STATE OF ALASKA

SUBCONTRACTOR
CERTIFICATION

Note: The Contractor shall provide this form for ALL subcontractors and lower tier subcontractors working on this project. This form is applicable to all projects, including Small Procurement Contracts, and must be completed in full. The Department will not allow the subcontractor to work on the project before the Department has received this signed certification (Form 25D-042A) and supporting documentation.

Project: _____ Project #: _____ Federal Aid #: _____
 Prime Contractor: _____ Subcontract being certified: _____

Pursuant to the Contract Documents, we hereby stipulate the following concerning the award of Work to the last Subcontractor on the following list:

- | | | | | |
|----|---------------------------------|------|------------------------------|-----------------------------|
| 1. | First Tier Subcontractor: _____ | DBE? | Yes <input type="checkbox"/> | No <input type="checkbox"/> |
| | Second Tier: _____ | DBE? | Yes <input type="checkbox"/> | No <input type="checkbox"/> |
| | Third Tier: _____ | DBE? | Yes <input type="checkbox"/> | No <input type="checkbox"/> |
| | Fourth Tier: _____ | DBE? | Yes <input type="checkbox"/> | No <input type="checkbox"/> |

If the subcontractor is performing work as a DBE, the dollar amount of DBE work is: \$ _____

2. Date of Subcontract: _____

3. Estimated Start Date of Sub-contracted work: _____

4. Amount of Subcontract: \$ _____

5. Subcontract amount is _____ % of the total Contract Award Amount

Cumulative signed subcontract amount (including this Agreement) is: _____ % of the total Contract Award Amount

6. Scope of Work: _____

7. Are the following documents kept on file by both the Contractor and the Subcontractor? (^F = Federal Projects Only)

EEO-1 Certification (Form 25A-304), ^F	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Contract Minimum Wage Schedule	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Civil Rights Representative (Form 25A-302) ^F	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Required Contract Provisions for Federal Aid (Form 25D-55A or 25D-55H) ^F	Yes <input type="checkbox"/>	No <input type="checkbox"/>
As required to demonstrate conformance with DBE Contract Provisions ^F	Yes <input type="checkbox"/>	No <input type="checkbox"/>
FAA Required Certification Regarding Tax Delinquency / Felony Convictions (25D-159) ^F	Yes <input type="checkbox"/>	No <input type="checkbox"/>

8. Is the Subcontractor qualified to do the work, in accordance with all contract documents?
 Yes ☐ No ☐

9. Is the Subcontractor listed on the Bidder's Registration List?
 Yes ☐ No ☐

10. Does the Subcontract contain provisions for prompt payment, release of retainage, and interest on late payment and retainage conforming to AS 36.90.210?
 Yes ☐ No ☐

11. Does the Subcontract specifically bind the Subcontractor to the applicable terms and conditions of the Contract Documents for the benefit of the Department and does it contain waiver provisions and termination provisions as required by the Contract Documents?
 Yes ☐ No ☐

12. Does the Subcontractor have adequate insurance coverages as specified in the Contract Documents?

Yes ☐ No ☐

a). If not, does the Contractor stipulate that the insurance limits of the Subcontractor are acceptable to the Contractor and that he has notified his insurance carrier of the reduced insurance limits?

Yes ☐ No ☐

b). Does the evidence of insurance certify that the policies described thereon comply with all aspects of the insurance requirements for this project?

Yes ☐ No ☐

c). Does the evidence of insurance list the Department as an "Additional Insured" or "Certificate Holder"?

Yes ☐ No ☐

d). Does the evidence of insurance commit to providing written notice in accordance with the policy provisions before cancellation or reduction of any coverage or reduction in any limits of liability?

Yes ☐ No ☐

e). Insurance Expiration dates:

Comprehensive or Commercial General Liability: _____

Automobile: _____ Workers' Compensation: _____

(Other): _____

13. Does the Contractor certify firms or individuals debarred or suspended by the Department, FAA, or FHWA are not employed or subcontracted under this construction project?

Yes ☐ No ☐

14. Copies of the following professional certifications, licenses, and registrations are attached (circle all that apply):

Federal Employer Identification Number (EIN) - If no Federal I.D. Number, Use owner's SSN (all subcontracts)

Business License (all subcontracts)

Contractor License (all subcontracts)

Land Surveyor's License (survey subcontract)

Electrical Administrator's License (electrical subcontract)

Mechanical Administrator's License (mechanical subcontract)

Phone Number: () _____

Address: _____ City: _____ State: _____

15. Does the Contractor certify the following?:

The Contractor remains responsible for all quality control and proper performance of all requirements of the contract.

Yes ☐ No ☐

For federal projects, the Contractor will continue to perform at least thirty percent (30%) of the contract work with his own organization.

Yes ☐ No ☐

This Contractor Self Certification does not relieve the Contractor and his surety, or either the Contractor or surety from any liability or responsibility under the contract.

Yes ☐ No ☐

Department's Request for Information – If the Department at any time makes written request for the Agreement, licenses, proof of insurance, or any other information relating to the certifications contained herein, the Contractor will deliver an executed copy of the Agreement and/or requested information to the Department within five calendar days. If the Contractor fails to provide the requested information within five calendar days, or if the Contractor fails to include required language and conditions in the Agreement, the Department may suspend all work relating to the Agreement. The Contractor shall not be due any additional compensation or contract time if the Department suspends work due to the Contractor's failure to provide requested information or failure to include required language and conditions in the Agreement.

Yes ☐ No ☐

False Statement or Omission – If a false statement or omission is made in connection with this Contractor Self Certification the Contractor will be excluded from participating in the self-certification process for the remainder of this Contract and for the following construction season. Contractors excluded from the self-certification process will be required to submit all necessary information for the Department's approval of proposed Subcontractors or Lower Tier Subcontractors.

Any false statement or omission made in connection with this Contractor Self Certification may be cause for suspension, a determination of non-responsibility on future bids, and may be cause for revocation of award, default, or disbarment. The person or entity making false statement or omission is subject to any and all civil and criminal penalties available pursuant to applicable state and federal law.

Yes ☐ No ☐

16. Exceptions to any of the above are explained as follows: _____

CERTIFICATION (to be completed and signed by PRIME CONTRACTOR): I certify all the above information to be true, correct and complete.

Signature: _____

Printed Name: _____ ; Title: _____

Company: _____ Date: _____

SUBCONTRACTOR ACKNOWLEDGEMENT: I hereby acknowledge that all requirements and pertinent provisions of the Contract, including but not limited to: Form 25D-55a (included in the contract), Required Contract Provisions for Federal Aid Construction Contracts, DBE provisions, prompt payment, and minimum wage rates, are included in the agreement and have been received.

Signature: _____

Printed Name: _____ ; Title: _____

Company: _____ Date: _____

DEPARTMENT'S APPROVAL/DISAPPROVAL

The subject subcontract is **APPROVED**. Nothing in this approval should be construed as relieving the Prime Contractor of the responsibility for complete performance of the work or as a waiver of any right of the Department to reject defective work.

SIGNATURE: _____ **DATE:** _____
Project Engineer

The subject subcontract is **NOT APPROVED** for the following reasons:

SIGNATURE: _____ **DATE:** _____
Project Engineer

SECTION 01 26 63
CHANGE PROCEDURES

PART 1 - GENERAL

1.01 RELATED REQUIREMENTS

- A. Section 00312 - Bid Schedule
- B. Section 00510 – Construction Contract
- C. Section 00700 - General Conditions
- D. Section 00800 - Supplementary Conditions: Modifications to General Conditions Section 00700
- E. Section 01 32 00 – Work Schedules and Reports
- F. Section 01 29 76 – Application for Payment
- G. Section 01 29 73 - Schedule of Values
- H. Section 01 73 00 – Execution Requirements: Project Record Documents

1.02 SUBMITTALS

- A. Submit the name of the individual authorized to accept changes, and to be responsible for informing others in CONTRACTOR's employ of changes in the Work.
- B. Submit with each price proposal a complete, detailed, itemized cost breakdown defining all impacts on Contract Price and Contract Time, in sufficient detail to fully explain the basis for the proposal.
- C. All change forms shall be provided by the DEPARTMENT.

1.03 CHANGE AUTHORIZATION

- A. In accordance with Section 00700 - General Conditions, Part 9 Changes, the DEPARTMENT may authorize changes to the Work. The DEPARTMENT may authorize changes in one of the following ways:
 - 1. Directive (Section 00700, Article 9.3)
 - 2. Change Order (CO) (Section 00700, Article 9.4)
 - 3. Acceptance of Shop Drawing variations, which have been identified by CONTRACTOR. (Section 00700, Article 9.5)
 - 4. Interim Work Authorization (IWA) (Section 00700, Article 9.10)
 - 5. Contingency Authorization (for CM/GC contracts only) (Section 00700, Paragraph 13.0.3 (b) (2))

1.04 CHANGE PROCEDURES

- A. The DEPARTMENT may initiate change to the contract by issuing to the CONTRACTOR a Request for Proposal (RFP) document. The RFP may include:
 - 1. Change narrative.
 - 2. Supplementary revised drawings, specifications, additional details, or sketches.
 - 3. Other information as deemed appropriate.
- B. The CONTRACTOR shall request a change to the contract by submitting to the DEPARTMENT a written Change Notice on a form provided by the DEPARTMENT. The DEPARTMENT may respond by rejecting it, or with a RFP to initiate contract change. The CONTRACTOR'S Change Notice shall include, at minimum:
 - 1. A description of the proposed change with a statement of the justification of the change.
 - 2. Statement of the effect of the change on Contract Price and Contract Time.
 - 3. The information required in Section 00700 - General Conditions, Part 15 Claims for Adjustments and Disputes.
- C. Upon receipt of a Request for Proposal (RFP) from the DEPARTMENT, the CONTRACTOR shall respond with a price proposal. The CONTRACTOR shall make every effort to return its price proposal in response to the RFP within the time frame requested by the DEPARTMENT, but in no event later than 14 calendar days from date the RFP is issued. For work to be performed after the execution of a Change Order or Contingency Authorization, the basis of pricing shall be estimated. For work performed prior to the execution of a Change Order or Contingency Authorization, the pricing shall be based upon documentation of actual incurred costs. The price proposal shall include:
 - 1. A complete, detailed, itemized price breakdown.
 - 2. For the prime contractor and subcontractors, detailed documentation of costs for direct costs, labor, equipment, consultants, sub-contractor markups, overhead and profit, and other items set forth in General Conditions Section 00700, Part 10.
 - 3. Other information as required by the DEPARTMENT.
- D. Upon receipt of pricing response to a RFP, the DEPARTMENT may execute a change to the contract. The issuance of an RFP or the receipt of pricing response to an RFP shall not obligate the DEPARTMENT to execute a change to the contract.

1.05 DIRECTIVES

- A. The DEPARTMENT may issue Directives as per Section 00700 – General Conditions, Article 9.3.

1.06 INTERIM WORK AUTHORIZATIONS (IWA)

- A. The DEPARTMENT may issue Interim Work Authorizations in accordance with Section 00700 – General Conditions, Article 9.10.

- B. IWAs may be issued to authorize the commencement of additional work in advance of the execution of a Change Order or Contingency Authorization.
- C. Work authorized by IWA shall be converted to a negotiated Change Order except that, for CM/GC contracts only, the work authorized by an IWA may be converted to a Contingency Authorization provided it does not result in an extension of Contract Time.
- D. The price on the IWA form shall be an estimated limit not to be exceeded by the CONTRACTOR without prior amendment of the IWA by the DEPARTMENT. The DEPARTMENT shall not be obligated to compensate the CONTRACTOR for costs in excess of the amount on the IWA.
- E. Upon the execution of an IWA, the CONTRACTOR is authorized to begin the specified work. The CONTRACTOR shall track its costs using Cost of Work procedures. The CONTRACTOR shall use the DEPARTMENT'S Cost of the Work form and shall submit the data to the DEPARTMENT at the close of each work day. A separate Cost of Work form is required for each IWA.

1.07 CHANGE ORDER

- A. Any change in Contract Time, Contract Price, or associated responsibility within the general scope of the Contract, shall be made by Change Order.
- B. The CONTRACTOR shall use forms furnished by the DEPARTMENT for Change Orders.

1.08 CONTINGENCY AUTHORIZATIONS (CM/GC Contracts Only)

- A. This provision for Contingency Authorizations shall apply only to Construction Manager/General Contractor (CM/GC) construction contracts.
- B. The use of Construction Contingency and CONTRACTOR'S Contingency components of the Guaranteed Maximum Price (GMP) of CM/GC construction contracts shall occur only with the execution of a Contingency Authorization (CA) form provided by the DEPARTMENT.
- C. Contingency Authorizations shall be used only to effect change of scope within the general scope of the Contract, and to provide associated monetary compensation from contingency components of the GMP, provided such change will not result in an extension of the Contract Time.
- D. Contingency Authorizations shall not be used to extend the Contract Time. The CONTRACTOR shall follow Change Order procedures for the consideration of any change of scope that may result in an associated extension of the Contract Time.
- E. With the execution of a Contingency Authorization, the CONTRACTOR agrees to waive any claim to any time impact associated with the Work set forth in the Contingency Authorization.
- F. A Contingency Authorization shall be used to establish the use of the following contingencies:

1. Construction Contingency components of the GMP per Section 00700 – General Conditions, Paragraph 13.0.3.b.2.i. On the Contingency Authorization form, the DEPARTMENT shall sign as the issuer, and the CONTRACTOR shall sign with its acknowledgement.
2. CONTRACTOR'S Contingency component of the GMP per Section 00700 – General Conditions, Paragraph 13.0.3.b.2.ii., The CONTRACTOR shall execute the Contingency Authorization form as the issuer, and the DEPARTMENT may sign with its acknowledgement.

1.09 CHANGE PRICING AND TIME ANALYSIS

- A. Unless specified elsewhere, Section 00700 - General Conditions, Part 10 shall be applied to the negotiation of all changes to the scope of the contract.
 1. Unit Price, when unit prices are contained in the Contract.
 2. Mutually acceptable Lump Sum Price, including overhead and profit.
 3. Cost of the Work
- B. UNIT PRICE CHANGE - For unit price CHANGE PROCEDURES, prices shall be determined by multiplying the contractual unit price(s) by the estimated quantities of Work associated with changed scope. Payment will be based on the actual installed quantities. Document actual installed quantities and submit information requested by the DEPARTMENT on a daily basis for its approval and certification. Refer to Section 00700 - General Conditions, Part 10 for additional requirements.
- C. LUMP SUM PRICE CHANGE - The CONTRACTOR and the DEPARTMENT shall negotiate an equitable price (and time adjustment if appropriate) in good faith. If negotiations do not result in a mutually acceptable lump sum price, the DEPARTMENT may, at its discretion, direct the CONTRACTOR to perform the work under Cost of the Work Change Order.
- D. COST OF THE WORK CHANGE – The CONTRACTOR shall document Cost of the Work on forms acceptable to the DEPARTMENT, and shall submit documented costs to the DEPARTMENT daily for verification and certification. Cost of the Work pricing proposals shall be supported by invoices for substantiation of purchase and rental costs and with additional data as may be requested by DEPARTMENT.
- E. Time Analysis for CHANGE ORDER PROCEDURES shall be performed as described in Section 01 32 00 – Work Schedules and Reports.
- F. The DEPARTMENT shall have the right to audit all records in possession of CONTRACTOR relating to activities covered by CONTRACTOR's pricing of Contract CHANGE ORDER PROCEDURES, including Cost of the Work pricing, as set forth in Section 00700 - General Conditions. If CONTRACTOR is a joint venture, the right of DEPARTMENT shall apply collaterally to the same extent to the records of joint venture sponsor, and of each individual joint venture member.

1.10 FORM EXECUTION

- A. Contract forms issued under this section shall be effective the date the DEPARTMENT's authorized person signs the form.
- B. For Change Orders, CONTRACTOR signature will indicate acceptance of the terms or acknowledgment of order, depending on box checked. Acknowledgment of Change Order does not substitute for notification requirements of Section 00700 - General Conditions, Article 15.1.

1.11 PAYMENT

- A. The CONTRACTOR shall promptly revise its Schedule of Values and Application for Payment forms to record each authorized Change Order and each authorized Contingency Authorization as a separate line item. For Change Orders, adjust the Contract Price as shown on the Change Order.
- B. The CONTRACTOR shall promptly revise and resubmit its progress schedules to reflect any change in Contract Time, including adjustments for other items of Work affected by the change.
- C. Payment for contract changes shall be made only following the execution of Change Orders or Contingency Authorizations and the inclusion of these change documents by reference on the Application for Payment form.
- D. Payment shall not be made for Work authorized via Interim Work Authorization.

PART 2 – PRODUCTS

Not Used

PART 3 – EXECUTION

Not Used

END OF SECTION

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**SECTION 01 29 73
SCHEDULE OF VALUES**

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Requirements for preparing and submitting the schedule of values.

1.02 RELATED REQUIREMENTS

- A. Section 00700 - General Conditions: Schedule of Values.
- B. Section 01 11 13 - Summary of Work: Work sequence.
- C. Section 01 26 63 – Change Procedures
- D. Section 01 29 76 - Applications for Payment: Procedures for Applications for Payment.
- E. Section 01 32 00 – Work Schedules and Reports
- F. Section 01 33 00 – Submittal Procedures
- G. Section 01 77 00 – Contract Closeout Procedures
- H. Section 01 71 13 – Mobilization and Demobilization

1.03 FORMAT

- A. Form and content must be acceptable to DEPARTMENT.
- B. Form shall have a signature block for submission by CONTRACTOR and a signature block for approval by DEPARTMENT.
- C. Content shall include the following column headings.
 - 1. CPM Activity Number
 - 2. CPM Activity Description
 - 3. CPM Dollar Value
 - 4. Current Percent Complete
 - 5. Current Dollar Complete
 - 6. Previous Percent Complete
 - 7. Previous Dollar Complete
 - 8. Percent Complete this Period
 - 9. Dollar Complete this Period

1.04 CONTENT

- A. List installed value of each activity shown on the submitted and approved CPM Schedule.
- B. For items on which payments will be requested for stored products, list sub values for cost of stored products with taxes paid.
- C. Limits for specific line item values shall be as specified below and shall be included on all approved Schedules of Values and Applications for Payment.
 - 1. Mobilization and Demobilization: Unless specified elsewhere, the assigned values for mobilization and demobilization shall be based upon the estimated value of specified Work for each of these tasks.
 - 2. Contract Closeout Procedures: Unless specified elsewhere, the assigned values for tasks specified under Contract Closeout Procedures shall be based upon the estimated value of each task. The breakdown shall include separate amounts for the requirements of Final Completion and Final Acceptance, as set forth below:

Contract Price	Value for Final Completion	Value for Final Acceptance
Less than \$200,000	\$2,000	\$2,000
\$200,000 - \$500,000	\$5,000	\$5,000
\$500,001 - \$1,000,000	\$10,000	\$10,000
\$1,000,001 - \$5,000,000	\$20,000	\$20,000
Greater than \$5,000,000	\$30,000	\$30,000

- D. The sum of values listed on the Schedule of Values shall equal total Contract Price.
- E. A Schedule of Values containing costs for early activities in excess of actual value ("front end loading") will be rejected by the DEPARTMENT until the CONTRACTOR corrects the deficiency. The DEPARTMENT shall not be obligated to pay the CONTRACTOR until front end loading is eliminated and the Schedule of Values is approved.

1.05 SUBMITTAL

- A. Submit proposed Schedule of Values with updated CPM Schedule per specification sections for Summary of Work, Work Schedules and Reports, and Submittals.
- B. Submit Schedule of Values with updated completion percentages sufficiently in advance of each Application for Payment to enable the DEPARTMENT to resolve differences.

1.06 SUBSTANTIATING DATA

- A. When the DEPARTMENT requires substantiating information, submit data justifying line item amounts in question.
- B. Provide one copy of data with cover letter for each copy of the Application for Payment. Show application number and date, and line item by number and description.

PART 2 - PRODUCTS**Not Used**

PART 3 - EXECUTION

Not Used

END OF SECTION

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SECTION 01 29 76
APPLICATION FOR PAYMENT

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Procedures for preparation and submittal of Application for Payment.

1.02 RELATED REQUIREMENTS

- A. Section 00312 – Bid Schedule
- B. Section 00700 - General Conditions
- C. Section 00800 – Supplementary Conditions
- D. Section 01 11 13 – Summary of Work
- E. Section 01 26 63 – Change Order Procedures
- F. Section 01 31 13 – Job Site Administration
- G. Section 01 32 00 – Work Schedules and Reports
- H. Section 01 33 00 –Submittal Procedures
- I. Section 01 29 73 - Schedule of Values
- J. Section 01 45 00 – Quality Control
- K. Section 01 45 29 – Testing Laboratory Services
- L. Section 01 51 00 – Construction Facilities
- M. Section 01 52 13 – Field Offices and Sheds
- N. Section 01 57 10 – Erosion, Sediment and Pollution Control
- O. Section 01 71 13 – Mobilization
- P. Section 01 77 00 - Contract Closeout Procedures
- Q. Section 01 78 39 – Project Record Documents

1.03 FORMAT

- A. Submit Application for Payment on form approved by the DEPARTMENT.

1.04 PREPARATION OF APPLICATIONS

- A. Type required information on Application for Payment form acceptable to the DEPARTMENT.
- B. Execute certification by original signature of authorized officer upon each copy of the Application for Payment.
- C. Show breakdown of costs for each item of the Work on accepted Schedule of Values as specified in Section 01 29 73 – Schedule of Values.
- D. List each authorized Change Order as an extension on continuation sheet, listing Change Order number and dollar amount as for an original item of Work.
- E. Submit Stored Materials Worksheet with every Application for Payment requesting payment for stored materials. Show only direct costs of materials and freight. Submit documentation in accordance with Section 00700 – General Conditions, Article 13.5 Stored Materials and Equipment, for materials shown in column titled “New Material This Pay Request Period.”

1.05 SUBMITTAL PROCEDURES

- A. Submit two originals of each Application for Payment at one-month intervals. Each document shall bear original signature of authorized executive.
- B. Submit with DEPARTMENT-approved transmittal letter bearing DEPARTMENT's project number.

1.06 SUBSTANTIATING DATA

- A. When DEPARTMENT requires substantiating information, submit all requested data justifying line item amounts in question.
- B. Provide one copy of data with cover letter for each copy of Application for Payment. Show Application for Payment number and date, and line item by number and description.

1.07 SUBMITTALS WITH APPLICATION FOR PAYMENT

- A. Submit the following for review sufficiently in advance of Application for Payment to allow detailed review by DEPARTMENT and resolution of differences.
 - 1. Schedule of Values with updated percentages of completion as required by Section 01 29 73 – Schedule of Values.
- B. Submit the following with each Application for Payment.
 - 1. Updated construction schedule as required by Section 01 32 00 – Work Schedules and Reports.
 - 2. Updated Project Record Documents as required by Section 01 78 39 – Project Record Documents.

3. Letter certifying that all Project Record Documents, including record drawings and submittals are current.

1.08 ADDITIONAL REQUIREMENTS FOR FIRST APPLICATION FOR PAYMENT

- A. The first Application for Payment will be processed after the Resident Engineer has received all of the following:
 1. Superintendent Data (Section 00700 – General Conditions, Article 6.2)
 2. Progress Schedule (Section 00700 – General Conditions, Paragraph 6.6.1, & Section 01 32 00 – Work Schedules and Reports)
 3. Schedule of Values (Section 00700 – General Conditions, Paragraph 6.6.2, & Section 01 29 73 – Schedule of Values)
 4. Submittal Schedule (Section 00700 – General Conditions, Paragraph 6.6.2)
 5. Safety Representative Designation (Section 00700 – General Conditions, Article 6.18)
 6. Building Permits (Section 00700 – General Conditions, Article 7.2)
 7. Name of Individual Authorized to Accept Changes (Section 01 26 63 – Change Order Procedures)
 8. CONTRACTOR's Management Team (Section 01 31 13 – Job Site Administration)
 9. CONTRACTOR Quality Control Program and Plan (Section 01 45 00 – Quality Control)
 10. National Bureau of Standards Inspection Report (Section 01 45 29 – Testing Laboratory Services)
 11. Freeze Protection Plan (Section 01 51 00 – Construction Facilities)
 12. Construction Site Layout Plan (Section 01 71 13 – Mobilization and Demobilization)
 13. Traffic Control Plan and Haul Routes (Section 01 11 13 – Summary of Work)
 14. Schedule for Dust and Air Pollution Abatement (Section 01 57 10 – Erosion, Sediment and Pollution Control)
 15. Pre-Construction Property and Structure Assessments (Section 01 51 00 – Construction Facilities)
 16. Hazardous Material Control Plan (Section 01 57 10 – Erosion, Sediment and Pollution Control)
 17. Notice of Intent (Section 01 57 10 – Erosion, Sediment and Pollution Control)
 18. Project Summary (Section 01 57 10 – Erosion, Sediment and Pollution Control)
 19. Temporary Facilities Plan. (Section 01 52 13 – Field Offices and Sheds)

PART 2 - PRODUCTS

Not Used

PART 3 - EXECUTION

Not Used

END OF SECTION

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SECTION 01 31 13
JOB SITE ADMINISTRATION

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. General requirements for the administration of the construction contract.

1.02 RELATED REQUIREMENTS

- A. Section 00700 – General Conditions
- B. Section 01 29 76 – Application for Payment
- C. Section 01 31 14 – Work Coordination
- D. Section 01 32 00 – Work Schedules and Reports
- E. Section 01 33 00 – Submittal Procedures
- F. Section 01 45 00 – Quality Control
- G. Section 01 77 00 – Contract Closeout Procedures
- H. Section 01 79 00 – Demonstration and Training

1.03 DEPARTMENT PROJECT MANAGEMENT TEAM

- A. The DEPARTMENT's Contracting Officer will issue a Delegation of Authority letter to the CONTRACTOR after Contract Award.
- B. The Delegation of Authority letter will designate the members of the DEPARTMENT's project management team, and delegate levels and limitations of contractual authority, all in accordance with Section 00700 - General Conditions, Article 2.1 Authorities and Limitations.
- C. The CONTRACTOR shall sign the Delegation of Authority letter to acknowledge its understanding of the instructions contained therein.

1.04 CONTRACTOR'S PROJECT MANAGEMENT TEAM

- A. For Construction Manager/General Contractor (CM/GC) construction contracts, the CONTRACTOR shall staff the construction project for its entire duration with the same personnel as proposed in the CM/GC proposal for pre-construction services.
- B. Regardless of delivery method, the CONTRACTOR's Project Management Team shall be capable of performing the following duties, including but not limited to:

1. Maintain the schedule in the progress of Work and resolve construction related issues.
2. Coordinate permitting and construction activities to ensure timely completion of the Work.
3. Maintain a CPM schedule as specified in Section 01 32 00 - Work Schedules and Reports.
4. Coordinate construction activities of suppliers and subcontractors with those of the CONTRACTOR and each other to ensure timely deliveries for installation.
5. Coordinate and effectively manage the construction activities of subcontractors to maintain the Contract schedule and quality requirements.
6. Coordinate necessary inspections with the DEPARTMENT, approved Testing Laboratory, and other agencies as required for the progress of the Work.
7. Participate in Project meetings with the DEPARTMENT and the Architect/Engineering Team to review the progress of the construction, and identify and resolve outstanding construction-related issues.
8. Coordinate the installation, operation and maintenance of temporary utilities required during construction.
9. Prior to submittal of Shop Drawings, Product Data, Samples and other submittals, as specified in Section 01 33 00 -- Submittal Procedures, review for compliance with the Contract Documents and coordination with other work.
 - a. Check field dimensions and clearance dimensions.
 - b. Check relation to available space.
 - c. Check anchor bolt settings.
 - d. Review the effect of changes, if any, on the Work of other subcontracts or by others.
 - e. Check compatibility of equipment and work of the various trades.
 - f. Check motor voltages and control characteristics.
 - g. Coordinate controls and interlocks: Voltages and wiring of electric switches and relays.
 - h. Coordinate wiring and control diagrams.
 - i. Certify compliance with Contract Documents or list differences.
10. Prepare coordination drawings, as specified in Section 01 31 14 - Work Coordination.
 - a. Prepare, as required to ensure coordination of Work of, or affected by mechanical and electrical Work, or to resolve conflicts
 - b. Reproduce and distribute reviewed copies to all concerned parties
11. Observe required testing and maintain a record of tests. Document in the record:
 - a. Testing Laboratory and name of inspector
 - b. Subcontractor
 - c. Manufacturer's representative present
 - d. Date and time of testing
 - e. Type of product or equipment
 - f. Type of test, and test results
 - g. Location of each test
 - h. Retesting required

- i. Other documentation upon request
 - 12. Verify that Subcontractors maintain an accurate and up-to-date set of Contract Documents and record documents.
 - 13. Observe the work for compliance with requirements of the Contract Documents, maintaining a list of observed deficiencies and discrepancies.
 - 14. Equipment Start-up:
 - a. Check to ensure that utilities and specified connections are complete and that equipment is in operable condition.
 - b. Observe testing, adjusting, and balancing.
 - c. Record results, including time and date of start-up.
 - 15. Inspection of Equipment:
 - a. Prior to inspection, check that equipment is clean, repainted as required, tested, and operational.
 - b. Assist inspector; prepare list of items to be completed or corrected.
 - 16. Assemble Project Record Documents from subcontractors and ensure that completed Project Record Documents are submitted to the DEPARTMENT in accordance with Section 01 77 00 - Contract Closeout Procedures, and other requirements of the Contract Documents.
- C. Execute Request for Information (RFI) Procedures.
- 1. Submit RFIs in writing to the DEPARTMENT in a format approved by the DEPARTMENT.
 - 2. The response to the RFI is formally issued to the CONTRACTOR when the DEPARTMENT signs and issues formal direction to the CONTRACTOR.
 - 3. The DEPARTMENT may request it's Architect/Engineers of record to provide recommendations before the DEPARTMENT issues the RFI response to the CONTRACTOR.
- D. Upon request, the CONTRACTOR shall submit all correspondence, including letters, memoranda, meeting minutes, transmittals, Request for Information, technical submittal transmittals, Requests for Change, specified Notices, and any other documentation using forms and format provided by or otherwise approved by the DEPARTMENT.

PART 2 – PRODUCTS

Not Used

PART 3 – EXECUTION

Not Used

END OF SECTION

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SECTION 01 31 14
WORK COORDINATION

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Project Work coordination, and coordination with work of other contracts.

1.02 RELATED REQUIREMENTS

- A. Section 00700 – General Conditions
- B. Section 01 11 13 – Summary of Work
- C. Section 01 31 13 – Job Site Administration
- D. Section 01 72 00 – Utilities Coordination
- E. Section 01 73 29 – Cutting and Patching

1.03 REQUIREMENTS

- A. Coordinate work of various sections of Specifications to assure efficient and orderly sequence of installation of construction elements, with provisions for accommodating items installed by DEPARTMENT or under separate contracts.
- B. Verify that characteristics of elements of interrelated operating equipment are compatible; coordinate work of various sections that have interdependent responsibilities for installing connection to, and placing such equipment in service.
- C. Coordinate space requirements and installation of electrical, mechanical, and other special work, which are indicated diagrammatically on the Contract Drawings. Follow routing shown for ducts, conduits, pipes etc., as closely as practicable; make runs parallel with lines of buildings and roads. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.
- D. Conceal ducts, wiring, and pipes in finished areas unless otherwise indicated. Coordinate locations of fixtures and outlets with finish elements.
- E. Whenever the Work of a Subcontractor is dependent upon the Work of other Subcontractors, contractors, or utility company contractors installing utilities under contract with the DEPARTMENT, then the CONTRACTOR shall require the Subcontractor to:
 - 1. Coordinate its Work with the dependent work.
 - 2. Provide dependent data and requirements.
 - 3. Supply and install items to be built into dependent work of others.
 - 4. Make provisions for dependent work of others.
 - 5. Examine dependent drawings, specifications and submittals.

6. Examine previously placed dependent work.
7. Check and verify dependent dimensions of previously placed work.
8. Notify CONTRACTOR of previously placed dependent work or dependent dimensions, which are unsatisfactory or will prevent a satisfactory installation of its Work.
9. Not proceed with its Work until the unsatisfactory dependent conditions have been corrected.
10. CONTRACTOR shall require subcontractors to participate in coordination meetings as required by the DEPARTMENT.

F. Not Used

PART 2 – PRODUCTS

Not Used

PART 3 – EXECUTION

Not Used

END OF SECTION

SECTION 01 31 19
PROJECT MEETINGS

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Requirements for various meetings during the construction project.

1.02 RELATED REQUIREMENTS

- A. Section 01 11 13 - Summary of Work: Coordination of Work.
- B. Section 01 32 00 – Work Schedules and Reports: Progress Schedules.
- C. Section 01 33 23 - Shop Drawings, Product Data, and Samples.
- D. Section 01 45 00 - Quality Control: CONTRACTOR responsibilities.
- E. Section 01 73 00 – Execution Requirements; Project Record Documents; Operation and Maintenance Data.
- F. Section 01 79 00 – Demonstration and Training

1.03 PRECONSTRUCTION CONFERENCES

- A. DEPARTMENT will administer preconstruction conference for execution of Contract and exchange of preliminary submittals. Attendance by all key CONTRACTOR and Subcontractor project personnel is required. The CONTRACTOR shall notify and invite in writing to the pre-construction conference all serving utilities at least 72 hours in advance of the conference.
- B. DEPARTMENT may administer site mobilization conference at Project site for clarification of CONTRACTOR responsibilities in use of site and for review of administrative procedures.
- C. DEPARTMENT will document the meeting and distribute minutes within 48-hours of adjournment. Minutes will be typed, reflecting date, list of attendees and in format to facilitate correction of previous meeting minutes. Distribution will be to all attendees and those affected by discussions or decisions made at meeting.

1.04 PREINSTALLATION CONFERENCES

- A. When required in an individual specification section, and as shown in the CONTRACTOR's quality control plan, or as directed by the DEPARTMENT, convene a pre-installation conference prior to commencing Work for a specific item.
- B. Require attendance of entities directly affecting, or affected by, Work of the section.

- C. Review conditions of installation, preparation and installation procedures, and coordination with related Work.
- D. Record significant discussions and agreements and disagreements of each conference, and approved schedule. Distribute record of conference to all attendees within 24-hours of adjournment.

1.05 WEEKLY PROGRESS MEETINGS

- A. The CONTRACTOR shall administer Weekly Progress Meetings on a regular day and time, which is mutually convenient to both the DEPARTMENT and the CONTRACTOR. These meetings shall be documented by the CONTRACTOR.
- B. Weekly Progress Meeting shall be attended by all key CONTRACTOR and, as appropriate, Subcontractor project personnel.
- C. The CONTRACTOR shall furnish copies of its current Two Week Look Ahead Schedule, per Section 01 32 00 – Work Schedules and Reports, to all attendees of the meeting. This schedule will be reviewed in detail during the meeting and will be used for the coordination of activities by others.
- D. Weekly Progress Meetings will also be used to review other key aspects of the Work, such as safety, quality, critical items, etc.
- E. Meeting Minutes: The CONTRACTOR shall document the meetings and distribute minutes within 48-hours of adjournment. Minutes shall be typed, reflecting date, attendees, and in format to facilitate correction of previous meeting minutes. Distribution shall be to all attendees and those affected by discussions or decisions made at meeting.

1.06 SAFETY MEETING

- A. The CONTRACTOR shall conduct Safety Meetings as required by its project Safety Program.
- B. The CONTRACTOR shall invite the DEPARTMENT to attend Safety Meetings.

1.07 OTHER MEETINGS

- A. At various times throughout the duration of the Contract, the CONTRACTOR will be required to attend meetings as requested by the DEPARTMENT. It is anticipated that such meetings will involve coordination with others, project schedule review, problem resolution, change order negotiations, and other topics of mutual importance.

PART 2 – PRODUCTS

Not Used

PART 3 – EXECUTION

Not Used

END OF SECTION

SECTION 01 32 00
WORK SCHEDULES AND REPORTS

PART 1 – GENERAL

1.01 SECTION INCLUDES

- A. Requirements for the preparation and maintenance of the construction CPM schedule, recovery schedules, time impact evaluation, monthly project status reports, two week look-ahead schedules, and daily construction reports.

1.02 RELATED REQUIREMENTS

- A. Section 00700 – General Conditions
- B. Section 00800 – Supplementary Conditions
- C. Section 01 11 13 – Summary of Work
- D. Section 01 26 63 – Change Order Procedures
- E. Section 01 29 73 – Schedule of Values
- F. Section 01 29 76 – Application for Payment
- G. Section 01 31 13 – Job Site Administration
- H. Section 01 31 19 – Project Meetings
- I. Section 01 33 00 – Submittal Procedures

1.03 SUMMARY

- A. Scheduling of Work under this Contract shall be performed by CONTRACTOR in accordance with the requirements of this Section.
- B. CPM Schedule shall be based upon, and incorporate, Contract milestone and completion dates as specified in Section 00800, Supplementary Conditions, and Section 01 11 13, Summary of Work.
- C. Definitions
 - 1. Project Schedule - The schedule prepared or updated by the CONTRACTOR to the requirements specified herein. The project schedule shall be used to measure the progress of the work and aid in the evaluation of time impacts to the project.
 - 2. Anticipated CPM Schedule - The schedule prepared by the CONTRACTOR defining the planned work in the first 90 calendar days of the contract.
 - 3. Interim CPM Schedule for Design Build - The schedule prepared by the CONTRACTOR for Design Build projects where the Finalized CPM Schedule cannot be completed until after completion of design.

4. Finalized CPM Schedule - The baseline schedule prepared by the CONTRACTOR that shows the sequence and dates in which the CONTRACTOR proposes to perform the work. Once approved, it becomes the basis upon which the CONTRACTOR performs periodic schedule updates.
5. Periodic Schedule Updates - Progress updates to the approved project schedule, shall occur monthly prior to, and included with, each pay application.
6. Time Impact Evaluation (TIE) - Forward looking schedule analysis technique that adds a modeled delay to an accepted contract schedule to determine the possible impact of that delay to the project completion.
7. Fragnet - A sequence of new activities that are proposed to be added to project schedule to demonstrate the influence of the delay or impact to the project's contractual dates. A Fragnet is created using a 'Reflection' of the approved project schedule that immediately preceded the delay.

D. Required Schedules

1. Anticipated CPM Schedule - Submit the Anticipated CPM Schedule, defining the CONTRACTOR's planned operations for the first 90 Calendar days after Notice-to-Proceed, for approval within 15 Calendar days after the NTP is acknowledged, or at the preconstruction conference, whichever comes first. The approved Anticipated Preliminary Project Schedule will be used for payment purposes not to exceed 90 Calendar days after NTP. It may be summary in nature for the remaining performance period. It must be early start (Start On) and late finish (Finish On or Before) constrained and logically tied as specified in this Section. The Anticipated CPM Schedule forms the basis for the Finalized CPM Schedule specified herein, and must include all of the required Plan and Program preparations, submissions, and approvals identified in the contract (for example, Quality Control Plan, Safety Plan, Environmental Protection Plan, etc.) as well as, if applicable, design activities, the planned submissions of all early design packages, permitting activities, design review conference activities and other non-construction activities intended to occur within the first 90 Calendar days. Schedule any Construction activities planned for the first 90 Calendar days after NTP. DEPARTMENT acceptance of the associated design package(s), if applicable, and all other specified Plan and Program approvals that must occur prior to any planned construction activities by CONTRACTOR. The DEPARTMENT and CONTRACTOR shall meet to discuss the Anticipated CPM Schedule within 10 working days after its submittal. The CONTRACTOR shall make corrections to the schedule necessary to comply with Contract requirements and shall adjust the schedule to incorporate any missing information requested by the DEPARTMENT. The CONTRACTOR shall resubmit the Anticipated CPM Schedule if requested by DEPARTMENT.
2. Interim CPM Schedule for Design Build - Submit the Interim CPM Schedule for Design Build projects detailing design and permitting activities, including but not limited to, identification of individual design packages, design submission, reviews and conferences; permit submissions and any required DEPARTMENT actions; and long lead item acquisition prior to design completion. As the design proceeds, and design packages are developed, fully detail the remaining construction activities concurrent with the monthly schedule updating process. When the design is

complete, prepare the Finalized CPM Schedule to incorporate into the then approved schedule update all remaining detailed construction activities that are planned to occur. The schedule shall demonstrate a reasonable and realistic sequence of activities which represent all work through the entire contract performance period. The Finalized CPM Schedule shall be at a reasonable level of detail as determined by the DEPARTMENT.

3. Finalized CPM Schedule - Submit the Finalized CPM Schedule for approval within 60 Calendar days after NTP. The schedule shall demonstrate a reasonable and realistic sequence of activities which represent all work through the entire contract performance period. In accordance with Section 00700 - General Conditions, the Finalized CPM Schedule shall be submitted prior to the first progress payment. The DEPARTMENT's review and approval of the Finalized CPM schedule shall be a prerequisite to the application for the second progress payment. The Finalized CPM Schedule shall be at a reasonable level of detail as determined by the DEPARTMENT.
 4. Monthly Updates and Status Reports
 5. Revision, Time Impact Evaluation (TIE), and Recovery Schedules
 6. Record Drawing Schedule
- E. Failure of the CONTRACTOR to meet the requirements of this specification may result in the disapproval of the Anticipated, Interim, Finalized, or Periodic Schedule Updates. In the event that the DEPARTMENT directs schedule revisions, and those revisions have not been included in subsequent project schedule revisions or updates, the Contracting Officer may not pay for the applicable activities until such revisions to the project schedule have been made.
- F. Basis for Payment and Cost Loading - Inspections of work progress shall be the basis for determining contract earnings during each update period and therefore the amount of each progress payment. The schedule shall be updated to reflect to outcome of these inspections. Activity cost loading shall be reasonable, as determined by the DEPARTMENT. Front loading activities will not be allowed.
- G. Schedules and Reports shall be submitted as specified in Sections 01 32 19, 01 33 00, Submittal Schedule and Submittal Procedures.
- H. CPM Schedule shall be the basis for Two Week Look Ahead Schedule presentation at Weekly Progress Meeting as specified in Section 01 31 19, Project Meetings.

1.04 SCHEDULER QUALIFICATIONS

- A. Designate an authorized representative to be responsible for the creation and maintenance of the project schedule including all updates, narratives, and reports. The authorized representative shall have 2 years experience scheduling projects similar in nature to this project with scheduling software that meets the requirements of this specification. The

resume of the authorized representative detailing the qualifying experience shall be submitted and approved by the DEPARTMENT.

1.05 SOFTWARE REQUIREMENTS

- A. Development of Schedule, Monthly Payment Requests, Schedule Updates, and Project Status Reporting Requirements of the Contract shall employ computerized Critical Path Method (CPM) scheduling, using Primavera P6 Rel 6.2 or later.

1.06 GENERAL REQUIREMENTS

- A. Develop the Project Schedule to an appropriate level of detail, as determined by the DEPARTMENT. Failure to develop the Project Schedule to the appropriate level of detail will result in its disapproval. Inaccuracy and/or the omission of any element of the Work by the CONTRACTOR will not relieve the CONTRACTOR of the responsibility for accomplishing the Work, in accordance with Contract Documents. The DEPARTMENT's acceptance of the schedule shall be for its use in monitoring and evaluating job progress, payment requests, time extension requests, and the like; and shall not, in any manner, impose a duty of care upon the DEPARTMENT; nor act to relieve the CONTRACTOR of its responsibility for the means and methods of construction. The DEPARTMENT will consider, but is not limited to, the following characteristics and requirements to determine appropriate level of detail:
 - 1. Activity Durations - Reasonable activity durations are those that allow the progress of ongoing activities to be accurately determined between update periods. No construction activity shall have Original Durations greater than one month's worth of work (20 working days or 30 calendar days).
 - 2. Design and Permit Activities - Include design and permit activities with the necessary conferences and follow-up actions and design package submission dates. Include the design schedule in the project schedule showing the sequence of events involved in carrying out the project design tasks within the specific contract period. This shall be at a detailed level of scheduling sufficient to identify all major design tasks, including those that control the flow of work. The schedule shall include review and correction periods associated with each item.
 - 3. Procurement Activities - Include activities associated with the submittal, approval, procurement, fabrication and delivery; of critical materials, equipment, fabricated assemblies and supplies. This will include all procurement activities that will have a direct impact on construction activities. Additionally, include activities on all long lead materials, equipment, fabricated assemblies and supplies. Long lead procurement activities are those with an anticipated procurement sequence of over 30 calendar days. These activities shall be logically tied to the submission and approval of product info/shop drawings, and the related construction installation activity.
 - 4. Mandatory Task - The following activities shall be included in the initial project schedule and all updates. The CONTRACTOR shall be responsible for all impacts resulting from resubmittal of shop drawings and submittals.
 - a. Submission and approval of design packages, if applicable.

- b. Submission and approval of SWPPP
 - c. Long material procurement activities.
 - d. Submission and approval of mechanical and electrical equipment.
 - e. Submission and approval of O&M Manuals.
 - f. Submission and approval of Record drawings.
 - g. Submission of Certificate of Occupancy.
 - h. Submission of Spare Parts & Maintenance Materials.
 - i. Submission of Warranties and Bonds.
 - j. Submission of Keys and Keying Schedule.
 - k. Request for Substantial Completion Inspection as specified in 01 77 00 Contract Closeout Procedures.
 - l. Submission and approval of Testing and Air Balance (TAB) results.
 - m. Submission and approval of HVAC commissioning/testing plans and data. (Develop the schedule logic associated with testing and commissioning of mechanical systems to a level of detail consistent with the contract commissioning requirements.)
 - n. Submission and approval of Controls Testing Plan.
 - o. Controls Testing.
 - p. Performance Verification Testing.
 - q. Other systems testing, if required.
 - r. Demonstration and Training
 - s. Final Cleaning.
 - t. Substantial Completion Inspection.
 - u. Substantial Completion.
 - v. Final Completion Inspection.
 - w. Final Completion.
5. DEPARTMENT Activities - Show DEPARTMENT and other agency activities that could impact progress. These activities include, but are not limited to, DEPARTMENT approvals, design reviews, review conferences, release for construction of design package(s), environmental permit approvals by State regulators, inspections, utility tie-ins, DEPARTMENT furnished equipment and Notice to Proceed (NTP) for phasing requirements. Unless otherwise agreed upon by CONTRACTOR and DEPARTMENT, DEPARTMENT approval activities shall be on a 7 day calendar with an Original Duration of 30 days.
6. Work Break-down Structure (WBS) - The project schedule shall be organized using WBS. (This is separate from, and in addition to, the use of Activity Codes; which are addressed below.) The WBS shall include all major elements of the scope of work including, but not limited to, the following elements:
- a. Milestones
 - b. Modifications
 - c. Design
 - d. Submittals
 - e. Approvals
 - f. Procurement
 - g. Construction

- h. Commissioning/Testing/Start-up
 - i. Close-out Submittals
 - j. Close-out Approvals
 - k. Inspections
7. Activity Coding - All Activity Codes shall be developed and assigned to activities as detailed herein. Some Activity Codes may not be used, but only at DEPARTMENT's discretion.

RESP Responsible Party (e.g. Prime CONTRACTOR, Subcontractor, DEPARTMENT)

AREA Area of Work

PHAS Phase of Work

MODF Modification to Contract

CATW Category of Work

FOW Feature of Work

- a. RESP Responsible Party - Assign responsibility code for all activities to the Prime CONTRACTOR, Subcontractor, or Government agency responsible for performing the activity. The list of activities to be coded with a DEPARTMENT Responsibility include, but is not limited to, DEPARTMENT approvals, DEPARTMENT design reviews, environmental permit approvals by State regulators, DEPARTMENT furnished property/equipment, Notice to Proceed (NTP). Code all activities not coded to the DEPARTMENT to the Prime CONTRACTOR or Subcontractor responsible to perform the work. Activities shall not have more than one Responsibility Code. Codes should be descriptive of the scope of work, for example DSGN (for designer of record), ELEC (for electrical Subcontractor), MECH (for mechanical Subcontractor), PRIM for Prime CONTRACTOR, and DEPT (for DEPARTMENT activities).
- b. AREA Area of Work - Assign Work Area code to activities based upon the work area in which the activity occurs. Define work areas based upon resource constraints or space constraints that would preclude a resource, such as a particular trade or craft work crew from working in more than one work area at a time due to restraints on resources or space. Examples of Work Area Coding include different areas within a floor of a building, different floors within a building, and different buildings within a complex of buildings. Activities shall not have more than one Work Area Code. Not all activities are required to be Work Area coded. A lack of Work Area coding will indicate the work area is not resource or space constrained.
- c. PHAS Phase of Work Coding - Assign Phase of Work code to all construction activities if the contract specifies phasing with separately defined performance periods. Identify a Phase Code to allow filtering and organizing the schedule accordingly. Each activity shall have only one Phase of Work code.
- d. MODF Modification of Contract - Assign a Modification of Contract code to any activity or sequence of activities added to the schedule as a result of a Contract Modification, after approval by DEPARTMENT. An activity can have only one Modification of Contract code.

- e. CATW Category of Work - Assign a Category of Work code to all activities. Category of Work codes include, but are not limited to, milestone, design submittal, design approval, design review conference, submittal, approval, procurement, permit, installation, weather sensitive installation, commissioning/testing, inspection, contract requirement. Each activity shall have only one Category of Work Code.
 - f. FOW Feature of Work - Assign a Feature of Work code to all construction activities based upon the definable feature of work to which the activity belongs. Use the Specification numbering system for the Code Value.
8. Contract Constraints and Milestones - The CONTRACTOR shall follow the parameters as specified herein for all schedules.
- a. Constraints - The schedule shall have no constrained dates other than those specified herein. Additional constraints may be approved by the DEPARTMENT on a case by case basis. The use of artificial float constraints, such as 'zero free float' or 'zero total float,' are prohibited. Additionally, Mandatory Start, Mandatory Finish, Finish On, and As Late As Possible constraints are prohibited.
 - i. Project Start Date Constraint - The first activity in the project schedule shall have a Start On constraint equal to the date that the NTP was acknowledged.
 - ii. Substantial Completion Constraint - The Substantial Completion activity shall have a Finish On or Before constraint equal to the contractual Substantial Completion Date.
 - b. Milestones - Use of milestone activities shall be held to a minimum. Milestone activities may be used for significant project events including, but not limited to, project phasing, project start and end activities, or interim completion dates. The following are required Milestone activities:
 - i. Project Start Date Milestone - The first activity in the project schedule shall be a Start Milestone titled 'Start Project (NTP).'
 - ii. Substantial Completion Milestone - The Substantial Completion activity shall be a Finish Milestone titled 'Substantial Completion DD-MMM-YY.' If the schedule calculates an early finish, then the float calculation for the 'Substantial Completion DD-MMM-YY' milestone shall reflect positive float on the longest path of logic. If the project schedule calculates a late finish, then the 'Substantial Completion DD-MMM-YY' milestone float calculation shall reflect negative float on the longest path. The DEPARTMENT is under no obligation to accelerate DEPARTMENT activities to support CONTRACTOR's early completion. The DEPARTMENT may reject an earlier (advanced) schedule, i.e. one that shows early completion dates for the Contract Milestones.
 - iii. Final Completion Milestone - The last activity in the schedule shall be a Finish Milestone titled 'Final Completion.'

9. The CONTRACTOR shall not be entitled to extra compensation in the event that a schedule is approved showing an earlier completion than is contractually required; but then completes the project, for whatever reason, beyond the completion date shown in the earlier approved schedule; but within the Contract performance period.
10. Ownership of Float - Float available in the schedule, at any time, shall not be considered for the exclusive use of either the DEPARTMENT, nor the CONTRACTOR. This includes Activity Float and Project Float. Activity Float is the length of time that an activity can be delayed without causing a delay to the 'End Project (CCD)' finish milestone. Project Float is the length of time between the CONTRACTOR's projected early finish and the Contract Completion Date milestone.
11. Calendars - Activities will be assigned a Project Specific Calendar to which the activity logically belongs. Calendars should be developed to accommodate any contract defined work period such as a '7-day no holidays' calendar for DEPARTMENT approval periods, concrete cure times, etc. The Default Calendar on the Project Level should be developed to include weekends and holidays. At a minimum, there should be both '7-day no holidays' and a '5-day w/ holidays' Project Specific calendars. For projects that include activities that are affected by adverse weather, an additional Project Specific calendar that includes weekends and holidays, as applicable, should be developed that blocks out the Winter Shut-down period as non-work days. When setting up the Project Specific calendars, with the 'Detailed work hours/day' radio button checked, click on the Workweek button on the bottom right hand side. Set the Standard work hours to be from 0800 to 1600 with no 'lunch' break blocked out. (Elsewhere in this specification, the required project administrative parameters set a 'day' as equivalent to 8 hours. For the purposes of establishing Original Durations, a day is a day. Even if CONTRACTOR intends to work 10 hrs/day or 12 hrs/day, to accurately calculate progress, the Calendars must match the 8 hrs/day setting.)
12. Open Ended Logic - There shall be only two open ended activities; the first activity 'Start Project (NTP)' shall have no Predecessor logic, and the last activity "Final Completion' shall have no Successor logic. Predecessor open ended logic may be allowed in time impact analyses, upon the DEPARTMENT's approval.
13. Default Progress Data Disallowed - Actual Start and Finish dates shall not automatically update with default mechanisms included in the scheduling software. Updating of the percent complete and the remaining duration of any activity shall be independent functions. Program features that calculate one of these parameters from the other shall be disabled. Activity Actual Start (AS) and Actual Finish (AF) dates assigned during the updating process shall match those dates provided in the CONTRACTOR Quality Control Reports. Failure of the CONTRACTOR to document the AS and AF dates in the Daily Quality Control report shall result in disapproval of the CONTRACTOR's schedule.
14. Out-of Sequence Progress - Activities that have progressed before all preceding logic has been satisfied (Out-of-Sequence progress) are not allowed. Logic must be corrected (e.g. changing the relationship from FS to SS to match actual field conditions) so that the error log is clear of any Out-of-Sequence logic.
15. Original Duration - Activity Original Duration (OD) changes are prohibited unless approved by DEPARTMENT. Remaining duration shall be used to make activity

duration changes, after an activity has started, when progressing the project schedule.

16. Negative Lags and Start to Finish (SF) Relationships - Lag durations contained in the project schedule shall not have a negative value under any circumstances. Start to Finish (SF) relationships are prohibited.
17. Retained Logic - Schedule calculations shall retain the logic between predecessors and successors ('Retained Logic' mode) even when the successor activity has started and the predecessor activity has not yet finished (Out-of-Sequence logic). Software features that in effect sever the tie between predecessor and successor activities when the successor has started and the predecessor logic is not satisfied ('Progress Override') is not allowed.

B. COST LOADING THE SCHEDULE

1. After the schedule has been approved by DEPARTMENT, create and submit a Schedule of Values (SOV) spreadsheet to cost load each pay activity. The SOV spreadsheet should include the same WBS structure as the approved schedule for ease of reference. Each pay activity should be categorized under the appropriate WBS. Create a Row below the Column Header Row that provides totals for each cost column. The page header shall include the Project Number, Project Name, Date, Pay Application Number, and Project Total Cost or GMP amount. Include the following columns:
 - a. Activity ID
 - b. Activity Name
 - c. Budgeted Total Cost
 - d. Previous Billings
 - e. Current Month Billing
 - f. Remaining Total Cost
 - g. Percent Complete
2. For CM/GC projects, Include an activity labeled 'General Conditions.' Assign the activity a Budgeted Total Cost equivalent to the currently approved NTE amount for reimbursable expenses. Do not assign a value to any other General Conditions activities such as Mobilization, Submittal Preparation, etc.
3. Each month include on the Narrative Report a list of activities that have had a Budgeted Cost change, including all added and deleted activities, with an explanation each change. Any change to the SOV must be approved by the DEPARTMENT.
4. For Procurement activities, only actual procurement costs are billable. Do not include any profit, overhead, or any other form of markup.
5. The Anticipated CPM and Interim CPM schedules shall be based upon a Schedule of Values approved by the DEPARTMENT, and will be used as basis for monthly progress payments until approval of the Finalized CPM Schedule.
6. The value assigned to each activity shall be an accurate representation of the total cost to perform each activity; including the total for labor, material (unless a separate procurement activity exists), and equipment costs. Front loading the schedule in any way is prohibited. The sum of all tasks shall equal the total Contract price.

7. The SOV spreadsheet must be approved by DEPARTMENT prior to submittal of any pay applications.
8. To allow for proper schedule management, cost load the correction of punch list from DEPARTMENT Substantial Completion Inspection activity not less than 1 percent of the total contract value.

C. PROGRESSING THE SCHEDULE

1. Percent Complete – CONTRACTOR and DEPARTMENT shall on a monthly basis review project progress and establish the approved percent complete for each activity started, based upon the realistic assessment of earned value. CONTRACTOR will then update the schedule with Actual Start, Actual Finish, Percent Complete, and Remaining Duration. Activities which are complete but for remaining minor punch list work, and which do not restrain the initiation of successor activities, may be declared 100 percent complete. The Substantial Completion Inspection activity may be declared 100 percent complete upon completion and correction of all punch list work identified during DEPARTMENT Substantial Completion Inspection(s).
2. Remaining Duration - Update the Remaining Duration on any activity that has started but is not yet finished. Remaining Duration should be a realistic assessment of the amount of days remaining to complete that activity.

D. PROJECT SCHEDULE SUBMISSIONS - Provide the submissions as described below. The data CD, reports, and Network Diagrams required for each submission are contained in paragraph 5.4.2.

1. Periodic Schedule Updates
 - a. The CONTRACTOR shall update the project schedule on a monthly basis. The updated project schedule shall be submitted to the DEPARTMENT for approval at the periodic schedule update meetings as prescribed in paragraph 5.4.3. These submissions will enable the DEPARTMENT to assess CONTRACTOR's progress. If the CONTRACTOR fails or refuses to furnish the information and schedule updates as set forth herein, then the CONTRACTOR shall be deemed not to have provided an estimate upon which a progress payment can be made. For Design-Build projects, update the schedule to include detailed construction activities as the design progresses, but not later than the submission of the final, un-reviewed design submission for each separate design package. The Contracting Officer may require submission of detailed schedule activities for any distinct construction that is started prior to submission of a final design submission, if such activity is authorized.
 - b. Neither updating, changing or revising of any report, curve, schedule or narrative submitted to the DEPARTMENT by the CONTRACTOR under this Contract, nor the DEPARTMENT's review or acceptance of any such report, curve, schedule or narrative shall have the effect of amending or modifying, in any way, the Contract Substantial Completion date or milestone dates or of modifying or limiting, in any way, the CONTRACTOR's obligations under this Contract.

2. Submittal Requirements - Each submittal shall have as its face document a completed DEPARTMENT-furnished submittal summary form. Submittals received from sources other than the CONTRACTOR will be returned to the CONTRACTOR without the DEPARTMENT's review. Submit the following items for the Anticipated CPM, Interim CPM, Finalized CPM, and every Periodic Schedule Update throughout the life of the project:
 - a. Data CDs - Provide two sets of data CDs or DVDs containing the current project schedule and all previously submitted schedules in the format of the scheduling software (i.e. .xer). Also, include on the data CDs the Narrative Report, Network Diagram Report, SOV spreadsheet, and all required Schedule Reports. Label each CD indicating the type of schedule (Anticipated, Interim, Finalized, Update #), full project number, Data Date, Submittal Number and file name. Each schedule shall have a unique file name and use project specific settings.
 - b. Narrative Report - Provide a Narrative Report with each schedule submission. The narrative report is expected to communicate to the DEPARTMENT the CONTRACTOR's thorough analysis of the schedule output and its plans to compensate for any problems, either current or potential, which are revealed through that analysis. Two hard copies of the Narrative Report shall accompany the submittal package. The Narrative Report shall include the following information as a minimum:
 - i. Project number, Date, Data Date, File Name, Update Number
 - ii. Critical Path - Show all activities on the critical path. The critical path is defined as the longest path of logic.
 - iii. Added Activities - Include Activity ID, Activity Name, Original Duration, Calendar, Predecessor(s), Successor(s), AREA, PHAS, CATW, FOW, and MODF codes.
 - iv. Deleted Activities
 - v. Duration Changes
 - vi. Calendar Changes
 - vii. Logic Changes
 - viii. SOV Changes
 - ix. Current and Anticipated Delays - Include a description of current and anticipated problem areas or delaying factors and their impacts, whether it/they are the responsibility of the DEPARTMENT or CONTRACTOR, and an explanation of corrective actions taken or required to be taken.
 - x. Scheduler Comments - Explain in narrative form, anything the DEPARTMENT should know or understand as to the reasons for the changes contained herein.
 - c. Schedule Log Report - Schedule the Project (F9, Enter), Press F9 again and then click Schedule Log. Print Report and submit with schedule updates.

Note: The only activity allowed to not contain a Predecessor is the Start Project (NTP) activity. The only activity allowed to not contain a Successor is the Finish Project (CCD) activity. There are to be no Out-of-Sequence

- activities, no activities with Actual Dates > the Data Date, and no activities with invalid relationships.
- d. Network Diagram Report - The network diagram report is required for the Anticipated, Interim, Finalized, and all Periodic Updates. Two 11"x17" color hard copies of the Network Diagram Report shall accompany the data CDs. Include the following columns:
 - i. Activity ID
 - ii. Activity Name
 - iii. Original Duration
 - iv. Remaining Duration
 - v. Start
 - vi. Late Start
 - vii. Finish
 - viii. Late Finish
 - ix. Percent Complete
 - x. Total Float
 - e. SOV Spreadsheet - The SOV Spreadsheet as detailed in Section 5.2, should be updated on a monthly basis to reflect accurate Previous Billings, Current Billing, Remaining Total Cost, and Percent Complete values. Two hard copies, with all columns formatted to fit on a single page, shall be included with the submittal package.
3. Periodic Schedule Update Meetings - Conduct periodic schedule update meetings for the purpose of reviewing the CONTRACTOR's proposed Periodic Schedule Update, Narrative Report, Schedule Reports, and progress payment. Meetings shall occur at least monthly within five days of the proposed schedule Data Date. The CONTRACTOR shall provide a computer with the scheduling software loaded on the computer and a projector, which allows all meeting participants to view the proposed schedule during the meeting. The CONTRACTOR's scheduler will be available during the meeting to organize, group, sort, and filter the schedule as requested by the DEPARTMENT. An electronic version of the proposed schedule update, narrative, and all reports will be provided at least 48 hours in advance of the meeting. The CONTRACTOR's Project Manager, superintendent, foreman, and major Subcontractors shall attend the meeting as required to discuss the project schedule and work. CONTRACTOR will present the current status of the project and will review the narrative report. Following the Periodic Schedule Update Meeting, the CONTRACTOR shall make corrections to its draft submission. Only those changes approved by the DEPARTMENT will be included in the submission and invoice for payment.
4. Update Submission Following Progress Meeting - Submit a complete update of the project schedule containing all approved progress, revisions, and adjustments; pursuant to paragraph SUBMISSION REQUIREMENTS not later than 4 working days after the Periodic Schedule Update meeting.

E. REQUESTS FOR TIME EXTENSIONS

Provide a justification of delay to the Contracting Officer in accordance with the contract provisions and clauses for approval within 10 days of a delay occurring. The CONTRACTOR shall also prepare a Time Impact Evaluation (TIE) for each DEPARTMENT request for proposal (RFP) to justify time extensions.

1. Justification of Delay - The CONTRACTOR shall provide a description of the event(s) that caused the delay and/or impact to the CONTRACTOR's work. As part of the description, the CONTRACTOR must identify all schedule activities that were impacted. The CONTRACTOR must show the event that caused the delay/impact was the responsibility of the DEPARTMENT. The CONTRACTOR shall also provide a Time Impact Evaluation (TIE) that demonstrates the effects of the delay or impact on the project completion date or interim completion date(s). Multiple impacts shall be evaluated chronologically; each with its own justification of delay. The sum of all delays shall be cumulative. A time extension and the schedule fragnet shall become part of the project schedule and all future schedule updates upon approval by the Contracting Officer.
2. Time Impact Evaluation (TIE) - The CONTRACTOR shall prepare a time impact evaluation for approval by the DEPARTMENT. The CONTRACTOR shall utilize a copy of the last approved schedule prior to the first day of the impact or delay for the time impact analysis. If DEPARTMENT determines the time frame between the last approved schedule and the first day of impact is too great, the CONTRACTOR shall prepare an interim updated schedule to perform the time impact evaluation. Unless approved by the DEPARTMENT, no other changes will be incorporated into the schedule being used to justify the time impact. Pending change orders shall not be incorporated into the schedule unless the TIE has been approved by the DEPARTMENT.
3. Fragmentary Network (Fragnet) - The CONTRACTOR shall prepare a proposed fragnet for its time impact evaluation. The proposed fragnet shall consist of a sequence of new activities that are proposed to be added to project schedule to demonstrate the influence of the delay or impact to the project's contractual dates. The CONTRACTOR shall clearly show how the proposed fragnet is to be tied into the project schedule including all predecessors and successors to the fragnet activities. The proposed fragnet shall be approved by the DEPARTMENT prior to incorporation into the project schedule.
4. Time Extension - The Contracting Officer must approve the CONTRACTOR's justification of Delay including the time impact evaluation before a time extension will be granted. The time extension shall be given in calendar days. No time shall be granted under this Contract for cumulative effect of changes.
5. Recovery Plan - Should the CONTRACTOR's progress fall behind the approved project schedule for reasons other than those that are excusable within the terms of the contract, the DEPARTMENT may require the CONTRACTOR to provide a written recovery plan to DEPARTMENT for approval. The plan shall detail how progress will be made-up to include which activities will be accelerated by adding additional crews, longer work hours, extra work days, etc.
6. Artificially Improving Progress - The CONTRACTOR shall not artificially improve progress by simply revising the schedule logic, modifying or adding constraints, shortening activity durations, or changing calendars in the project schedule. The CONTRACTOR shall indicate assumptions made and the basis for any logic,

- constraint, duration and calendar changes used in the creation of the recovery plan. Any additional resources, manpower, or daily and weekly work hour changes proposed in the recovery plan must be evident at the work site and documented in the CONTRACTOR's daily report.
7. Failure to Perform - Failure to perform work and maintain progress in accordance with the supplemental recovery plan, may result in an interim and final unsatisfactory performance rating and/or may result in corrective action by the DEPARTMENT in accordance with the contract provisions.
 8. The CONTRACTOR shall be responsible for all costs associated with the preparation of Time Impact Evaluations, and the process of incorporating them into the current schedule update. The CONTRACTOR shall provide the DEPARTMENT four (4) copies of each TIE.
- F. WEEKLY PROGRESS MEETINGS - The CONTRACTOR shall meet weekly with the DEPARTMENT (or as otherwise mutually agreed to) between the meetings described in paragraph PERIODIC SCHEDULE UPDATE MEETINGS for the purpose of jointly reviewing the actual progress of the project as compared to the as planned progress, and to review planned activities for the upcoming two weeks. The current approved schedule update shall be used for the purposes of this meeting and for the production and review of reports. The weekly progress meeting will address the status of RFI's, RFP's and Submittals. CONTRACTOR shall provide and present a time scaled two-week look ahead schedule that is based and correlated to the current CPM schedule. The schedule shall look out two weeks from the day of the Weekly Progress Meeting.
- G. PRIMAVERA P6 MANDATORY REQUIREMENTS - The following settings are mandatory and required in Anticipated, Interim, and Finalized CPM schedule submissions to the DEPARTMENT.
1. Activity Codes shall be Project Level not Global or EPS level.
 2. Calendars shall be Project Level not Global or Resource level.
 3. Activity Duration Types must be set to "Fixed Duration & Units". (note: Milestones default to Fixed Duration & Units/Time)
 4. Percent Complete Types must be set to "Physical".
 5. Time Period Admin Preferences must remain the default "8.0 hr/day, 40 hr/week, 172 hr/month, 2000 hr/year". Calendar Work Hours/Day must be set to 8.0 Hour days.
 6. Schedule Option for defining Critical Activities shall be set to "Longest Path".
 7. Schedule Option for defining progressed activities shall be set to "Retained Logic".
 8. Activity ID's shall not exceed 10 characters.
 9. Activity Names shall have the most defining and detailed description within the first 30 characters.
- H. SUBCONTRACTOR AGREEMENT - Submit for each Subcontractor and supplier on their corporate letterhead, a statement certifying that the Subcontractor or supplier accepts the CONTRACTOR's Finalized CPM Schedule, and that the Subcontractors' or suppliers' related schedules have been properly incorporated. Include with the certification a copy of each Subcontractors' or suppliers' schedules upon which the proposed Finalized CPM Schedule was built. The certification statements shall confirm that task durations, cost and

resource loading variables have been correctly included in the Finalized CPM schedule. Failure to provide Subcontractor agreements may result in denial of the project schedule submission.

- I. **DAILY CONSTRUCTION REPORTS** - The CONTRACTOR shall, on a daily basis, submit a daily task report to the DEPARTMENT for each working day, including weekends and holidays, when worked. The CONTRACTOR shall develop the daily construction reports on a computer-generated database capable of sorting daily Work, manpower and labor hours by the CONTRACTOR, Subcontractor, area, and Change Order. Upon request of the DEPARTMENT, the CONTRACTOR shall furnish computer disk of this database. The CONTRACTOR shall obtain the DEPARTMENT's written approval of database format for daily construction reports prior to implementation. The following shall be included in report:
1. Project name and Project number
 2. CONTRACTOR's name and address
 3. Weather, temperature and any unusual site conditions.
 4. Was this day adversely affected by the weather?
 5. Brief description and location of the day's scheduled activities and any special problems and accidents, including Work implemented by Subcontractors.
 6. Activities Started today.
 7. Activities Completed today.
 8. Worker quantities for prime and for Subcontractors of any tier. Include the trade of the worker, ie. Superintendent, Quality Control, Electrician, Operator, etc., and number of hours worked.
 9. Equipment, other than hand tools, utilized by CONTRACTOR and Subcontractors. Include equipment identification, number of hours in service and number of hours idle. Include any equipment inspections and equipment maintenance performed, if any.

PART 2 – PRODUCTS

Not Used

PART 3 – EXECUTION

Not Used

END OF SECTION

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SECTION 01 33 00
SUBMITTAL PROCEDURES

PART 1 – GENERAL

1.01 SECTION INCLUDES

- A. Procedures for the preparation, tracking, and review of submittals for the project.

1.02 RELATED REQUIREMENTS

- A. Section 00700 – General Requirements
- B. Section 00800 – Supplementary Conditions
- C. Section 01 11 13 - Summary of Work: Work sequence
- D. Section 01 12 19 – Subcontractor Certifications
- E. Section 01 29 73 - Schedule of Values: Submittal of Schedule of Values
- F. Section 01 29 76 - Applications for Payment: Submittal of Applications
- G. Section 01 31 13 – Job Site Administration
- H. Section 01 32 00 – Work Schedules and Reports
- I. Section 01 33 23 – Shop Drawings Product Data and Samples.
- J. Section 01 45 00 - Quality Control: Manufacturers' field service reports, Testing laboratory reports
- K. Section 01 45 29 – Testing Laboratory Services
- L. Section 01 60 00 - Material and Equipment: Substitutions
- M. Section 01 71 23 – Field Engineering
- N. Section 01 73 00 – Execution Requirements: Project Record Documents, Warranties and Bonds: Closeout submittals
- O. Section 01 77 00 - Contract Closeout Procedures: Closeout submittals
- P. Section 01 79 00 – Demonstration and Training
- Q. Technical Product Specifications
- R. Commissioning Specifications
- S. Operations and Maintenance Manuals

- T. Equipment Installation Data

1.03 SCHEDULE OF SUBMITTALS

- A. Submit preliminary Schedule of Submittals as required by Section 00700 - General Conditions. In addition to shop drawing submissions, include all submittals required by the Contract Documents in the Schedule of Submittals.
- B. Schedule of Submittals will be used by the DEPARTMENT to schedule time in their activities relating to review of submittals. Schedule of Submittals shall portray an orderly sequence of submittals, early submittals for long lead-time items, and submittals which require extensive review.
- C. Schedule of Submittals shall be reviewed by the DEPARTMENT and shall be revised and resubmitted until accepted by the DEPARTMENT.

1.04 CONTRACTOR REVIEW

- A. The CONTRACTOR shall prepare and review submittals as required by the provisions of Section 00700 – General Conditions and Section 00800 – Supplementary Conditions.

1.05 SUBMITTAL REQUIREMENTS

- A. Number of copies: Submit the number of copies of submittals which the CONTRACTOR requires to be returned to it following review, plus four (4) copies for retention by the DEPARTMENT.
- B. Submit each submittal with a Submittal Summary form as its face document. Use a Submittal Summary form provided by the DEPARTMENT, or a substitute approved by the DEPARTMENT.
- C. Label submittals with a numbering system approved by the DEPARTMENT. Identify the project by title and DEPARTMENT'S project number; identify Work and product by Specification section and Article number.
- D. Submit items required by individual specification sections. Sequence the submission of submittals to correspond with the approved Schedule of Submittals.
- E. Before the submission of each submittal, the CONTRACTOR shall have determined and verified all quantities, dimensions, specified performance criteria, installation requirements, materials, catalog numbers and similar data with respect thereto and reviewed or coordinated each submittal with other submittals and with the requirements of the Work and the Contract Documents, upon which the CONTRACTOR shall certify in writing on each submittal that it has made this determination. The failure to review and certify a submittal shall be cause for the DEPARTMENT to return the submittal without review.
- F. On the submittal, notify the DEPARTMENT in writing of any deviations from requirements of the Contract Documents.
- G. Organize the submittals into logical groupings to facilitate the processing of related submittals, such as:

1. Finishes which involve DEPARTMENT selection of colors, textures, or patterns.
 2. Items required by the individual Technical Product Specification Sections.
 3. Associated items, which require correlation for efficient function or for installation.
- H. Submit all required color and finish samples in order to receive approval for colors and finishes.

1.06 RESUBMITTALS

- A. Provide the same number of submittals required for the first submission. For example, if 6 are required and 2 are returned marked "rejected" or "revise and resubmit", re-submit 6 copies. The DEPARTMENT will not return any of its copies from the prior submittal for the CONTRACTOR'S use in preparing the re-submittal.
- B. Provide complete copies of re-submittals. Do not re-submit partial copies of submittals for incorporation into the DEPARTMENT'S retained submittals from the prior submission.
- C. If drawings, product submittals, samples, mockups, or other required submittals are incomplete or not properly submitted, the DEPARTMENT will not review the submittal and will return it to the CONTRACTOR. The DEPARTMENT will review a submittal no more than 2 times without additional charge to the CONTRACTOR (incomplete or improperly submitted submittals count as one). The CONTRACTOR shall pay all review costs associated with more than 2 reviews.

1.07 DEPARTMENT REVIEW

- A. The DEPARTMENT will review submittals and re-submittals, and return submittal comments within 30 calendar days of receipt.
- B. The DEPARTMENT or authorized agent will receive, review and return submittals to the CONTRACTOR with one of the following dispositions noted:

"No Exceptions Taken" – denotes that the submittal is generally consistent with the requirements of the Contract Documents. A resubmittal is not required.

"Make Corrections Noted" – denotes that the submittal is generally consistent with the requirements of the Contract Documents but only as conditioned by notes and corrections made on the submittal. A resubmittal is not required provided the CONTRACTOR understands the review comments and desires no further clarification.

"Revise and Resubmit" – denotes that revisions are required in the submittal in order for the submittal to be generally consistent with the requirements of the Contract Documents. The DEPARTMENT will indicate on the returned submittal what revisions are necessary. A resubmittal is required.

"Rejected" – denotes that the submittal does not meet the requirements of the Contract Documents and shall not be used in the Work. The DEPARTMENT will indicate on the returned submittal the reasons for its rejection. A resubmittal is required

- C. Review by the DEPARTMENT of submittals shall not be construed as a complete check, but will indicate only that the general method of construction and detailing is consistent with the requirements of the Contract Documents. Review of submittals shall not relieve the CONTRACTOR of the responsibility for compliance with the requirements of the Contract Documents or for errors, dimensions, and quantities unless specific exception is requested and approved on the submittal.
- D. The DEPARTMENT's review shall not extend to the means, methods, techniques, sequences or procedures of construction or to safety precautions or programs incident thereto. The review and approval of a separate item as such will not indicate approval of the assembly in which the item functions.

1.08 DISTRIBUTION

- A. The CONTRACTOR shall be responsible for making and distributing any reproductions of approved submittals that it may require for its use.
- B. The CONTRACTOR shall perform work in accordance with approved submittals.

PART 2 – PRODUCTS

Not Used

PART 3 – EXECUTION

Not Used

END OF SECTION

SECTION 01 33 23

SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES

PART 1 - GENERAL

1.01 RELATED REQUIREMENTS

- A. Section 00700 - General Conditions
- B. Section 01 11 13 - Summary of Work
- C. Section 01 31 19 – Project Meetings
- D. Section 01 33 00 - Submittals: Schedules for submittals and submittal requirements
- E. Section 01 45 00 - Quality Control: Mockups and samples for testing
- F. Section 01 60 00 - Material and Equipment
- G. Section 01 73 00 - Execution Requirements
- H. Section 01 78 39 – Project Record Documents
- I. Technical Specifications: Identification of submittal requirements

1.02 SHOP DRAWINGS

- A. Present in a clear and thorough manner. Label each Shop Drawing with DEPARTMENT's Project name, Project number and date of submittal. Identify each element of the Shop Drawings by reference to specification section, sheet number and detail, schedule, or room number of Contract Documents.
- B. The data shown on the Shop Drawings shall be complete with respect to specified performance and design criteria, materials and similar data to show the DEPARTMENT materials and equipment the CONTRACTOR proposes to provide.
- C. Identify dimensions; show relation to adjacent or critical features or Work or products.
- D. Designation of work "by others," if shown in submittals, shall mean that work will be responsibility of CONTRACTOR rather than subcontractor or supplier who has prepared submittals.
- E. Minimum Sheet Size: 11"x17".

1.03 PRODUCT DATA

- A. Submit only pages which are pertinent; mark each copy of standard printed data to identify pertinent products, referenced to Specification section and Article number. Show reference standards, performance characteristics and capacities; wiring and piping diagrams and controls; component parts; finishes; dimensions; and required clearances.

- B. Modify manufacturer's standard schematic drawings and diagrams to supplement standard information and to provide information specifically applicable to the Work. Delete information not applicable.
- C. Submit manufacturer's instructions for storage, preparation, assembly, installation, start up, adjusting, balancing, and finishing.

1.04 SAMPLES

- A. Submit full range of manufacturer's standard finishes except when more restrictive requirements are specified, indicating colors, textures and patterns, for DEPARTMENT selection as specified in technical product sections.
- B. Submit samples to illustrate functional characteristics of products, including parts and attachments.
- C. Approved samples, which may be used in the Work, are indicated in the Specification section.
- D. Samples shall be identified clearly as to material, supplier, pertinent data such as catalog numbers and the use for which they are intended and otherwise as the DEPARTMENT may require, to enable the DEPARTMENT to review the submittal.
- E. Label each sample with identification required for transmittal letter.
- F. Provide field sample mockup of finishes at Project, at location acceptable to DEPARTMENT, as required by individual Specification section. Install each sample complete and finished. Acceptable finishes in place may be retained in completed Work.

PART 2 – PRODUCTS

Not Used

PART 3 - EXECUTION

Not Used

END OF SECTION

SECTION 01 41 00
SPECIAL REGULATORY REQUIREMENTS

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Compliance with Governmental Regulatory Permit requirements and conditions.

1.02 RELATED REQUIREMENTS

- A. Section 00700 - General Conditions

1.03 SPECIAL REGULATORY REQUIREMENTS

- A. The CONTRACTOR shall comply with all the requirements enumerated in the Contract Documents. In addition, the CONTRACTOR shall comply with the following codes and permits, as amended by the Authority Having Jurisdiction.
 - 1. Current Edition of the International Building Code
 - 2. Current Edition of the International Fire Code
 - 3. Current edition of Uniform Plumbing Code
 - 4. Current edition of International Mechanical Code
 - 5. Current edition of NFPA 70 National Electrical Code
 - 6. Current edition of NFPA 70E Standard for Electrical Safety in the Workplace
 - 7. Current Edition of Americans with Disability Act Guidelines
 - 8. Current edition of Occupational safety and Health Administration standards
 - 9. NFPA 101 – Life Safety Code
 - 10. ASCE 7-05
 - 11. Required Permits of the Authority Having Jurisdiction
 - 12. Environmental Protection Agency (EPA), Section 402/40 CFR 125, National Pollutant Discharge Elimination System (NPDES) Nationwide Permit Compliance, with compliance with all permit requirements; Storm Water Pollution Prevention (SWPP) Plan, Notice of Intent (NOI), and Notice of Termination (NOT)
 - 13. State Energy Conservation Requirements (as applicable).

1.04 CONTRACTOR SUBMITTALS

- A. Safety Plan Compliance Document – For projects constructed at or near an airport, prior to the start of work submit a Safety Plan Compliance Document in accordance with Federal Aviation Administration AC 150/5370-2, the project Construction Safety and Phasing Plan, and all other applicable FAA standards for safety during construction activities at or near the airport.

PART 2 – PRODUCTS

NOT USED

PART 3 – EXECUTION

NOT USED

END OF SECTION

SECTION 01 42 19
REFERENCE STANDARDS

PART 1 - GENERAL

1.01 RELATED SECTIONS

- A. Section 00700 - General Conditions

1.02 QUALITY ASSURANCE

- A. For Products or workmanship specified by association, trade, or other technical standards: comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.
- B. Conform to reference standard by date of issue current on date of bid advertisement, unless otherwise stated in the Contract Documents.
- C. Provide copies of standards through the submittal process when required by the Contract Documents. Maintain a copy of each reference standard on site during construction.
- D. Should specified reference standards conflict with Contract Documents, request clarification from the DEPARTMENT before proceeding. Local code requirements, where more stringent than referenced standards, shall govern.
- E. Neither the contractual relationship, duties, and responsibilities of the parties to the Contract, nor those of the Architect/Engineer, shall be altered by the Contract Documents by mention or inference otherwise in any reference document.

PART 2 - PRODUCTS

Not Used

PART 3 - EXECUTION

Not Used

END OF SECTION

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SECTION 01 45 00
QUALITY CONTROL

PART 1 – GENERAL

1.01 SECTION INCLUDES

- A. Quality Control program requirements
- B. Manufacturer field services requirements
- C. Testing laboratory requirements
- D. Record keeping for quality control
- E. Quality surveillance by DEPARTMENT

1.02 RELATED SECTIONS

- A. Section 00700 - General Conditions
- B. Section 01 29 76 – Application for Payment
- C. Section 01 31 19 – Project Meetings
- D. Section 01 33 00 – Submittal Schedule, Submittal Procedures
- E. Section 01 33 23 – Shop Drawings, Product Data, and Samples
- F. Section 01 42 19 – Reference Standards
- G. Section 01 45 23 – Departmental Inspection Service
- H. Section 01 45 29 – Testing Laboratory Services
- I. Section 01 60 00 – Material and Equipment
- J. Section 01 77 00 – Contract Closeout
- K. Individual Specification Sections: Quality Control

1.03 REFERENCES

- A. Comply with Section 01 42 19 – Reference Standards and the individual technical product specification sections.

1.04 DESCRIPTION

- A. The CONTRACTOR shall provide and maintain an effective Quality Control Program related to testing and inspection. The CONTRACTOR shall perform Quality Control Testing

as specified and shall provide copies of all results to the DEPARTMENT for use in observing contract compliance.

- B. The CONTRACTOR's Quality Control Program shall include, but is not limited to: administration, management, supervision, reports, record-keeping, submittals, services of independent testing agencies and labs, and other related services.
- C. Quality Control is the sole responsibility of the CONTRACTOR.
- D. The CONTRACTOR's Quality Control program does not include I.B.C. required special inspection performed by the DEPARTMENT as described in Section 01 45 23 – Departmental Inspection Service.
- E. Quality Control services are required to verify compliance with requirements specified or indicated and do not relieve the CONTRACTOR of responsibility for compliance with the Contract Documents.
- F. Specific Quality Control requirements for individual construction fabrication and procurement activities are included in the Technical Product Specifications. General Quality Control requirements entail ensuring that all aspects of the Work conform to the technical requirements of the Contract Documents.
- G. The CONTRACTOR's Quality Control Program described herein is not intended to limit the CONTRACTOR's Quality Control activities, which may be necessary to achieve compliance with the Contract Documents.
- H. The CONTRACTOR shall have a full-time Quality Control Manager whose sole responsibility is to ensure compliance with Contract Documents and manage the CONTRACTOR Quality Control Program, except that the Quality Control Manager may also serve as the site safety officer.

1.05 JOB CONDITIONS

- A. Where Specifications require work to be field-tested or approved, it shall be tested in the presence of the DEPARTMENT after timely notice of its readiness for inspection and testing, and the work after testing shall be concealed only upon approval of DEPARTMENT.
- B. The DEPARTMENT shall have the right to witness all off site tests. The CONTRACTOR shall notify the DEPARTMENT at least seven (7) calendar days prior to testing.
- C. The results of tests are for use by the DEPARTMENT to evaluate the acceptability of materials with respect to specified testing requirements. Regardless of the test results, CONTRACTOR is solely responsible for quality of workmanship and materials and for compliance with requirements of Contract Documents.
- D. Maintain quality control over suppliers, manufacturers, products, services, site conditions, and workmanship to produce work of specified quality. Verify applicability and follow all manufacturers' recommendations and instructions for assembly, installation and testing of materials and equipment. In any case where the CONTRACTOR believes that such

recommendations or instructions are not applicable, the CONTRACTOR shall so notify the DEPARTMENT and state the reasons for the CONTRACTOR's determination. The CONTRACTOR shall then follow the DEPARTMENT's written direction on whether to follow manufacturer's recommendations and instructions.

- E. Upon failure of materials and equipment, which have been tested or inspected, previous acceptance may be withdrawn and material may be subject to removal and replacement with material meeting Specification requirements, at no cost to the DEPARTMENT.

1.06 MANUFACTURER'S FIELD SERVICES

- A. Required when technical specifications require the manufacturer or supplier to provide qualified personnel to observe field conditions, conditions of surfaces and installation, quality of workmanship, and to start, test, and adjust equipment as applicable.
- B. Submit to the DEPARTMENT the manufacturer representative's written reports containing observations and recommendations. Provide three (3) copies and a digital version.

1.07 TESTING LABORATORY DUTIES

- A. Testing laboratories retained by the CONTRACTOR shall comply with the requirements of Section 01 45 29 – Testing Laboratory Services.

PART 2 – PRODUCTS

Not Used

PART 3 - EXECUTION

3.01 GENERAL

- A. The CONTRACTOR shall provide full and complete documentation of Quality Control procedures and activities in a Quality Control Program and Plan.

3.02 QUALITY CONTROL

- A. The CONTRACTOR shall establish a Quality Control Program (Program) which shall establish an independent organization and a methodology to perform the CONTRACTOR's inspection and tests of all items including that of its subcontractors. The Program shall ensure conformance to applicable technical specifications and drawings with respect to the materials, codes, workmanship, storage, installation, construction, finishes, functional performance, and identification. The Program shall be established for all construction work performed under this Contract, including assigned subcontract work. The Program shall specifically include surveillance and tests required in the technical specifications.
- B. The CONTRACTOR shall coordinate all work requiring special inspection with the DEPARTMENT to ensure full access by the DEPARTMENT's Special Inspectors and Quality Assurance testing personnel to work, work performance, and testing preparation, operations and results.
- C. CONTRACTOR shall describe the Program in a detailed Quality Control Plan that must be approved by the DEPARTMENT prior to the start of any construction or offsite fabrication.

- D. The Program shall include, as a minimum, the following components for all definable features of work:
1. Preparatory Inspection Meeting: CONTRACTOR shall schedule and attend a preparatory meeting to review testing procedures a minimum of a week prior to beginning work on any element of Work which has been identified in the Contract Documents to require testing and inspection by the CONTRACTOR testing and inspection by the DEPARTMENT, or code-required inspections. Subsequent meetings shall be conducted as necessary to ensure continued accuracy of testing procedures.
 2. Document Control: CONTRACTOR's Program to include procedure for ensuring that all Work is performed in accordance with the following:
 - a. Conformed sets of Contract Drawings and Specifications
 - b. Contract Change Order documents
 - c. Approved Submittals, most current revision
 - d. Applicable Requests for Information (RFI's)
 - e. Manufacturer's Instruction.
 3. In Progress Inspection: CONTRACTOR shall perform in-progress inspections as work progresses on the Work which shall include, but not be limited to:
 - a. Examination of the quality of workmanship with respect to Contract Drawings, Technical Specifications and Approved Submittals.
 - b. Review of control testing for compliance with Contract requirements.
 - c. Inspection for use of defective or damaged materials, omissions and dimensional requirements.
 - d. Review of timeliness and scheduling requirements for all tests, retests and eventual approvals.
 - e. CONTRACTOR Deficiency Reports and punch lists as appropriate to the level of completion of the work.
 4. Non-Conformance Procedure: CONTRACTOR's program shall include procedure for identifying, documenting, tracking, and resolving items in the Work which do not comply with Contract Documents, Specifications, Approved Submittals, or Manufacturer's Instructions. If a quality control test indicates that the tested material does not conform to the requirements of the contract documents, the CONTRACTOR shall eventually take supplemental tests at the same location from which the non-conforming result was obtained, to document conformance and acceptability for payment. Otherwise, the DEPARTMENT reserves the right to reject materials for which final Quality Control tests indicate non-conformance with the contract documents.
 5. Code Required Inspection: CONTRACTOR shall coordinate and make timely requests for inspections, tests and other activities required by codes and regulations as specified, which are to be provided by others. This requirement includes coordinating with and providing access to the Authority Having Jurisdiction. (AHJ)

3.03 RECORD KEEPING

- A. The CONTRACTOR shall maintain current Quality Control records, on forms acceptable to the DEPARTMENT, of all inspections and tests performed. The records shall include factual evidence that the required inspections or tests have been performed, including, but not limited to, the following information for each such test and inspection: specification reference, date, type and number of inspections or test involved; results of the inspections, tests or retests; the nature of defect, causes for rejection, proposed remedial action, corrective action(s) taken, and similar information related to any reinspection.
- B. The CONTRACTOR shall maintain and submit to the DEPARTMENT the following Quality Control records and reports:
 - 1. Daily Reports: The CONTRACTOR shall maintain a daily log of all inspections performed for both CONTRACTOR and subcontractor operations. The Daily Log shall include compliance with shop submittals, identification by specification section and schedule activity of inspections, tests, and retests conducted, results of inspections and tests, location and nature of defects found, causes for rejection, and remedial or corrective actions taken or proposed. One copy of Daily Reports shall be submitted to the DEPARTMENT by 12:00 noon of the next business day.
 - 2. Immediate Notification of Deficiencies: CONTRACTOR shall provide immediate notification to the DEPARTMENT whenever a failed nonconforming test or inspection occurs. This immediate notification shall be followed up with the required written reports.
 - 3. Nonconformance Report: CONTRACTOR shall submit three copies of a weekly Nonconformance Report to the DEPARTMENT identifying all substandard inspections and tests taken during the week including identification by specification section and schedule activity of the inspection or test, location and nature of defects, causes for rejection and remedial actions taken or proposed. The Nonconformance Report shall also identify corrective actions taken or proposed for any open items on prior Nonconformance Reports including a scheduled date for resolution of each item. The Nonconformance Report shall be submitted and discussed in each Weekly Progress Meeting.
 - 4. Inspection Control Log: CONTRACTOR shall maintain an inspection control log chronologically recording each inspection and test performed by the CONTRACTOR, including the nature of the inspection, test or retest, the date performed, the results, causes for rejection, remedial action or corrective action taken and dates of subsequent inspections and retests, and final acceptance. The CONTRACTOR shall submit three (3) copies plus an electronic copy of the updated Inspection Control Log weekly to the DEPARTMENT; the Log will be discussed in each Weekly Progress Meeting.
 - 5. Testing Laboratory Data: Maintain and submit to DEPARTMENT in accordance with Section 01 45 29.

3.04 ORGANIZATION

- A. The Program shall be implemented by the establishment of a Quality Control Organization which shall as a minimum, consist of the following: Quality Control personnel shall be dedicated to Quality Control duties only, and independent of the production and commercial aspects of the CONTRACTOR's full organization.

1. Quality Control Manager: The Quality Control Manager shall have the following qualifications: Minimum of 5 years experience in a supervisory Quality Control position whose sole responsibility is to ensure compliance with the Contract Documents. This person shall be employed on this Project only, shall be physically on the Project site during performance of all Contract Work, and shall be in charge of the CONTRACTOR's Quality Control Organization. The Quality Control Manager shall report directly to the responsible corporate officer of the firm.
 2. Quality Control Inspectors: The Quality Control Inspectors shall report directly to the Quality Control Manager. Quality Control Inspectors shall be provided as required to meet requirements of the Contract Documents for CONTRACTOR testing and inspection and as needed to verify that all aspects of the Work comply with the technical requirements of the Contract. Inspectors shall have minimum 5 years experience inspecting the type of work being inspected. Submit qualifications as part of the Quality Control Plan.
 3. Independent Testing and Inspection Laboratories: Provide and pay for an industry-recognized, independent laboratory or laboratories to perform all Quality Control tests and/or inspections as may be indicated by the nature of the construction or as specifically required under the terms of the Contract.
 4. Electrical and Mechanical Testing: If specified elsewhere, provide and pay for an independent testing firm (or firms) performing electrical and mechanical testing. The testing firm shall be a corporately and financially independent testing organization that can function as an unbiased testing authority, professionally independent of the manufacturers, suppliers, and installers of equipment or systems evaluated by the testing firm. Follow Technical Product Specifications Quality Control requirements and testing responsibilities.
 5. Manufacturers' Representative: Provide review and inspection by qualified technical non-sales manufacturers' representatives for specific work as appropriate, or as directed by the DEPARTMENT including but not limited to, roofing, waterproofing, skylights, window wall and building system, and fireproofing.
- B. Staffing Levels: Provide sufficient qualified personnel to monitor the work quality at all times. The scheduling and coordinating of all inspection and testing must match the type and pace of work activity.
1. In cases where multiple trades, disciplines or subcontractors are on site at the same time, each activity shall be inspected and tested by personnel skilled in that portion of the work.
 2. In cases where multiple shifts are employed, the Quality Control staff shall be increased as required to monitor the work on each shift.

3.05 QUALITY CONTROL PLAN

- A. Provide a Quality Control Plan to the DEPARTMENT as soon as practicable, and in no event later than 15 days after Notice to Proceed. Plan shall be updated as required by "Detailed Quality Control Procedures" below, and approved by the DEPARTMENT prior to construction.
- B. Quality Control Plan Contents: Include the personnel, procedures, instructions and documents to be used.

1. Organization: A description of the CONTRACTOR's Quality Control Organization, including:
 - a. An organization chart showing lines of authority and relationship of the quality control organization to other CONTRACTOR management and project personnel.
 - b. Names and resumes of work experience and qualifications of personnel in the quality control organization.
 - c. Area of responsibility and authority of each individual in the quality control organization.
2. Inspection:
 - a. Methods of performing quality control inspections including those for each subcontractor's work.
 - b. Detailed lists of inspection activities for each specification section. See "Detailed Quality Control Procedures" below.
3. Testing:
 - a. Description of how testing will be performed including identification and qualifications of the industry recognized testing laboratory or laboratories proposed for the work.
 - b. Identify the testing methods, frequency, and number to be taken of each type of material requiring Quality Control testing. To facilitate the development of a testing plan, the DEPARTMENT will provide a tabular schedule of minimum testing requirements, to be derived from the requirements contained in the contract documents. The CONTRACTOR shall be responsible for taking the tests summarized in the schedule, in conjunction with any other tests that may be required in the contract documents.
4. Documentation: Method of documenting Quality Control operation, inspection and testing.
5. Administration: Methods of administering Quality Control operations document control, non-conformance procedure, inspection and testing.
6. Letter of Authority: A copy of a letter of direction to the CONTRACTOR's Quality Control Manager responsible for quality control outlining that person's duties and responsibilities and signed by responsible officer of the firm. This letter shall include the authority to halt construction and direct removal and replacement of work not in compliance with the Contract.
7. Forms: Sample copies of all forms and reports to be used, a flow chart describing their distribution, and identification of those documents to be retained by the CONTRACTOR.
8. Subcontractor's Quality Control: The CONTRACTOR shall include, as part of its Quality Control Plan, specific methods of performing quality control inspections of onsite and offsite subcontractors.
9. Detailed Quality Control Procedures: Detailed descriptions of quality control activities for work under each section of the specifications. Include list of all tests, inspection and frequencies, personnel, and instruction prior to starting such work. The

procedures shall be updated each month incorporating any changes. Changes shall be submitted at least one month prior to Work effected by any change.

C. Quality Control Plan Approval

1. Before the CONTRACTOR's Quality Control Plan is officially submitted, the CONTRACTOR shall meet with the DEPARTMENT and discuss the CONTRACTOR's Quality Control Plan. The CONTRACTOR and the DEPARTMENT shall jointly develop a mutual understanding of the details of the plan, including the forms to be used for recording the quality control operations, inspections, administration of the plan for both onsite and offsite work, and the interrelationship of CONTRACTOR and DEPARTMENT inspection. The CONTRACTOR shall prepare minutes of the meeting, which shall be incorporated in the CONTRACTOR's Quality Control Plan, which shall then be officially submitted for approval.
2. If the DEPARTMENT determines that the Quality Control Plan, personnel, inspections, tests, or records are not adequate, corrective actions shall be taken as directed prior to payment of the next monthly CONTRACTOR's Progress Report.
3. Notify the DEPARTMENT in writing of any proposed change to the CONTRACTOR's Quality Control Plan; no such change shall be implemented prior to approval in writing by the DEPARTMENT.

- D. Quality Control Plan Implementation:** Implementation of the Quality Control Plan is the responsibility of the CONTRACTOR. This implementation will be monitored by the DEPARTMENT and deficiencies therein will be corrected at the sole expense of the CONTRACTOR.

3.06 QUALITY SURVEILLANCE BY THE DEPARTMENT

- A.** All items of materials and equipment shall be subject to surveillance testing and inspection by the DEPARTMENT at the point of production, manufacture or shipment to determine if the producer, manufacturer or shipper maintains an adequate inspection system which insures conformance to the applicable specifications and drawings with respect to materials, workmanship, construction, finish, functional performance and identification. In addition, all items or materials, equipment and work in place shall be subject to surveillance testing and inspection by the DEPARTMENT at the site for the same purposes. Surveillance by the DEPARTMENT does not relieve the CONTRACTOR of performing Quality Control inspections and testing of either onsite or offsite CONTRACTOR's or subcontractor's workplace or manufacturing assembly plant.

END OF SECTION

SECTION 01 45 23
DEPARTMENTAL INSPECTION SERVICES

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Testing and inspection services provided by the DEPARTMENT.

1.02 RELATED REQUIREMENTS

- A. Section 00700 - General Conditions
- B. Section 00700 - General Conditions: Article 13, Substantial Completion, Final Inspection.
- C. Section 01 45 00 - Quality Control
- D. Section 01 45 29 - Testing Laboratory Services
- E. Section 01 73 00 - Execution Requirements
- F. Individual Specifications Sections: Inspections and tests required, and standards for testing.

1.03 REFERENCES

- A. International Building Code
- B. Special Inspection Program as approved by Authority Having Jurisdiction (AHJ)

1.04 DESCRIPTION

- A. In accordance with the International Building Code, the DEPARTMENT will provide Special Inspection Services. These services are in addition to those inspection and testing services provided by the CONTRACTOR under Section 01 45 00 – Quality Control and Section 01 45 29 – Testing Laboratory Services and AHJ permit inspections.
- B. The CONTRACTOR is responsible for requesting Special Inspection Services from the DEPARTMENT for the following work activities:
 - 1. Soil compaction: Special Inspector to monitor the soils compaction process and review soils compaction testing data provided by the CONTRACTOR.
 - 2. Asphalt: Special Inspector to monitor placement of asphalt and review asphalt testing data provided by the CONTRACTOR.
 - 3. Concrete and concrete reinforcement: Special Inspector to monitor placement of concrete reinforcing steel, review concrete sampling and testing data provided by the CONTRACTOR, perform other related inspections as required by the IBC.
 - 4. Concrete post-tensioned assemblies: Special Inspector to monitor placement of post tension assemblies and review post tensioning test data as provided by the CONTRACTOR (strand sampling, jacking and elongation records).
 - 5. Structural steel field bolting and welding: Special Inspector to monitor placement of post installed anchors and bolts and provide high strength bolt tension testing. The Special Inspector will monitor erection of structural assemblies and provide weld testing.

6. Pile and pier foundations: The special inspector will provide inspections during installation and testing, as set forth in the IBC.
7. Masonry and masonry reinforcement: The special inspector will inspect masonry reinforcement, masonry and grouting procedures.
8. Wind requirements: The special inspector will inspect for wind requirements as required for cold-formed steel light-frame construction, wood construction, roof and wall cladding.
9. Seismic resistance: Special inspections will be performed for seismic resistance elements as required by the IBC.
10. Sprayed fire resistive materials, mastic and intumescent fire-resistant coatings: The special inspector will inspect these materials applied to structural elements and decks, in accordance with the IBC.
11. Exterior insulation and finish systems (EIFS): Require inspection as set forth by the IBC.
12. Smoke control systems: Require inspection and testing as set forth by the IBC.
13. Other special inspections and activities required by the IBC and Authority Having Jurisdiction (AHJ)

1.05 REQUEST AND PAYMENT

- A. The CONTRACTOR shall request services provided by the DEPARTMENT to perform specified inspection and testing.
- B. Inspection by the DEPARTMENT or its agents shall in no way relieve CONTRACTOR of obligation to perform Work in accordance with requirements of Contract Documents

1.06 CONTRACTOR SUBMITTALS

- A. The CONTRACTOR shall coordinate with the DEPARTMENT to provide adequate advance notice to enable the DEPARTMENT'S special inspector(s) to be present when necessary.
- B. A Materials Placement Schedule shall also be submitted each Thursday for the work scheduled for the following week, if requested by the DEPARTMENT. This schedule shall include the date and time each material, required to have materials testing or inspection, is scheduled for placement or observation. A schedule of material deliveries to the site of materials stored for incorporation into work items, which require Special Inspection, may also be required upon notification from the Department.
- C. The CONTRACTOR shall provide a minimum of 8 hours written notification counting only working hours and working days of a change in the Special Inspection schedule of time and/or date. Submit written notification, which provides the Project name and location, CONTRACTOR's name, and phone number, inspection cancelled, time changed or added, and reason for the change. Failure to provide this notification will result in a reduction of the Contract value for extra costs incurred by the DEPARTMENT.
- D. A CONTRACTOR request for re inspection of previous Work shall include the DEPARTMENT's prior report, listing of deficiencies, and remedies provided since prior inspection.

1.07 DEPARTMENT RESPONSIBILITIES

- A. Review schedules and request for inspections as submitted by CONTRACTOR for timeliness and conformance.

- B. Provide qualified personnel at site after due notice; cooperate with CONTRACTOR in performance of services.
- C. Perform specified inspection, inventorying, and testing of products in accordance with specified standards.
- D. Promptly notify CONTRACTOR of observed irregularities or non-conformance of Work or products.
- E. Perform additional inspections and re-tests required by the Contract Documents.
- F. When applicable provide to the CONTRACTOR a written description of the DEPARTMENT's costs attributed to the inspection.

1.08 DEPARTMENT REPORTS

- A. After each inspection or test, the DEPARTMENT will promptly submit one copy of inspection report to the CONTRACTOR. The report will include: date issued, project title, DEPARTMENT project number, name of inspector(s), date and time of inspection, identification of product and Specifications section, location in the Project, type of inspection or test, results of inspection or tests, and conformance with Contract Documents. When requested in writing by the CONTRACTOR, the DEPARTMENT will interpret the results.

1.09 LIMITS ON AUTHORITY RESULTING FROM INSPECTIONS

- A. The DEPARTMENT may not release, revoke, alter, or enlarge on requirements of the Contract Documents through the issuance of an inspection report.
- B. The DEPARTMENT may not approve or accept any portion of the Work through the issuance of an inspection report.
- C. The DEPARTMENT may not assume any duties of the CONTRACTOR through the issuance of an inspection report.
- D. The DEPARTMENT inspection report shall not constitute a stop work order.

1.10 CONTRACTOR RESPONSIBILITIES

- A. Pre-construction Inspection Meeting. The CONTRACTOR shall arrange a meeting of all parties involved with Special Inspection, Inspection, and testing to be conducted by the Authority Having Jurisdiction (AHJ), to review all inspection requirements, particularly those involving Special Inspection.
- B. Special Inspection Notification: The CONTRACTOR shall notify the DEPARTMENT 72 hours in advance of each required special inspection. The CONTRACTOR is responsible for notifying the DEPARTMENT in a timely manner regarding individual inspections for items listed in the Specifications and as noted in the Special Inspection Program approved by the AHJ. Adequate notice shall also be provided so that the Special Inspector has time to become familiar with the project.
- C. Inspector access to approved plans: The CONTRACTOR shall be responsible for providing the Special Inspector access to or copies of approved plans at the job site.
- D. Availability of Test Reports: The CONTRACTOR shall make copies of all test reports that are pertinent to the responsibilities of the Special Inspector available to that individual.

- E. Access to Areas of Work: The CONTRACTOR shall provide adequate, safe means for the Special Inspector to access the areas to be inspected.
- F. Retention of Special Inspection Records.: The CONTRACTOR shall be responsible for retaining at the job site copies of all special Inspection records submitted by the Special Inspector and copies of test reports, material ticket, etc. These records shall be available for review by the AHJ upon request.
- G. Cooperate with DEPARTMENT personnel, and provide access to work and to manufacturer's facilities.
- H. Provide incidental labor and facilities to provide safe access to work to be inspected, to obtain and furnish incidental supplies at the site or at source of products to be inspected, to facilitate tests and inspections, and for storage and curing of test samples when appropriate.
- I. Notify the DEPARTMENT as required above in CONTRACTOR Submittals for operations requiring inspection, special inspection and testing services.
- J. Pay costs of DEPARTMENT furnished services for all re-inspections as required by Contract Documents.

PART 2 - PRODUCTS

Not Used

PART 3 – EXECUTION

Not Used

END OF SECTION

SECTION 01 45 29
TESTING LABORATORY SERVICES

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. CONTRACTOR'S requirements for quality control inspections and testing.

1.02 RELATED REQUIREMENTS

- A. Section 00700 General Conditions: Inspections, testing, and approvals required by public authorities
- B. Section 01 33 00- Submittal Procedure
- C. Section 01 45 00 Quality Control
- D. Section 01 45 23 – Departmental Inspection Service.
- E. Section 01 73 00 – Execution Requirements
- F. Individual Specification Sections: Inspections and tests required, and standards for testing

1.03 REFERENCES

- A. ANSI/ASTM E329 – Specification for Agencies Engaged in the Testing and/or Inspection of Materials used in Construction.

1.04 SELECTION AND PAYMENT

- A. The CONTRACTOR shall employ and pay for the services of an independent, industry-recognized testing laboratory or laboratories to perform specified inspection and testing. The laboratory shall be corporately and financially independent of the CONTRACTOR's organization, as well as of any organization which is associated with performing the Work, such that it can offer an unbiased professional appraisal of compliance with the technical requirements of the Contract. The qualifications of the proposed testing laboratory and personnel shall be submitted to the DEPARTMENT for review and approval, 30 days prior to any inspection or testing by the laboratory.
- B. Employment of testing laboratory shall in no way relieve the CONTRACTOR of obligation to perform Work in accordance with requirements of the Contract Documents.

1.05 QUALITY ASSURANCE

- A. Comply with requirements of ANSI/ASTM E329.
- B. The testing laboratory shall maintain an Alaska registered Engineer on staff to review services.
- C. The laboratory shall be authorized to operate in State in which testing is performed.

- D. Testing equipment shall be calibrated at reasonable intervals with devices of having an accuracy traceable to either NBS Standards or accepted values of natural physical constants.

1.06 CONTRACTOR SUBMITTALS

- A. Prior to the start of Work, submit testing laboratory name, address, and telephone number, and names of registered Engineer and responsible officer.
- B. Submit copy of report of laboratory facilities inspection made by Materials Reference Laboratory of National Bureau of Standards during most recent tour of inspection, with memorandum of remedies of any deficiencies reported by the inspection.

1.07 LABORATORY RESPONSIBILITIES

- A. Test samples of materials and mixes submitted by CONTRACTOR.
- B. Provide qualified personnel at site after due notice; cooperate with the DEPARTMENT and the CONTRACTOR for the performance of services.
- C. Perform specified inspection, sampling, and testing of products and installations in accordance with specified standards. When requested, perform these services at locations designated by the DEPARTMENT.
- D. Ascertain compliance of materials and mixes with requirements of the Contract Documents.
- E. Promptly notify the DEPARTMENT and the CONTRACTOR of observed irregularities or non-conforming Work or products.
- F. Perform additional inspections and tests required by the DEPARTMENT.
- G. Attend pre-construction conferences and progress meetings.

1.08 LABORATORY REPORTS

- A. Inspection reports shall be transmitted in duplicate each day to the DEPARTMENT and the Engineer of Record.
- B. Reports for tests conducted shall be submitted to the DEPARTMENT immediately after the results are determined and no later than when the testing agency leaves the site for the day.
- C. Within 24 hours of the completion of each inspection and test, submit ONE copy of the laboratory report directly to the DEPARTMENT in addition to copies required by the CONTRACTOR. Include: date issued, project title and DEPARTMENT project number, name of inspector, date and time of sampling or inspection, identification of product and specifications section, location in the Project, type of inspection or test, date of test, results of tests, and conformance with Contract Documents. When requested by the DEPARTMENT, provide written interpretations of test results.

1.09 LIMITS ON TESTING LABORATORY AUTHORITY

- A. The testing laboratory may not release, revoke, alter, or enlarge on requirements of Contract Documents.
- B. The laboratory may not approve or accept any portion of the Work.

- C. The laboratory may not assume any duties specified to be performed directly by the CONTRACTOR.
- D. The laboratory has no authority to stop Work.

1.10 CONTRACTOR RESPONSIBILITIES

- A. Deliver to the testing laboratory, at a designated location, adequate samples of materials proposed to be used which require testing, together with proposed mix designs.
- B. Cooperate with laboratory personnel, and provide safe access to Work.
- C. Provide incidental labor and facilities to provide safe access to work to be tested, to obtain and handle samples at the site or at source of products to be tested, to facilitate tests and inspections, and for storage and curing of test samples.
- D. Notify the DEPARTMENT and the CONTRACTOR's laboratory 48 hours prior to expected time for operations requiring inspection and testing services.
- E. Provide the DEPARTMENT 4 hours written notification of change in date and/or time of inspection and/or testing services.
- F. Pay costs of testing laboratory services for all tests.

PART 2 - PRODUCTS

Not Used

PART 3 - EXECUTION

Not Used

END OF SECTION

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SECTION 01 54 00
SECURITY REQUIREMENTS

PART 1 GENERAL

1.01 SUMMARY

- A. This document outlines security provisions that the CONTRACTOR working at the Yukon-Kuskokwim Correctional Center (YKCC) will be required to follow. The facility is an occupied correctional institution housing female and male inmates. As the performance of the Work could impact the operation of the institution, the Department of Corrections (DOC) is concerned that the CONTRACTOR understand and comply with its security requirements. The intent of this Section is to prevent: any escape, sabotage, or assault attempt; any disturbance, or; the importation of contraband.

1.02 REQUIREMENTS INCLUDED

- A. Security Check
- B. Project Manager
- C. Personnel Access
- D. Vehicle Access
- E. Tool Control
- F. Contraband

1.03 RELATED REQUIREMENTS

- A. Section 01005 - Administrative Provisions

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

3.01 SECURITY CHECK

- A. All personnel (CONTRACTOR and Subcontractor staff) will be required to undergo a security check prior to commencement of work. A mandatory security briefing will be provided to CONTRACTOR's forces by the Anchorage Correctional staff prior to start of on-site work.
- B. The CONTRACTOR will submit a list of personnel and a completed "Request for Clearance" form for each individual to the YKCC security officer for review at least 72 hours prior to commencement of work. A clearance form will be provided to the Contractor upon award of the contract. In general, the following information is required for each person:

1. Full name.
 2. Residence address.
 3. Telephone Number.
 4. Date of birth.
 5. Social Security Number.
 6. Valid driver's license and state of issue, or other photo identification bearing social security number.
- C. The security check will look for recent or frequent past convictions or for outstanding warrants. YKCC reserves the right to disqualify anyone from access to the work site. A past conviction will not automatically disqualify.

3.02 PROJECT COORDINATOR

- A. DOC will designate an On-Site Project Coordinator to be the liaison between the CONTRACTOR and YKCC.
- B. In the event of an emergency affecting the secure operation of YKCC, the Project Coordinator is authorized to direct the CONTRACTOR to take appropriate action. The directions of the Project Coordinator will be followed immediately.
- C. The Project Coordinator shall be briefed each week by the CONTRACTOR regarding the CONTRACTOR's work requirements and weekly work plan for the subsequent week. This briefing may be performed concurrently with the progress meetings that may be required under the contract.

3.03 PERSONNEL ACCESS

- A. Access to the Work site, which is within a correctional facility, will be monitored and controlled by the Department of Corrections in order to prevent importation of contraband and escape of inmates.
- B. Construction crews will report to the Control Room at the beginning of each shift to obtain their identification badge or visitors badge and sign in on the Contractor's log. At the end of each shift, workmen will return their badges to this office and sign out on the Contractor's log. If workers leave the compound at lunch, they will leave as a group. Contractor should encourage workmen to bring lunch rather than leave.
- C. Contractors, Subcontractors, Employees may be denied access or be removed from the facility for the following reasons:
1. Contractors or workers that are incompetent, careless or otherwise detrimental to the work or the security of the facility.
 2. Security requirements.
 3. Disruptive, abrasive, and/or argumentative conduct.
 4. Being under the influence of Alcohol, Drugs and/or any substance that is considered contraband by the Facility.
 5. Refusal to submit to search of personal property/belongings or themselves.
 6. Health problems.
 7. Failure to show proper identification.
 8. Failure to follow the direction of Correctional Officers and/or staff members.
 9. Having any contact or interaction with inmates.
 10. Failure to pass security check.
 11. Failure to secure tools and work areas. (Contractor is required to provide personnel to secure his work area and tools. This means that there will be a member of the

Contractor's staff in the active work area. If no personnel are physically present in the work area, the work area and/or tools will be secured.)

3.04 VEHICLE ACCESS

- A. No privately owned vehicles may enter inside the security fence without approval of the DOC on-site Security Officer. Employee vehicles can be parked in the employee/visitor parking lot outside the security fence.
- B. Authorized work vehicles, i.e. job site trailers and trucks may be left inside the fence in a location if they can be secured and upon the approval of the YKCC on-site Security Officer.

3.05 TOOL CONTROL

- A. Do not leave prisoner-accessible work areas unattended without first removing or securing all tools and objects that would be considered contraband.
- B. At the end of each workday, remove all tools and equipment from inmate-accessible work areas and store within locked cabinets, locked containers, or locked storage trailers.
- C. Maintain written inventory of tools and equipment daily. Tools and equipment that cannot be accounted for at the end of each workday shall be brought to the immediate attention of the YKCC Security Officer.

3.06 CONTRABAND

- A. The mailing, bartering, introducing, exchanging or buying of items between inmates and contractors or their employees is strictly prohibited without the written consent of the Superintendent of the institution.

3.07 CELL PHONES / CAMERAS

- A. No Cell phones allowed inside of security perimeter. No cameras or pictures are allowed. Pictures if necessary, will be permitted of work area only, but only under supervision of project manager or facility security sergeant.

The following quotes are from Alaska Statutes and are provided herein to inform the CONTRACTOR:

Title 11 - Alaska Statutes

Section 11.56.375, Promoting contraband in the first degree.

- 1. A person commits the crime of promoting contraband in the first degree if the person violates AS 11.56.380 and the contraband is:
 - a. a deadly weapon;
 - b. an article that is intended by the defendant to be used as a means of facilitating an escape;
 - c. a controlled substance; or
- 2. Promoting contraband in the first degree is a class C felony.

Section 11.56.380, Promoting contraband in the second degree.

- 1. A person commits the crime of promoting contraband in the second degree if the person:

- a. introduces, takes, conveys, or attempts to introduce, take, or convey contraband into a correctional facility; or
 - b. makes, obtains, possesses, or attempts to make, obtain, or possess anything that person knows to be contraband while under official detention within a correctional facility.
- 2. Promoting contraband in the second degree is a Class A misdemeanor.
 - a. Effective August 26, 1999, contraband includes tobacco products.

Sec. 11.56.390, definition:

In AS 11.56.300-11.56.390, "contraband" means any article or thing which persons confined in a correctional facility are prohibited by law from obtaining, making, or possessing in that correctional facility."

END OF SECTION

SECTION 01 57 21
INDOOR AIR QUALITY CONTROLS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Construction procedures to promote adequate indoor air quality after construction.
- B. Building flush-out after construction and before occupancy.
- C. Testing indoor air quality after completion of construction.

1.02 PROJECT GOALS

- A. Dust and Airborne Particulates: Prevent deposition of dust and other particulates in HVAC ducts and equipment.
 - 1. Cleaning of ductwork is not contemplated under this Contract.
 - 2. Contractor shall bear the cost of cleaning required due to failure to protect ducts and equipment from construction dust.
 - 3. Establish condition of existing ducts and equipment prior to start of alterations.
- B. Airborne Contaminants: Procedures and products have been specified to minimize indoor air pollutants.
 - 1. Furnish products meeting the specifications.
 - 2. Avoid construction practices that could result in contamination of installed products leading to indoor air pollution.

1.03 REFERENCE STANDARDS

- A. ASHRAE Std 52.2 - Method of Testing General Ventilation Air-Cleaning Devices for Removal Efficiency by Particle Size; 2007.
- B. ASHRAE Std 62.1 - Ventilation For Acceptable Indoor Air Quality; 2010.
- C. SMACNA (OCC) - IAQ Guideline for Occupied Buildings Under Construction; 2007.

1.04 DEFINITIONS

- A. Adsorptive Materials: Gypsum board, acoustical ceiling tile and panels, carpet and carpet tile, fabrics, fibrous insulation, and other similar products.
- B. Contaminants: Gases, vapors, regulated pollutants, airborne mold and mildew, and the like, as specified.
- C. Particulates: Dust, dirt, and other airborne solid matter.

- D. Wet Work: Concrete, plaster, coatings, and other products that emit water vapor or volatile organic compounds during installation, drying, or curing.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Auxiliary Air Filters: MERV of 8, minimum, when tested in accordance with ASHRAE 52.2.

PART 3 - EXECUTION

3.01 CONSTRUCTION PROCEDURES

- A. Prevent the absorption of moisture and humidity by adsorptive materials by:
 - 1. Sequencing the delivery of such materials so that they are not present in the building until wet work is completed and dry.
 - 2. Delivery and storage of such materials in fully sealed moisture-impermeable packaging.
 - 3. Provide sufficient ventilation for drying within reasonable time frame.
- B. If extremely dusty or dirty work must be conducted inside the building, shut down HVAC systems for the duration; remove dust and dirt completely before restarting systems.
- C. When working in a portion of an occupied building, prevent movement of air from construction area to occupied area.
- D. HVAC equipment and supply air ductwork may be used for ventilation during construction:
 - 1. Ensure that air filters are correctly installed prior to starting use; replace filters when they lose efficiency.
 - 2. Do not use return air ductwork for ventilation unless absolutely necessary.
 - 3. Where return air ducts must be used for ventilation, install auxiliary filters at return inlets, sealed to ducts; use filters with at least the equivalent efficiency as those required at supply air side; inspect and replace filters when they lose efficiency.
- E. Do not store construction materials or waste in mechanical or electrical rooms.
- F. Prior to use of return air ductwork without intake filters clean up and remove dust and debris generated by construction activities.
 - 1. Inspect duct intakes, return air grilles, and terminal units for dust.
 - 2. Clean plenum spaces, including top sides of lay-in ceilings, outsides of ducts, tops of pipes and conduit.
 - 3. Clean tops of doors and frames.
 - 4. Clean mechanical and electrical rooms, including tops of pipes, ducts, and conduit, equipment, and supports.
 - 5. Clean return plenums of air handling units.
 - 6. Remove intake filters last, after cleaning is complete.
- G. Do not perform dusty or dirty work after starting use of return air ducts without intake filters.

- H. Use other relevant recommendations of SMACNA IAQ Guideline for Occupied Buildings Under Construction for avoiding unnecessary contamination due to construction procedures.

3.02 BUILDING FLUSH-OUT

- A. Contractor's Option: Either full continuous flush-out OR satisfactory air contaminant testing is required, not both.
- B. Perform building flush-out before occupancy.
- C. Do not start flush-out until:
 - 1. All construction is complete.
 - 2. HVAC systems have been tested, adjusted, and balanced for proper operation.
 - 3. Inspection of inside of return air ducts and terminal units confirms that cleaning is not necessary.
 - 4. New HVAC filtration media have been installed.
- D. Building Flush-Out: Operate all ventilation systems at normal flow rates with 100 percent outside air until a total air volume of 14,000 cubic feet per square foot of floor area has been supplied.
 - 1. Obtain Department's concurrence that construction is complete enough before beginning flush-out.
 - 2. Maintain interior temperature of at least 60 degrees F and interior relative humidity no higher than 60 percent.
 - 3. If additional construction involving materials that produce particulates or any of the specified contaminants is conducted during flush-out, start flush-out over.
 - 4. If interior spaces must be occupied prior to completion of the flush-out, supply a minimum of 25 percent of the total air volume prior to occupancy, and:
 - a. Begin ventilation at least three hours prior to daily occupancy.
 - b. Continue ventilation during all occupied periods.
 - c. Provide minimum outside air volume of 0.30 cfm per square foot or design minimum outside air rate, whichever is greater.
- E. Install new HVAC filtration media after completion of flush-out and before occupancy or further testing.

3.03 AIR CONTAMINANT TESTING

- A. Contractor's Option: Either full continuous flush-out OR satisfactory air contaminant testing is required, not both.
- B. Perform air contaminant testing before occupancy.
- C. Do not start air contaminant testing until:
 - 1. All construction is complete, including interior finishes.

2. HVAC systems have been tested, adjusted, and balanced for proper operation.
 3. New HVAC filtration media have been installed.
- D. Indoor Air Samples: Collect from spaces representative of occupied areas:
1. Collect samples while operable windows and exterior doors are closed, HVAC system is running normally as if occupied, with design minimum outdoor air, but with the building unoccupied.
 2. Collect samples from spaces in each contiguous floor area in each air handler zone, but not less than one sample per 25,000 square feet; take samples from areas having the least ventilation and those having the greatest presumed source strength.
 3. Collect samples from height from 36 inches to 72 inches above floor.
 4. Collect samples from same locations on 3 consecutive days during normal business hours; average the results of each set of 3 samples.
 5. Exception: Areas with normal very high outside air ventilation rates, such as laboratories, do not need to be tested.
 6. When retesting the same building areas, take samples from at least the same locations as in first test.
- E. Outdoor Air Samples: Collect samples at outside air intake of each air handler at the same time as indoor samples are taken.
- F. Analyze air samples and submit report.
- G. Air Contaminant Concentration Determination and Limits:
1. Carbon Monoxide: Not more than 9 parts per million and not more than 2 parts per million higher than outdoor air.
 2. Airborne Mold and Mildew: Measure in relation to outside air ; not higher than outside air.
 3. Formaldehyde: Not more than 50 parts per billion.
 4. Formaldehyde: Measure in micrograms per cubic meter, in relation to outside air ; not more than 20 micrograms per cubic meter higher than outside air.
 5. Total Volatile Organic Compounds (TVOC): Not more than 500 micrograms per cubic meter.
 6. Total Volatile Organic Compounds (TVOC): Measure in micrograms per cubic meter, in relation to outside air ; not more than 200 micrograms per cubic meter higher than outside air.
 7. Particulates (PM10): Not more than 50 micrograms per cubic meter.
 8. Total Particulates (PM): Measure in micrograms per cubic meter, in relation to outside air; not more than 20 micrograms per cubic meter higher than outside air.

END OF SECTION

**STATE OF ALASKA
DOT & PF
STATEWIDE PUBLIC FACILITIES**

**SUBSTITUTION REQUEST FORM
(after Award)**



Project:

Project No.:

Contractor: _____

Specified item for which substitution is requested: _____
(reference specification section and paragraph)

The following product is submitted for substitution: _____
(describe proposed substitution and differences from specified item; attach complete technical, performance, and test data; state whether substitution affects dimensions and functional clearances shown on drawings or affects other trades, and include complete information for changes to drawings and/or specifications which proposed substitution will require for its proper installation.)

I certify the following:

- | Yes | No | |
|--------------------------|--------------------------|---|
| <input type="checkbox"/> | <input type="checkbox"/> | The substitute will perform adequately and achieve the results called for by the general design. |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> The substitute is similar, of equal substance, suited to the same use, and will provide the same warranty as the product specified. |
| <input type="checkbox"/> | <input type="checkbox"/> | An equivalent source of replacement parts is available. |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> The evaluation and approval of the proposed substitute will not delay the Substantial or Final Completion of the project. |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> Any change in the design necessitated by the proposed substitution will not delay the Substantial or Final Completion of the project. |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> The cost of any change in the design necessitated by the proposed substitution, including engineering and detailing costs, and construction costs caused by the substitution will be paid by the contractor at no cost to the State. |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> The cost of any license fee or royalty necessitated by the proposed substitution will be paid by the contractor at no cost to the State. |

The undersigned states that the function, appearance and quality are equivalent or superior to the specified item.

Signed: _____ Date: _____
Authorized Contractor Signature

Architect/Engineer Recommendation:

☐ Accepted ☐ Accepted as Noted ☐ Not Accepted ☐ Received Too Late

Remarks:

Signed: _____ Date: _____
Architect/Engineer

Recommend Acceptance / Rejection _____ Date: _____
(circle one) Resident Engineer

☐ Accepted _____ Date: _____
☐ Rejected _____
Project Manager

SECTION 01 60 00
MATERIAL AND EQUIPMENT

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Requirements for transportation and handling, storage and protection, substitutions, and product options.

1.02 RELATED REQUIREMENTS

- A. Section 00700 – General Conditions
- B. Section 01 33 23 – Shop Drawings
- C. Section 01 42 19 Reference Standards
- D. Section 01 33 00 - Submittal Procedures
- E. Section 01 45 00 – Quality Control
- F. Section 01 51 00 – Construction Facilities
- G. Section 01 60 00A – Substitution Request Form
- H. Section 01 73 00 – Execution Requirements

1.03 TRANSPORTATION AND HANDLING

- A. Transport products by methods to avoid product damage; deliver in undamaged condition in manufacturer's unopened containers or packaging, dry.
- B. Provide equipment and personnel to handle products by methods to prevent soiling or damage.
- C. Immediately on delivery, inspect shipment to assure:
 - 1. Product complies with requirements of Contract Documents and reviewed submittals.
 - 2. Quantities are correct.
 - 3. Accessories and installation hardware are correct.
 - 4. Containers and packages are intact and labels legible.
 - 5. Products are protected and undamaged.

1.04 STORAGE AND PROTECTION

- A. Handle and store materials for construction, products of demolition, and other items to avoid damage to existing buildings, and infrastructure. All materials stored or staged on the roof shall be properly covered and anchored to prevent materials from being blown off the roof. Do not overload the structure.
- B. Store products in accordance with manufacturer's instructions, with seals and labels intact and legible. Store sensitive products in weather tight enclosures; maintain within temperature and humidity ranges required by manufacturer's instructions.
- C. For exterior storage of fabricated products, place on sloped supports above ground. Cover products subject to deterioration with impervious sheet covering; provide ventilation to avoid condensation.
- D. Store loose granular materials on solid surfaces in a well-drained area; prevent mixing with foreign matter. Cover such material to prevent material from being blown or transported away from the stockpile.
- E. Arrange storage to provide access for inspection. Periodically inspect to assure products are undamaged, and are maintained under required conditions.

1.05 SUBSTITUTIONS

- A. Substitutions shall be allowed during the Bidding period only if Document 00100, Information to Bidders, designates a time for submitting requests for substitutions under requirements specified in this Section.
- B. Only one request for substitution will be considered for each product from each Prime Bidder/CONTRACTOR. When substitution is not accepted, Prime Bidder/CONTRACTOR shall provide specified product.
- C. DEPARTMENT will consider requests for Substitutions only within 90 days after date established in Notice to Proceed.
- D. Substitutions may be considered when a Product becomes unavailable through no fault of the CONTRACTOR.
- E. Document each request with complete data substantiating compatibility of proposed Substitution with Contract Documents.
- F. Substitutions will not be considered when they are indicated or implied on shop drawing or product data submittals, without separate written request, or when acceptance will require revision to the Contract Documents.

1.06 SUBSTITUTION SUBMITTAL PROCEDURE:

- A. Submit four copies of Request for Substitution for consideration on Substitution Request form provided by DEPARTMENT (Section 01 60 00-A). Limit each request to one proposed Substitution.
- B. Submit certification signed by the CONTRACTOR: that the CONTRACTOR:
 - 1. Has investigated proposed Product and determined that it meets or exceeds the quality level of the specified Product. List similar projects using proposed product, dates of installation and user telephone number.
 - 2. Will provide an equivalent warranty for the Substitution as for the specified Product.
 - 3. Will coordinate installation and make changes to other Work, which may be required for the Work to be complete with no additional cost to DEPARTMENT.
 - 4. Waives claims for additional costs or time extension, which may subsequently become apparent from indirect costs.
 - 5. Will reimburse Department for review or redesign services associated with re-approval by Authorities.
- C. Submit shop drawings, manufacturers' product data, and certified test results attesting to the proposed Product equivalence and variations between substitute and specified product. The burden of proof is on proposer.
- D. The DEPARTMENT will notify CONTRACTOR in writing of decision to accept or reject request.

PART 2 - PRODUCTS

2.01 PRODUCTS

- A. Products include material, equipment, and systems.
- B. Comply with Specifications and referenced standards as minimum requirements.
- C. Components required to be supplied in quantity within a Specification section shall be the same, and shall be interchangeable.
- D. Do not use materials and equipment removed from existing structure, except as specifically required, or allowed, by Contract Documents.

2.02 PRODUCT OPTIONS

- A. Products Specified by Reference Standards or by Description Only: Any Product meeting those standards or description.
- B. Products Specified by Naming One or More Manufacturers followed by the term "No Substitutions": use only specified manufacturers, no substitutions allowed.

- C. Products Specified by Naming One or More Manufacturers with a Provision for Substitutions:
Submit a request for substitution for any manufacturer not specifically named that meets the description specifications of the named manufacturers.

PART 3 - EXECUTION

Not Used

END OF SECTION

SECTION 01 71 13
MOBILIZATION AND DEMOBILIZATION

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Requirements for mobilization and demobilization.

1.02 RELATED REQUIREMENTS

- A. Section 01 11 13 – Summary of Work
- B. Section 01 29 73 – Schedule of Values
- C. Section 01 29 76 – Application for Payment
- D. Section 01 51 00 – Construction Facilities
- E. Section 01 52 13 – Field Office and Sheds
- F. Section 01 77 00 – Contract Closeout

1.03 DEFINITIONS

- A. Mobilization and Demobilization includes:
 - 1. CONTRACTOR's work to prepare Site for Work under Contract and to marshal workers, materials and equipment, and those of subcontractors, to accomplish the Work.
 - 2. Mobilization of all construction equipment, materials, suppliers, appurtenances, and the like, staffed and ready for commencing and prosecuting the Work, and the subsequent demobilization and removal from the site of said equipment, appurtenances, and the like upon completion of the Work.
 - 3. Assembly and delivery to the site of plant, equipment, materials, and supplies necessary for the prosecution of Work which are not intended to be incorporated in the work; the clearing of and preparation of the CONTRACTOR's work area; the complete assembly, in working order, of equipment necessary to perform the required work; personnel services preparatory to commencing actual work; all other preparatory work required to permit commencement of the actual work on construction items for which payment is provided under the Contract.

1.04 REQUIREMENTS

- A. Haul routes, staging areas, and security guard and flagger positions will be designated and/or subject to approval by DEPARTMENT, who will coordinate with CONTRACTOR to determine requirements and locations.

- B. Cooperate with DEPARTMENT in allocation and use of MOBILIZATION AND DEMOBILIZATION areas of Site, field offices and sheds, materials storage, traffic, and parking facilities.
- C. During construction, coordinate use of Site and facilities through DEPARTMENT.
- D. Comply with DEPARTMENT'S procedures of contract communications; submittals, reports and records, schedules, coordination drawings, and recommendations; and resolution of ambiguities and conflicts.
- E. Comply with instructions of DEPARTMENT for use of utilities and construction facilities.
- F. Coordinate field engineering and layout Work under instructions of DEPARTMENT.
- G. Walk through Site with DEPARTMENT prior to start of Work.

1.05 SUBMITTALS

- A. Refer to Section 01 33 00 - Submittal Procedure, for submittal requirements.
- B. If requested by DEPARTMENT, submit a plan of the proposed layout of the construction site, including fences, roads, parking, buildings, staging, and storage areas, within seven (7) days after Notice to Proceed.

PART 2 – PRODUCTS

Not used

PART 3 - EXECUTION

3.01 Delivery: Delivery to the jobsite of construction tools, equipment, materials, and supplies shall be accomplished in conformance with local governing ordinances and regulations and the requirements of the Contract Documents.

3.02 Upon completion of the Work, remove construction tools, apparatus, equipment, unused materials and supplies, plant, and personnel from the jobsite.

END OF SECTION

SECTION 01 71 23
FIELD ENGINEERING

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Requirements for field surveying.

1.02 PERFORMANCE REQUIREMENTS:

- A. The CONTRACTOR shall conduct pre-construction inspection and documentation surveys, accompanied by a representative of the DEPARTMENT, prior to start of work.

1.03 RELATED REQUIREMENTS

- A. Section 00700 - General Conditions: Basic requirements.
- B. Section 01 11 13 - Summary of Work: Work sequence, Use of premises, and Using Agency occupancy
- C. Section 01 33 00 –Submittal Procedures
- D. Section 01 51 00 – Construction Facilities
- E. Section 01 73 00 – Execution Requirements

1.04 QUALITY CONTROL

- A. Land Surveyor: Registered in the State of Alaska, and acceptable to DEPARTMENT.
- B. Professional Engineer: Registered Professional Engineer of the discipline required elsewhere in the Contract Documents for specific service on Project, licensed in the State of Alaska.
- C. DEPARTMENT reserves the right to field verify all survey data provided by the CONTRACTOR.

1.05 SUBMITTALS

- A. Submit name, address, and telephone number of Surveyor/ Engineer before starting survey Work.
- B. Submit survey notes as required by Sections 00700 and 00800.
- C. On request, submit documentation verifying accuracy of survey Work.

1. Submit certificate signed by CONTRACTOR's Surveyor and Engineer, certifying that elevations and locations of improvements constructed under this contract are in conformance, or non-conformance, with Contract Documents.
- D. Submit two copies of each survey or inspection report. The DEPARTMENT will retain both copies.

1.06 SURVEY RECORD DOCUMENTS

- A. Maintain complete, accurate log of control and survey Work as it progresses.
- B. On completion of foundation walls, buried utilities, and major site improvements, prepare a certified survey showing dimensions, locations, angles, and elevations of Work completed to permanent surface features, sufficient to develop a certified as-built plot plan and to obtain a certificate of occupancy from the Authority Having Jurisdiction.
- C. Submit record documents under provisions of Section 01 78 39 – Project Record Documents.

PART 2 – PRODUCTS

Not Used

PART 3 - EXECUTION

3.01 INSPECTION

- A. Verify locations of survey control points prior to starting Work. Promptly notify DEPARTMENT of any discrepancies discovered.

3.02 SURVEY REFERENCE POINTS

- A. Protect survey control points prior to starting site Work; preserve permanent reference points during construction. Make no changes without prior written notice to DEPARTMENT.
- B. Promptly report to DEPARTMENT the loss or destruction of any reference point or relocation required because of changes in grades or other reasons. Replace dislocated survey control points based on original survey control.

3.03 SURVEY REQUIREMENTS

- A. Establish a minimum of one permanent bench mark on site, referenced to established control points. Record locations, with horizontal and vertical data, on project record documents.
- B. Establish lines and levels, locate and lay out by instrumentation and similar appropriate means:
 1. Site improvements, including pavements; stakes for grading, fill and topsoil replacement; and utility locations, slopes, invert elevations, switch cabinets, etc.

2. Grid or axis for structures.
 3. Building foundation, column locations, and ground floor elevations.
- A. Periodically verify layouts by same means.
 - B. The CONTRACTOR shall obtain all field measurements for the accurate fabrication and installation of the work included in the Contract. Exact measurements are the CONTRACTOR's responsibility.
 - C. The CONTRACTOR shall furnish or obtain templates, patterns, and installation instructions as required for the installation of work. All dimensions shall be verified in the field.
 - D. Establish and maintain records of all existing and new utility locations.

3.04 SURVEYING ACCURACY AND TOLERANCES

- A. Control Traverse surveys, computations and staking of the building grid control points shall be performed to the Third Order, Class I traverse surveys (1:10,000) as specified in the "Standards and Specifications for Geodetic Control Surveys," Federal Geodetic Control Committee.
- B. Vertical Accuracy requirements for building foundations will meet the Survey Accuracy Requirements for Bridges as defined in "Construction Surveying Requirements," State of Alaska Department of Transportation and Public Facilities.
- C. All other construction survey will be performed in accordance with "Construction Surveying Requirements".

3.05 DEPARTMENT AS-BUILT SURVEY

- A. Department completed a boundary survey as part of the project. Survey will be made available to CONTRACTOR in cad and/or hard copy upon request.

END OF SECTION

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**SECTION 01 72 00
UTILITIES COORDINATION**

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Coordination of utilities to be provided by the CONTRACTOR, DEPARTMENT, and others, and utility locates.

1.02 RELATED DOCUMENTS

- A. Section 00700 – General Conditions
- B. Section 01 11 13 – Summary of Work
- C. Section 01 31 14 – Work Coordination
- D. Related Technical Specification Sections

1.03 UTILITIES PROVIDED BY OTHERS

- A. The DEPARTMENT will provide permanent utilities listed in this section, to points of demarcation shown in the Contract Documents, under separate agreements with utility companies. The CONTRACTOR shall coordinate with the DEPARTMENT to sequence the provision of utilities provided by others with its Work.
- B. Utilities to be provided by the DEPARTMENT are described below.
 - 1. Water and Sewer Utilities:
 - 2. Electrical Service:
 - 3. Natural Gas Service:
 - 4. Telecommunications Utilities:
- C. The CONTRACTOR shall notify the DEPARTMENT at least Thirty (30) calendar days before it needs utility companies retained by the DEPARTMENT to begin work on the site. Coordinate with the DEPARTMENT to enable the utilities to be installed as per the requirements of the CONTRACTOR'S schedule.
- D. Not Used

1.04 UTILITIES PROVIDED BY CONTRACTOR

- A. The CONTRACTOR shall provide permanent utilities listed in this section as shown in the contract documents.
- B. Utilities to be provided by the CONTRACTOR are described below.

1. Water and Sewer Utilities:
2. Electrical Service:
3. Natural Gas Service:
4. Telecommunications:

C. Not Used

PART 2 - PRODUCTS

Not Used

PART 3 - EXECUTION

3.01 UTILITY LOCATES

- A. The CONTRACTOR shall request field locates from all utilities having facilities in the area a minimum of seven (7) calendar days prior to excavation. Utility company telephone numbers are summarized below:

Not Used

- B. The location and elevation of existing utilities shown on the Plans are approximate only. Additional utilities may exist that are not shown on the Plans. Before starting construction, the CONTRACTOR shall request all utility owners to locate their utilities and, at points of possible conflict, the CONTRACTOR shall uncover the located utilities.
- C. The CONTRACTOR shall repair any damage caused to utilities by the CONTRACTOR's operations at no cost to the DEPARTMENT.
- D. The CONTRACTOR shall protect and work around existing underground utilities.
- E. Comply with requirements of utility companies when working with, in, or around their utilities.
- F. Not Used

3.02 NOTIFICATION FOR COORDINATION WITH UTILITY COMPANIES

- A. Provide the DEPARTMENT and affected utility companies a minimum of thirty (30) calendar days advance written notice of any work requiring coordination with utility companies, or longer notification as required by the utility companies. The utility companies will not be required to work at more than one location at a time, and shall be allowed to complete work at a specific location prior to commencing with work at another specific location.
- B. Not Used

3.03 STAGING DURING THE WORK

- A. Coordinate with utility companies, whether retained by the DEPARTMENT or the CONTRACTOR, to allow adequate staging area on-site for utility companies to perform their work.
- B. Designate and dedicate area seven calendar days prior to required Utility mobilization. Allow for multiple mobilizations as required to accommodate Contractor schedule.
- C. Not Used

END OF SECTION

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SECTION 01 73 00
EXECUTION REQUIREMENTS

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Requirements for addressing defects, cleaning, operating and maintenance manuals, spare parts, training, warranties and bonds, and maintenance service.

1.02 RELATED REQUIREMENTS

- A. Section 00700 - General Conditions: Fiscal provisions, legal submittals, and other administrative requirements
- B. Section 01 26 63 – Change Procedures
- C. Section 01 31 19 – Project Meetings
- D. Section 01 33 00 – Submittal Procedures
- E. Section 01 33 23 – Submittal Procedures
- F. Section 01 45 23 – Departmental Inspection Services
- G. Section 01 45 29 – Testing Laboratory Services
- H. Section 01 60 00 – Material and Equipment
- I. Section 01 71 23 – Field Engineering
- J. Section 01 79 00 – Demonstration and Training.

1.03 CLOSEOUT PROCEDURES

- A. Comply with Section 01 77 00 - Contract Closeout Procedures.

1.04 DEFECTS

- A. Product defects shall be all items that affect the visual appearance or function of the Products. Defects shall be as identified below unless more stringent requirements are specified within specific sections.
- B. Products shall be shall typically be viewed from a distance of 30.0 inches (760 mm).
- C. Defects shall be solely determined by the Project Manager.
- D. Defects, Product:

1. Cuts, Scrapes, Gouges Abrasions 0.250 inch (6 mm) long or longer than and 0.03125 inches (0.79375 mm) wide or wider that are visible at a distance of 30.0 inches (762 mm) shall be considered defects.
 2. Abrasions less than the above shall be accepted.
 3. Burns of any size that permanently discolor the surface material shall be considered defects.
 4. Product color variation.
- E. Defects, Joint:
1. Non-alignment of Products. Visual defects and non-alignment of joints shall be considered defective.
- F. Defects, Structural:
1. Bent members or other structural damage shall be considered defective.
 2. Incorrectly manufactured members shall be considered defective.
- G. Defects, Corrosion:
1. Surface corrosion not exceeding one percent (1%) of the surface area shall be considered a visual defect.
 2. Surface corrosion exceeding one percent (1%) and not exceeding five percent (5%) of the surface area shall be evaluated by the Project Manager.
 3. Surface corrosion exceeding five percent (5%) of the surface area shall be shall be considered a structural defect.
- H. Defects shall be repaired or replaced as solely determined by the Project Manager at no additional cost to the DEPARTMENT.
1. Structural defects shall be replaced, no exceptions.
 2. Visual defects shall be repaired or replaced as solely determined by the Project Manager.

1.05 PROGRESS CLEANING AND WASTE REMOVAL

- A. Maintain work and storage areas free of waste materials, debris, and rubbish. Maintain site in a neat and orderly condition to maintain safe passage and exits and to avoid fire hazard. Provide covered containers for deposit of waste materials.
- B. Collect and remove waste materials, debris, and rubbish from site periodically and at least weekly, and dispose off-site. Have equipment and personnel available on-site daily to sweep and scrub roads and parking areas, which are work sites or haul routes.
- C. Pavement striping and markings that cannot be effectively cleaned shall be replaced at expense of CONTRACTOR.

1.06 FINAL CLEANING

- A. Execute final cleaning prior to Substantial Completion inspection.

- B. Clean interior and exterior surfaces exposed to view; remove temporary labels, stains and foreign substances.
- C. Use materials which will not create hazards to health or property, and which will not damage surfaces. Follow manufacturer's recommendations.
- D. Maintain cleaning until DEPARTMENT issues certificate of Substantial Completion.
- E. Remove waste, debris, and surplus materials from site. Clean grounds; remove stains, spills, and foreign substances from paved areas and sweep clean. Rake clean other exterior surfaces.

1.08 ADJUSTING

- A. Adjust operating Products and equipment to ensure smooth and unhindered operation.

1.09 OPERATION AND MAINTENANCE DATA

- A. Submit data bound in 3-ring slant "D" presentation ring binders, maximum 11-5/5" high and 11-1/4" deep. Spine, front, and back shall be heavy virgin vinyl sealed over heavy board. Binders shall have clear, full size pockets on spine and front cover. Thickness of content shall not exceed 75% of binder manufacturer's stated capacity. All pages shall be 8 ½" x 11", or 11" x 17" folded to 8 ½" x 11" in a manner to permit unfolding without removal from binder.
- B. O&M Manual binders shall be black, clearly and permanently labeled as follows:
 - a. Spine
 - Project Name
 - Project Number
 - Operations & Maintenance Manual, Volume ____ of ____
 - Building Name:
 - b. Front Cover:
 - Project Name:
 - Project No.:
 - Building Name:
 - CONTRACTOR:
 - Address
 - City, State, ZIP

Phone:

Fax:

Consultant:

Address

City, State, ZIP

Phone:

Fax:

Operations & Maintenance Manual, Volume ____ of ____

Discipline:

Date:

- C. Internally subdivide the binder contents with permanent page dividers, logically organized as described below; with tab titling clearly printed under reinforced laminated plastic tabs.
- D. Contents: Prepare a Table of Contents for each volume, with each Product or system description identified, typed on 24 pound white paper, in three parts as follows:
 - 1. Part 1: Directory, listing names, addresses, and telephone numbers of Architect/Engineer, CONTRACTOR, Subcontractors, and major equipment suppliers.
 - 2. Part 2: Operation and maintenance instructions, arranged by system process flow and subdivided by specification section. For each category, identify names, addresses, and telephone numbers of Subcontractors and suppliers. Identify the following:
 - a. Significant design criteria.
 - b. List of equipment.
 - c. Parts list for each component.
 - d. Operating instructions.
 - e. Maintenance instructions for equipment and systems.
 - f. Maintenance instructions for [special] finishes, including recommended cleaning methods and materials, and special precautions identifying detrimental agents.
 - 3. Part 3: Project documents and certificates, including the following:
 - a. Shop drawings and product data.
 - b. Air and water balance reports.
 - c. Certificates.
 - d. Originals of warranties and bonds.

- E. Submit 1 draft copy of completed volumes 90 working days prior to Training or Substantial Completion inspection, whichever is earliest. This copy will be reviewed and returned, with DEPARTMENT comments. Revise content of all document sets as required prior to final submission.
- F. Submit three sets of revised final volumes 45 days prior to Training or Substantial Completion inspection, whichever is earliest.
- G. In addition to required hard copies, provide electronic copy on .pdf format with table of contents hyperlinked to all referenced sections.

1.10 TRAINING

- A. Before Substantial Completion, instruct DEPARTMENT designated personnel in operation, adjustment, and maintenance of products, equipment, and systems, at agreed upon times. For equipment requiring seasonal operation, or placed into operation subsequent to Final Completion, perform instructions within six months.
- B. Refer to Section 01 79 00 for additional training requirements.
- C. Use operation and maintenance manuals as basis of instruction. Review contents of manual with personnel in detail to explain all aspects of operation and maintenance.
- D. Unless specified elsewhere, the duration of on-site instruction shall be as specified.
- E. Provide digital video recordings of all provided instruction in format approved by DEPARTMENT. Training videos shall be submitted prior to Substantial Completion.
- F. Prepare and insert additional data in Operation and Maintenance Manual when need for such data becomes apparent during instruction.

1.11 SPARE PARTS AND MAINTENANCE PRODUCTS

- A. Provide spare parts, maintenance, and extra Products in quantities specified in individual specification sections. These shall be labeled and stored per manufacturer's recommendations.
- B. Deliver to Project site and place in location as directed; obtain receipt prior to Substantial Completion payment.

1.12 WARRANTIES AND BONDS

- A. Provide duplicate notarized copies.
- B. Execute and assemble transferable warranty documents from Subcontractors, suppliers, and manufacturers.
- C. Provide Table of Contents and assemble in three D side ring binder with durable plastic cover.

- D. For items of Work delayed beyond date of Substantial Completion, provide updated submittal within 10 days after acceptance, listing date of acceptance as start of warranty period.

1.13 MAINTENANCE SERVICE

- A. Furnish service and maintenance of components indicated in specification sections for one year from date of Substantial Completion.
- B. Examine system components at a frequency consistent with reliable operation. Clean, adjust, and lubricate as required.
- C. Include systematic examination, adjustment, and lubrication of components. Repair or replace parts whenever required. Use parts produced by the manufacturer of the original component.
- D. Maintenance service shall not be assigned or transferred to any agent or Subcontractor without prior written consent of the DEPARTMENT.

PART 2 - PRODUCTS**Not Used****PART 3 - EXECUTION REQUIREMENTS****Not Used****END OF SECTION**

SECTION 01 73 29
CUTTING AND PATCHING

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Related Documents and Requirements
- B. General Requirements
- C. Submittals
- D. Structural Work
- E. Operational Systems
- F. Visual Requirements
- G. Existing Warranties
- H. Materials
- I. Inspection
- J. Preparation
- K. Performance
- L. Cleaning

1.02 RELATED REQUIREMENTS

- A. Section 01 11 13 - Summary of Work
- B. Section 01 31 14 - Work Coordination
- C. Section 01 33 00 – Submittal Procedures
- D. Section 01 60 00 - Material and Equipment

1.03 REQUIREMENTS

- A. 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. Repairs and Patching: CONTRACTOR shall repair or patch all cut or disturbed areas as incidental to the Work. All patching and repairs shall match adjacent areas in texture, color, materials, and quality of workmanship.
- C. Employ skilled and qualified workers to perform cutting and patching.

1.04 SUBMITTALS

- A. Cutting and Patching Proposal: Prior to proceeding with cutting and patching, submit and obtain DEPARTMENT'S review of proposed cutting and patching procedures.
- B. Include the following information, as applicable, in proposal:
 - 1. Describe extent of cutting and patching required. Show how it will be performed and indicate why it is unavoidable.
 - 2. Describe anticipated results in terms of changes to existing construction. Include changes to structural elements and operating components as well as changes in building's appearance and other significant visual elements.
 - 3. List products to be used and firms or entities that will perform Work.
 - 4. Indicate dates and times when cutting and patching will be performed.
 - 5. Describe how the Work may affect operations of the facility user and what measures will be taken to mitigate them.
 - 6. Utilities: List utilities cutting and patching procedures will disturb or affect. Describe how service from affected utilities will be bypassed if necessary to maintain uninterrupted service.
 - 7. Structural: Where cutting and patching involves adding reinforcement to structural elements, submit details and engineering calculations showing integration of reinforcement with original structure.
 - 8. Roofing and Exterior Architectural Systems: Submit information on proposed cutting and patching procedures adequate for the DEPARTMENT to obtain in writing from the manufacturer of the existing system that the proposed procedures will not void the manufacturer's warranty. Work shall be performed by an installer authorized by the existing system manufacturer.
- C. The DEPARTMENT'S review of cutting and patching proposals does not waive its right to later require complete removal and replacement of unsatisfactory work.

1.05 STRUCTURAL

- A. Requirements for Structural Work: Do not cut and patch structural elements in manner that would change their load-carrying capacity or load-deflection ratio.
- B. Obtain approval of cutting and patching proposal before cutting and patching following structural elements:
 - 1. Foundations
 - 2. bearing and retaining walls
 - 3. structural concrete and masonry units

4. structural steel
5. Lintels
6. timber and primary wood framing
7. structural decking
8. stair systems
9. miscellaneous structural metals
10. exterior curtain-wall constructions
11. equipment supports
12. piping, ductwork, vessel, and equipment
13. structural systems of special construction
14. others as deemed necessary by the DEPARTMENT

1.06 OPERATIONAL SYSTEMS

- A. Obtain approval of cutting and patching proposal before performing cutting and patching work affecting the following operating elements or safety related systems:
 1. primary operational system and equipment
 2. air or smoke barriers
 3. water, moisture or vapor barriers
 4. membranes and flashings
 5. fire protection system
 6. noise and vibration control elements and systems
 7. control systems
 8. communication systems
 9. conveying systems
 10. electrical wiring systems
 11. operating system of special construction
 12. others as deemed necessary by the DEPARTMENT
- B. Provide bypass or backup systems to minimize downtime and operational impact to existing facility.

1.07 EXISTING WARRANTIES

- A. 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.
- B. Work on existing roofing and other items covered by warranty shall be done by firm or craftsman authorized by warranty issuer.

PART 2 - PRODUCTS

PART 3 - EXECUTION

3.01 INSPECTION

- A. Before proceeding meet at Project Site with DEPARTMENT'S representative and parties involved in cutting and patching, including related trades.
- B. Examine surfaces to be cut and patched and conditions under which cutting and patching is to be performed.
- C. Review areas of potential interference and conflict; coordinate procedures and resolve before proceeding.

3.02 PREPARATION

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

3.03 PERFORMANCE

- A. 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: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
 - 4. Mechanical and Electrical Services: Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting.
 - 5. Proceed with patching after construction operations requiring cutting are complete.
- B. 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.
3. Floors and Walls: Where walls or partitions that are removed extend one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform finish, color, texture, and appearance. Remove in-place floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.
4. Ceilings: Patch, repair, or rehang in-place ceilings as necessary to provide an even-plane surface of uniform appearance.
5. Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weather-tight condition and ensures thermal and moisture integrity of building enclosure.

3.04 CLEANING

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

END OF SECTION

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**SECTION 01 77 00
CONTRACT CLOSEOUT PROCEDURES**

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Requirements for Substantial Completion
- B. Requirements for Final Completion
- C. Requirements for Final Payment and Final Acceptance

1.02 RELATED SECTIONS

- A. Section 00700 - General Conditions: Substantial Completion, Final Completion, Final Payment, Final Acceptance
- B. Section 01 11 13 - Summary of Work: Using Agency occupancy
- C. Section 01 33 00 – Submittal Procedures
- D. Section 01 29 73 – Schedule of Values
- E. Section 01 29 76 – Application for Payment
- F. Section 01 31 13 – Job Site Administration
- G. Section 01 45 23 – Departmental Inspection Service: CONTRACTOR'S Responsibilities
- H. Section 01 71 13 – Mobilization and Demobilization
- I. Section 01 73 00 – Execution Requirements: Final cleaning, Project Record Documents, Operation and Maintenance Data, Warranties and Bonds, Spare Parts and Maintenance Materials
- J. Section 01 78 39 – Project Record Documents
- K. Section 01 79 00 – Demonstration and Training

1.03 SUBSTANTIAL COMPLETION SUBMITTALS

Submit the following prior to requesting the Substantial Completion Inspection:

- A. Evidence of Compliance with Requirements of Authority Having Jurisdiction:

1. Certificate of Occupancy
 2. Required Certificates of Inspection
 3. Other approvals as may be required
- B. Project Record Documents
- C. Operation and Maintenance Data
- D. Spare Parts and Maintenance Materials
- E. Warranties and Bonds
- F. Keys and Keying Schedule
- G. No progress payments will be made for Substantial Completion until all required submittals have been submitted and accepted by the DEPARTMENT.

1.04 SUBSTANTIAL COMPLETION

- A. In accordance with Section 00700 - General Conditions, Article 13.10 Substantial Completion, the CONTRACTOR shall notify the DEPARTMENT in writing that the Work or a portion of the Work which has been specifically identified in the Contract Documents (except for items specifically listed by the CONTRACTOR as incomplete) is substantially complete and request that the DEPARTMENT issue a Certificate of Substantial Completion. The DEPARTMENT will consider the CONTRACTOR'S request for Substantial Completion only when:
1. Written request for Substantial Completion is provided at least 14 calendar days in advance of the DEPARTMENT'S scheduled Substantial Completion inspection date.
 2. List of items to be completed or corrected is submitted.
 3. All Operation and Maintenance Manuals are submitted and approved by the DEPARTMENT.
 4. All commissioning requirements have been met.
 5. All equipment and systems have been tested, adjusted, balanced and are fully operational.
 6. All demonstration and training requirements have been met.
 7. All automated and manual controls are fully operational.
 8. Operation of all equipment and systems has been demonstrated to DEPARTMENT.
 9. Certificate of Occupancy is submitted.
 10. Certificates of Inspection for required inspections have been submitted.
 11. Project Record Documents for the Work or the portion of the Work being accepted are submitted and approved.
 12. Spare parts and maintenance materials are turned over to DEPARTMENT.
 13. All keys are turned over to the DEPARTMENT.
 14. All warranties and bonds are submitted and approved.
 15. Final cleaning has been completed to the satisfaction of the DEPARTMENT.

- B. When all of the preceding requirements for the consideration of Substantial Completion have been met, the DEPARTMENT will conduct a scheduled Substantial Completion inspection with its Architect/Engineers and Using Agency representatives. If upon the completion of the inspection, the DEPARTMENT should find that the Work is not substantially complete, DEPARTMENT will promptly notify CONTRACTOR in writing, listing observed deficiencies.
- C. The CONTRACTOR shall remedy deficiencies and send a second written notice of Substantial Completion.
- D. When the DEPARTMENT finds the Work is substantially complete, it will have 14 days to issue a certificate of Substantial Completion with an attached punch list of deficiencies, all in accordance with the provisions of the General Conditions.
- E. The CONTRACTOR shall be responsible for scheduling the activities required for Substantial Completion to enable completion within the Contract Time.

1.05 FINAL COMPLETION

- A. In accordance with Section 00700 – General Conditions, Article 13.13 Final Completion, when the CONTRACTOR considers that it has completed all the deficiencies listed on the Substantial Completion punch list, and that the Work is otherwise complete, it shall submit written certification that:
 - 1. Contract Documents have been reviewed
 - 2. Work has been completed in accordance with Contract Documents, and deficiencies listed with certificate of Substantial Completion have been corrected
 - 3. Work is complete and ready for final inspection
- B. Upon the receipt of the preceding written notice, the DEPARTMENT will conduct a Final Completion inspection. If the DEPARTMENT should then find the Work to be incomplete, it will promptly notify the CONTRACTOR in writing with a list of observed deficiencies.
- C. The CONTRACTOR shall remedy deficiencies and transmit to the DEPARTMENT a second certification of Final Completion.
- D. When the DEPARTMENT determines the Work is complete, all in accordance with the General Conditions article, “Final Completion and Application for Payment”, the CONTRACTOR may make application for Final Payment.

1.06 REINSPECTION FEES

- A. In accordance with Section 00700 – General Conditions, Articles 13.10 Substantial Completion and 13.12 Final Inspection, the CONTRACTOR shall pay for all costs incurred by the DEPARTMENT for re-inspection.
- B. The DEPARTMENT may deduct the re-inspection costs from the application for final payment.

1.07 FINAL ACCEPTANCE

- A. Following the issuance of Final Completion, and subject to the completion of requirements specified in Section 00700 - General Conditions, Articles 13.14 Final Payment and 13.15 Final Acceptance, the DEPARTMENT will review the project files for completeness. The DEPARTMENT may require the CONTRACTOR to submit or re-submit any of the following documents, upon request:
1. Contractor's transmittal letter: O&M Manuals
 2. Contractor's transmittal letter: Warranty/Bonds
 3. Contractor's transmittal letter: Record Documents
 4. Spare parts, maintenance materials receipts
 5. Contractor's transmittal letter: keys & keying schedule
 6. Contractor's certification of insurance
 7. EEO compliance certification (Federally funded projects only)
 8. Submittals and miscellaneous registers
 9. Original final pay estimate
 10. Contractor's release
 11. Department of Labor Notice of Completion (NOC)
 12. Other documentation as required by the DEPARTMENT
- B. Statement of Adjustment of Accounts – The DEPARTMENT may require the CONTRACTOR to submit a final statement reflecting adjustments to the Contract Price showing:
1. Original Contract Price
 2. Previous Change Orders
 3. Changes under allowances
 4. Changes under Unit Prices
 5. Deductions for uncorrected Work
 6. Penalties and bonuses
 7. Deductions for liquidated damages
 8. Deductions for re-inspection fees
 9. Other adjustments to Contract Price
 10. Total Contract Price as adjusted
 11. Previous payments
 12. Sum remaining due
- C. DEPARTMENT will issue a final Change Order reflecting all remaining adjustments to Contract Price not previously made by Change Orders.
- D. See Section 01 29 73 - Schedule of Values for minimum value that shall be assigned for Final Acceptance.
- E. The CONTRACTOR shall cooperate with the DEPARTMENT and shall provide the requested documentation.

- F. When the DEPARTMENT determines its files are complete, it may make final payment and issue a letter of Final Acceptance.

PART 2 - PRODUCTS

Not Used

PART 3 - EXECUTION

Not Used

END OF SECTION

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SECTION 01 78 39
PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.01 SECTION INCLUDES

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

1.02 RELATED REQUIREMENTS

- A. Section 00700 - General Conditions: Record Documents
- B. Section 01 11 13 – Summary of Work: Record survey
- C. Section 01 29 76 – Application for Payment
- D. Section 01 33 23 – Shop Drawings, Product Data, and Samples
- E. Section 01 77 00 – Contract Closeout Procedures
- F. Individual Specifications Sections: Manufacturer's certificates and certificates of inspection

1.03 MAINTENANCE OF DOCUMENTS AND SAMPLES

- A. In addition to requirements in General Conditions, maintain at the site for DEPARTMENT one accurate record copy of:
 - 1. Contract Drawings
 - 2. Specifications
 - 3. Addenda
 - 4. Change Orders and other modifications to the Contract
 - 5. Reviewed Shop Drawings, product data, and samples
 - 6. Survey and field records
 - 7. Field test records
 - 8. Inspection certificates
 - 9. Manufacturer's certificates
- B. Prior to Substantial Completion, provide original or legible copies of each item maintained by CONTRACTOR as listed in 01 78 39.1.02.B,C, and D above.
- C. Delegate responsibility for management of maintenance of Record Documents to one person on CONTRACTOR's staff as approved in advance by Contracting Officer.
- D. Promptly following award of Contract, secure from DEPARTMENT, at no cost to the CONTRACTOR, one complete set of all Documents comprising the Contract.

- E. Immediately upon receipt of job set described above, identify each Document with title "RECORD DOCUMENTS - JOB SET".
- F. Store record documents and samples in field office apart from documents used for construction. Provide files, racks, and secure storage for record documents and samples.
- G. Label and file record documents and samples in accordance with section number listings in table of contents of this Project manual. Label each document "PROJECT RECORD" in neat, large, printed letters.
- H. Maintain record documents in a clean, dry and legible condition. Do not use record documents for construction purposes.
- I. Use all means necessary to maintain job set of Record Documents completely protected from deterioration and from loss and damage until completion of Work and transfer of recorded data to Contracting Officer.
- J. Keep record documents and samples available for inspection by DEPARTMENT.
- K. Upon request by the DEPARTMENT and at time of each Application for Payment enable inspection of record documents by the DEPARTMENT for review as to completeness.
- L. Contracting Officer's approval of current status of Record Documents will be prerequisite to Contracting Officer's approval of requests for progress payments and request for final payment.
 - 1. Prior to submitting each request for progress payment, secure Contracting Officer's approval of Record Documents as currently maintained.
 - 2. Prior to submitting request for Final Payment, obtain Contracting Officer's approval of final Record Documents.
- M. Do not use job set for any purpose except entry of new data and for review and copying by Contracting Officer.

1.04 RECORDING

- A. Record information on a set of blue line opaque Drawings, and in a copy of a Project manual, provided by DEPARTMENT.
- B. Using felt tip marking pens or colored pencil, maintaining separate colors for each major system, clearly describe changes by note and by graphic line, as required. Date all entries. Call attention to entry by a "cloud" around area or areas affected.
- C. Thoroughly coordinate all changes within Record Documents, making adequate and proper entries on each Specification Section and each sheet of Drawings and other Documents where such entry is required to properly show change or selection.

- D. When a change within Record Documents is referenced to another document, such as a RFI, Shop Drawing or Change Order, attach a copy of the referenced document to the respective Record Drawing or Record Specification where the entry is made.
- E. Contract Drawings and Shop Drawings: Legibly mark each item to record actual construction, including:
 - 1. Measured depths of elements of foundation in relation to finish first floor datum. Accurate to the nearest inch.
 - 2. Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements. Accurate to the nearest inch.
 - 3. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of construction.
 - 4. Field changes of dimension and detail.
 - 5. Changes made by modifications.
 - 6. Details not on original Contract Drawings.
 - 7. References to related Shop Drawings and modifications
 - 8. Clearly label all changes and show dimensions to establish size and location. All identifications shall be sufficiently descriptive to relate reliably to Specifications.
- F. Other Documents: Maintain manufacturer's certifications, inspection certifications, and field test records required by individual Specifications sections.

1.05 SUBMITTALS

- A. Upon submittal of the completed Record Documents, make changes in Record Documents as required by the Contracting Officer.
- B. Transmit with cover letter in duplicate, listing:
 - 1. Date
 - 2. DEPARTMENT's Project title and number
 - 3. CONTRACTOR's name, address, and telephone number
 - 4. Number and title of each record document
 - 5. Signature of CONTRACTOR or authorized representative.
- C. Final Record Documents shall include both hard copies and digitally scanned copies in .pdf format (high quality greyscale scans, minimum 200 pixels/inch). Scans shall include front and back of drawings/documents where information occurs on both sides.

PART 2 – PRODUCTS

Not Used

PART 3 - EXECUTION

Not Used

END OF SECTION

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**SECTION 01 79 00
DEMONSTRATION AND TRAINING**

PART 1 – GENERAL

1.01 SECTION INCLUDES

- A. Administrative and procedural requirements for instructing DEPARTMENT's personnel. Major topics include the following:
 - 1. Demonstration of operation of systems, subsystems, and equipment.
 - 2. Training in operation and maintenance of systems, subsystems, and equipment.

1.02 RELATED REQUIREMENTS

- A. Section 00700 – General Conditions
- B. Section 01 11 13 – Summary of Work
- C. Section 01 31 13 – Job Site Administration
- D. Section 01 31 19 – Project Meetings
- E. Section 01 33 00 – Submittal Procedures
- F. Section 01 73 00 – Execution Requirements
- G. Section 01 77 00 – Contract Closeout Procedures

1.03 SUBMITTALS

- A. Instruction Program: Submit three copies of outline of instructional program for demonstration and training, including a schedule of proposed dates, times, length of instruction time, and instructors' names for each training module. Include learning objective and outline for each training module.
 - 1. At completion of training, submit two complete training manual(s) for DEPARTMENT's use.
- B. Qualification Data: For facilitator and instructor.
- C. Attendance Record: For each training module, submit list of participants and length of instruction time.

1.04 QUALITY ASSURANCE

- A. **Facilitator Qualifications:** A firm or individual experienced in training or educating maintenance personnel in a training program similar in content and extent to that indicated for this Project, and whose work has resulted in training or education with a record of successful learning performance.
- B. **Instructor Qualifications:** A factory-authorized service representative, complying with requirements in Division 1 Section "Quality Requirements," experienced in operation and maintenance procedures and training.
- C. **Pre-instruction Conference:** Conduct conference at Project site to comply with requirements in Division 1 Section "Project Meetings." Review methods and procedures related to demonstration and training including, but not limited to, the following:
 - 1. Inspect and discuss locations and other facilities required for instruction.
 - 2. Review and finalize instruction schedule and verify availability of educational materials, instructors' personnel and facilities needed to avoid delays.
 - 3. Review required content of instruction.
 - 4. For instruction that must occur outside, review weather and forecasted weather conditions and procedures to follow if conditions are unfavorable.

1.05 COORDINATION

- A. Coordinate instruction schedule with DEPARTMENT's operations. Adjust schedule as required to minimize disrupting DEPARTMENT's operations.
- B. Coordinate instructors, including providing notification of dates, times, length of instruction time, and course content.
- C. Coordinate content of training modules with content of approved emergency, operation, and maintenance manuals. Do not submit instruction program until operation and maintenance data has been reviewed and approved by Department.

PART 2 - PRODUCTS

2.01 INSTRUCTION PROGRAM

- A. **Program Structure:** Develop an instruction program that includes individual training modules for each system and equipment not part of a system, as required by individual Specification Sections, and as follows:
 - 1. Door hardware
 - 2. Equipment, including projection screens, A/V, and laboratory fume hoods
 - 3. Fire-protection systems, including fire alarm, fire pumps and fire-extinguishing systems
 - 4. Intrusion detection and security systems

5. Laboratory equipment, including laboratory air and vacuum equipment and piping, and laboratory fume hoods
 6. Heat generation, including boilers, feed water equipment, pumps, and water distribution piping
 7. HVAC systems, including air-handling equipment, air distribution systems and terminal equipment and devices
 8. HVAC instrumentation and controls
 9. Electrical service and distribution, including transformers, switchboards, panel boards, uninterruptible power supplies and motor controls
 10. Packaged engine generators, including transfer switches
 11. Lighting equipment and controls
 12. Communication systems, including intercommunication and voice and data equipment.
- B. Training Modules: Develop a learning objective and teaching outline for each module. Include a description of specific skills and knowledge that participant is expected to master. For each module, include instruction for the following:
1. Basis of System Design, Operational Requirements, and Criteria: Include the following:
 - a. System, subsystem, and equipment descriptions
 - b. Performance and design criteria if CONTRACTOR is delegated design responsibility
 - c. Operating standards
 - d. Regulatory requirements
 - e. Equipment function
 - f. Operating characteristics
 - g. Limiting conditions
 - h. Performance curves
 2. Documentation: Review the following items in detail:
 - a. Emergency manuals
 - b. Operations manuals
 - c. Maintenance manuals
 - d. Project Record Documents
 - e. Identification systems
 - f. Warranties and bonds
 - g. Maintenance service agreements and similar continuing commitments
 3. Emergencies: Include the following, as applicable:
 - a. Instructions on meaning of warnings, trouble indications, and error messages
 - b. Instructions on stopping
 - c. Shutdown instructions for each type of emergency
 - d. Operating instructions for conditions outside of normal operating limits
 - e. Sequences for electric or electronic systems

- f. Special operating instructions and procedures
- 4. Operations: Include the following, as applicable:
 - a. Startup procedures
 - b. Equipment or system break-in procedures
 - c. Routine and normal operating instructions
 - d. Regulation and control procedures
 - e. Control sequences
 - f. Safety procedures
 - g. Instructions on stopping
 - h. Normal shutdown instructions
 - i. Operating procedures for emergencies
 - j. Operating procedures for system, subsystem, or equipment failure
 - k. Seasonal and weekend operating instructions
 - l. Required sequences for electric or electronic systems
 - m. Special operating instructions and procedures
- 5. Adjustments: Include the following:
 - a. Alignments
 - b. Checking adjustments
 - c. Noise and vibration adjustments
 - d. Economy and efficiency adjustments
- 6. Troubleshooting: Include the following:
 - a. Diagnostic instructions
 - b. Test and inspection procedures
- 7. Maintenance: Include the following:
 - a. Inspection procedures
 - b. Types of cleaning agents to be used and methods of cleaning
 - c. List of cleaning agents and methods of cleaning detrimental to product
 - d. Procedures for routine cleaning
 - e. Procedures for preventive maintenance
 - f. Procedures for routine maintenance
 - g. Instruction on use of special tools
- 8. Repairs: Include the following:
 - a. Diagnosis instructions
 - b. Repair instructions
 - c. Disassembly; component removal, repair, and replacement; and reassembly instructions
 - d. Instructions for identifying parts and components

- e. Review of spare parts needed for operation and maintenance.

PART 3 - EXECUTION

3.01 PREPARATION

- A. Assemble educational materials necessary for instruction, including documentation and training module. Assemble training modules into a combined training manual.
- B. Set up instructional equipment at instruction location.

3.02 INSTRUCTION

- A. Facilitator: Engage a qualified facilitator to prepare instruction program and training modules, to coordinate instructors, and to coordinate between CONTRACTOR and DEPARTMENT for number of participants, instruction times, and location.
- B. Engage qualified instructors to instruct DEPARTMENT's personnel to adjust, operate, and maintain systems, subsystems, and equipment not part of a system.
 - 1. Architect/Engineer will furnish a representative to describe basis of system design, operational requirements, criteria, and regulatory requirements.
 - 2. DEPARTMENT will furnish an instructor to describe DEPARTMENT's operational philosophy.
 - 3. DEPARTMENT will furnish CONTRACTOR with names and positions of participants.
- C. Scheduling: Provide instruction at mutually agreed on times. For equipment that requires seasonal operation, provide similar instruction at start of each season.
 - 1. Schedule training with DEPARTMENT with at least 14 days' advance notice.
- D. Cleanup: Collect used and leftover educational materials and give to DEPARTMENT. Remove instructional equipment. Restore systems and equipment to condition existing before initial training use.

END OF SECTION

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Section 23 01 30 – HVAC Air-Distribution System Cleaning

Part 1 GENERAL

1.1 Scope of Work

- A. The Contractor shall provide services to clean all ductwork in the facility. This includes supply air, return air, general exhaust air, clothes dryer exhaust, and kitchen cooking hood exhaust.
- B. Work shall not include cleaning of vents serving fuel-fired equipment.
- C. Record drawings of the facility ductwork are available through the Department of Corrections (DOC) project manager.

1.2 Related Sections

- A. 23 05 00 - Common Work Results for HVAC.
- B. 23 07 00 - HVAC Insulation.
- C. 23 31 00 - HVAC Ducts and Casings.

1.3 References

- A. ASTM D93 – Standard Test Methods for Flash Point by Pensky-Martens Closed Cup Tester.
- B. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
- C. ASTM E96 – Standard Test Methods for Water Vapor Transmission of Materials.
- D. NFPA 90A – Standard for the Installation of Air-Conditioning and Ventilating Systems.

1.4 Cleaning Procedures

- A. See General Conditions and the General Requirements in Division 01 regarding submittals.
- B. Cleaning plans and reports as described in Part 3.

1.5 Cleaning Procedures

- A. The Contractor shall become familiar with the general layout of the existing conditions by visiting project site. Promptly notify the DOC project manager of any existing conditions that may prevent the complete cleaning of the air distribution systems specified. Check the location of all existing doors and panels. The Contractor shall assume full responsibility for making proper and thorough investigation of existing conditions which might affect cleaning and maintenance procedures described herein.
- B. The Contractor shall perform cleaning procedures with special care to avoid disruption of work areas. The Contractor is responsible for all costs incurred for area clean-up and replacement of office equipment damaged in the course of the air distribution cleaning operations.

- C. At the start of the cleaning process; electrical switches, detection devices and system components that may be accidentally activated shall be locked, pinned, protectively covered and sealed.

1.6 Post Condition Report

- A. Prior to acceptance of the cleaning of the indicated systems, it shall be demonstrated that there is no visible dirt, contamination, or bacterial growth at any point in the systems. The Contractor shall submit a post condition report including findings and recommendations. Photographic evidence of both pre and post conditions along with documentation supporting these findings are required for inclusion in the post condition report to the greatest extent possible.
- B. Photographs shall be taken at same location and of same components as submitted in pre-job report.

1.7 Quality Assurance

- A. Duct cleaning work shall be performed by a firm with three years continuous, demonstrable history in similar work including at least five successfully completed projects.

1.8 Quality Control

- A. The DOC project manager shall be able to inspect all stages of work and shall be able to utilize the fiber-optic borescope with dedicated light source, at anytime, to spot check treated areas. The DOC project manager shall have its own reporting procedures to cross check with the Contractor's report.

1.9 MONITORING PROGRAM

- A. The Contractor shall provide a monitoring program of the air distribution system and ductwork indicated within this project's scope. Work shall include a minimum of four inspections for a period of one year from the date of acceptance of the post condition report. Both inspections shall require laboratory analysis and report on findings.

Part 2 PRODUCTS

2.1 Cleaning Equipment and Cleaning Personnel

- A. Provide equipment and materials for cleaning, repairing and inspection work including scaffolding, wire brushes, rotary brushes, filters, air lances, mechanical agitators, fiber-optic borescopes, vacuums, or other equipment and materials necessary for workman to perform work specified.
- B. Cleaning personnel shall be properly supervised by a qualified, experienced foreman. Foreman shall be prepared to discuss work in progress, at anytime, with the DOC project manager.

2.2 Access Doors

- A. Galvanized steel access doors and frames in ductwork and plenum shall be, as a minimum, of same thickness sheet metal as duct or plenum in which installed. Doors in insulated ducts shall be set flush with the exterior insulation surface and shall be of the

double panel, insulated type with a minimum of one-inch thick insulation. Insulation shall comply with ASTM E84, Class I criteria.

- B. Access door construction shall be in accordance with the 2005 SMACNA HVAC Duct and Construction Standards, Figure 7-2.
- C. Minimum size of access opening shall be 12 inches by 18 inches, unless precluded by duct dimension.
- D. All doors shall seal against neoprene gaskets. Door installation shall be made air tight on all supply; return and exhaust ducts; plenums and equipment with four ounce, four-inch-wide canvas; saturated with solvent lagging adhesive and firmly applied. Solvent shall be non-flammable. The canvas stripping shall be applied prior to insulation repairs.

2.3 Stainless Steel

- A. All doors installed in ducts connected to stainless steel ductwork shall be constructed of 18-8 type stainless steel.
- B. Material thickness and construction details except fabrication and installation shall be same as specified for galvanized steel doors and frames.
- C. All seams and installation joining of stainless-steel doors and frames shall be heliarc welded completely air tight and water tight, with exposed welds ground smooth.

Part 3 EXECUTION

3.1 Planning and Coordination

- A. The building is a corrections facility; therefore, it is expected that the cleaning work will be broken up into phases to accommodate relocation of inmates as needed to perform work.
- B. The Contractor shall provide a Draft Cleaning Plan to the DOC project manager for review and comment.
- C. The Contractor will participate in a teleconference with the DOC project manager and facility personnel to discuss implementation of the Draft plan.
- D. After the teleconference, the Contractor will revise the Draft Cleaning Plan as needed and submit a Final Cleaning Plan to the DOC Project manager for approval.
- E. The cleaning plan shall include at a minimum:
 - 1. Schedule to perform work.
 - 2. Phasing plan.
 - 3. Critical paths.
 - 4. Work that will take place outside of normal working hours.
 - 5. Other information as required by the DOC project manager.
- F. Prior to any cleaning, temporary filters shall be fitted at supply grilles and diffusers. All openings shall be suitably protected to avoid particulate contamination and debris from falling into conditioned air spaces.

3.2 Access Doors

- A. Contractor shall install (at pre-determined, selected locations) into all supply, return and exhaust air systems that required quantity of access points. Access points must not exceed twenty-foot intervals as to accommodate cleaning of all related ductwork, and to allow inspection of said ductwork by the Maintenance Department. Access points shall be of an approved type or conform to Part 2 of this specification. All related ductwork must not be cut into for cleaning purposes other than to install access points. Contractor to show exact installed positions on the provided project drawings.
- B. Access points shall be provided with access doors. The access covers shall be air tight, not subject to developing leaks, not unsightly and must act as permanent reusable inspection points.
- C. When access points are installed in concealed attic areas, visual checks are to be made of the condition of both the external duct insulation and the ducts. If breaks in either the insulation or ductwork are found, Contractor shall repair and document said repair. When appropriate, photographs can be taken for inclusion in the Post Project Report.

3.3 Inspection

- A. Contractor shall perform a full inspection of the duct interior through the installed access points. Utilizing a fiber-optic borescope with dedicated light source, interior ductwork surfaces, and ductwork accessories including terminal units, mixing boxes, ductwork liners, duct mounted coils, filters, dampers, humidifiers and all other appurtenances within ductwork system. Damaged components shall be noted in pre-job report.
- B. The Contractor shall visually inspect air handlers and air handler components. Visual inspection shall include, but not be limited to, all filters, coils, holding frames, fans, flooring, ceilings, wall paneling, air plenums, and outside air intakes.

3.4 Cleaning

- A. Upon completion of the analyses and temporary filters installed, Contractor shall remove all loose contaminants from all sides of the interior ductwork surfaces. Visual inspections are to be performed throughout the entire process to ensure that no areas are left untreated:
 - 1. By inserting special air lances, mechanical agitators and rotary brushes through the installed access points; gently loosen and remove all contaminants from the interior surfaces of the ductwork. Temporary filters and blanking pieces shall be used to protect areas that are not being treated at that time.
 - 2. Special fan powered HEPA filtered dust and particulate collection systems shall be utilized in all areas. The Contractor shall take all necessary precautions to prevent dirt and debris greater or equal to 0.5 microns from entering these sensitive areas. The HEPA system shall be self-contained unit, with appropriate components and appurtenances, to adequately prevent dirt and debris loosened from upstream duct mains and branches during cleaning operations from entering sensitive locations. The HEPA filters utilized in the collection system shall be, as a minimum, an industrial grade type, labeled and certified to be no less than 99.9% efficient on 0.3-micron particles at rated flow. Wherever practical, discharge air from the HEPA system shall not be recirculated to clean spaces.

- Volumetric capacity of HEPA filter system shall be sized to match cfm rating of diffuser, mixing box, ductwork section or device in which unit is being connected.
3. All duct mounted coils shall be hand washed (air or water) on both coil faces carefully to avoid damage to tubes and fins. Thoroughly clean both coil faces ensuring contaminants are removed. Remove corrosion from around coil frames, hand brush and vacuum clean. Paint all exposed metal frame surfaces. Where necessary, recomb coil fins to restore them to original condition.
 4. All duct mounted volume, fire and zone damper sets are to be marked to their current setting, then inspected and cleaned by hand scraping, sanding or wire brush. External moving parts are to be treated with an approved dry lubricant material: Aerolox Dry Moly or equal. After cleaning, dampers shall be repaired as necessary to ensure their intended operation and then returned to original setting. Contractor shall indicate locations of all dampers on record drawing set.
 5. Clean all turning vanes installed in ductwork. Elbows containing turning vanes may be removed to facilitate cleaning, and shall be reinstalled by a sheet metal contractor in accordance with specification section 23 31 00 - HVAC Ducts and Casings.
 6. Where insulation is broken, the Contractor shall repair and/or replace. If insulation is exposed without neoprene, foil or approved facing, Contractor shall coat surface with sealer. Sealer, coatings, adhesive and insulation materials shall have composite fire and smoke hazard rating maximum 25 for flame spread and 50 for smoke developed in accordance with ASTM E84 and NFPA 90A, Class I ratings. Wet flammability shall conform to ASTM D93. Water vapor permeance of sealers and coatings shall conform to ASTM E96, maximum of .90 perms.
 7. Whenever the supply/return/exhaust grilles are removable, they shall be removed, vacuum cleaned, washed, dried and then replaced. Welded grilles may be cleaned in place. Contractor shall take care as to not disturb the damper setting.
 8. Where deemed necessary, and where access points prove inadequate; ductwork access doors may be installed at locations approved by the Maintenance Department prior to fabrication, so as to accommodate the complete cleaning of the ductwork systems.
 9. Wherever feasible, all access for personnel and equipment shall be accomplished through the installed access points, existing ceiling tiles, access doors, diffusers or grilles. Items removed for access shall be replaced to their original state upon completion of work. Facility operations shall not be disturbed due to Contractor's work. Where access doors are missing or poorly fitted, report condition to Maintenance Department.
 10. Upon completion of the air distribution system cleaning, the Contractor shall remove the filters from the ceiling diffusers carefully, to avoid spilling ingredients into the room surfaces. Dispose of the ingredients into a closeable container and discard the throwaway filters.
 11. Following the cleaning operation, a process of sanitizing the ductwork shall be performed as required by the pre-job report laboratory analysis

recommendations. Using a special extension lance and atomizing nozzle, coat the interior surfaces of the ductwork with a fine mist of an approved sanitizing fluid through the installed access points. Sanitizing fluid shall be registered with Environmental Protection Agency LD-50 toxicity tests.

3.5 Air Handling Units

- A. The air handling units shall be treated. Prior to work commencement, a pre-arranged schedule of shutdown time and locations shall be established with the DOC project manager. Contractor has the responsibility to ensure that all units are left in a correct operating mode.
- B. Treatment work on each unit includes, but is not limited to, the following:
 - 1. All areas shall be vacuum cleaned thoroughly.
 - 2. Remove filters, hand scrape, prime with a chromate primer and top coat the filter holding frames with an epoxy paint.
 - 3. Hand wire brush all areas of side, roof, and ceiling panels when necessary.
 - 4. Remove all corrosion (rust) from around coil frames and drain pans, hand brush and vacuum clean.
 - 5. Coat coil frames using a chromate primer and epoxy pitch paint.
 - 6. Utilizing a high-pressure water cleaning system with a suitable cleaning agent, thoroughly clean all coil faces ensuring all contaminants and materials are removed.
 - 7. Vacuum clean and hand wash fan casing and motors so that all grease debris is removed.
 - 8. Hand scrape fan impellers and remove all loose contaminants from within the fan casing.
 - 9. Where insulation is broken, the Contractor shall repair and/or replace. If insulation is exposed without neoprene, foil, or approved facing; Contractor shall coat surface with sealer. Sealer, coatings, adhesive and insulation materials shall have a composite fire and smoke hazard rating maximum 25 for flame spread and 50 for smoke developed in accordance with NFPA 255 and NFPA 90A, Class I ratings. Wet flammability shall conform to ASTM D93.
 - 10. Water vapor permeance of sealers, and coatings shall conform to ASTM E96, maximum of 0.90 perms. Contractor shall ensure that all filters are replaced and fitting properly. New filters will be furnished by facility maintenance personnel through the DOC project manager. Instances where access doors are missing and filters are badly fitted shall be reported immediately to the DOC project manager.
 - 11. After all interior and equipment are cleaned; sanitize the unit interiors including coil faces and filters with the approved broad-spectrum biocide.

3.6 Miscellaneous

- A. Post condition report shall be submitted upon completion of air distribution system's cleaning (as originally outlined) within 30 days following installation of monitoring probes.

- B. Upon completion of work, and at the end of each shift, the Contractor shall clean up his assigned work area of all trash, rubble, rags, containers, materials and equipment resulting from work on this contract, and shall remove same from the premises at no additional cost. The assigned work/storage site shall be left "broom clean."
- C. When cleaning procedures are completed; all electrical switches, detection devices and system components shall be returned to an operable state by qualified personnel. Cover plates shall be replaced, and dampers and diffusers shall be positioned for proper airflow.

End of Section 23 01 30

Section 23 05 00 – Common Work Results for HVAC

Part 1 GENERAL

1.1 Scope

- A. All provisions of the Contract including the General and Supplementary Conditions and the General Requirements apply to this work.

1.2 Work Included

- A. The work to be included in these and all other mechanical subsections shall consist of providing, installing, adjusting and setting into proper operation complete and workable systems for all items shown on the drawings, described in the specifications or reasonably implied. This shall include the planning and supervision to coordinate the work with other crafts and to maintain a proper time schedule for delivery of materials and installation of the work.
- B. Division 01 of the specifications is to be specifically included as well as all related drawings.

1.3 Related Work

- A. Related Work Specified Elsewhere:
 - 1. Electrical Specifications: Division 26.
 - 2. Motors and Connections: Division 26.
 - 3. Starters and Disconnects: Division 26.
- B. Unless otherwise indicated on the electrical drawings or the electrical schedules, provide all mechanical equipment motors, motor starters, thermal overload switches, control relays, time clocks, thermostats, motor operated valves, float controls, damper motors, electric switches, electrical components, wiring and any other miscellaneous Division 23 controls. Disconnect switches are included in the electrical work, unless specifically called out on mechanical plans.
- C. Carefully coordinate all work with the electrical work shown and specified elsewhere.

1.4 Reference Codes – Latest Adopted Edition

- A. NFPA 70 National Electrical Code (NEC).
- B. IMC International Mechanical Code.
- C. UPC Uniform Plumbing Code.
- D. IFC International Fire Code.
- E. IBC International Building Code.

1.5 Project Record Drawings

- A. In addition to other requirements of Division 01, mark up a clean set of drawings as the work progresses to show the dimensioned location and routing of all mechanical work which will become permanently concealed. Show routing of work in concealed blind

spaces within the building. Show exact dimensions of buried piping off of columns or exterior walls.

- B. Maintain record documents at job site in a clean, dry and legible condition. Keep record documents available for inspection by the Project Manager.
- C. Show the location of all valves and their appropriate tag identification.
- D. At completion of project, deliver these drawings to the Owner and obtain a written receipt.

1.6 Submittals

- A. See General Conditions and the General Requirements in Division 01 regarding submittals.
- B. Submit by specification section complete and all at one time; partial submittals will not be considered. Submittals shall be provided in electronic PDF Format. The data in the electronic file shall be arranged and indexed under basic categories in order of the Specification Sections. An index shall be included with bookmarks and identifying tabs between sections and references to sections of specifications.
- C. Catalog sheets shall be complete and the item or model to be used shall be clearly marked, and identified as to which item in the specifications or on the drawings is being submitted and with drawing fixture number where applicable.
- D. Only submit on items specifically required by each specification section. If a submittal has not been requested, it will not be reviewed.
- E. Submit product data for:
 - 1. Hangers and Supports for HVAC Piping and Equipment.
 - 2. Vibration and Seismic controls for HVAC Piping, Ductwork and Equipment.
 - 3. Identification for HVAC Piping, Ductwork and Equipment.
- F. Provide shop drawings with calculations for selection of seismic/wind restraints in accordance with IBC and ASCE 7, certified by a qualified professional engineer, licensed in the State of Alaska. Seismic calculations shall be based upon Seismic Category D. Fuel oil piping shall utilize and Component Importance Factor, IP, of 1.5. All other components shall utilize an IP of 1.0 for seismic calculations.

1.7 Operating and Maintenance Manuals

- A. See General Conditions and the General Requirements in Division 01 regarding Operating and Maintenance Manuals.
- B. Submit maintenance manuals to the Engineer covering all equipment, devices, etc. installed by the Contractor.
- C. The operation and maintenance manuals shall be submitted by specification section complete and all at one time; partial operations and maintenance manual submittals will not be considered. The Operation and maintenance manuals shall be provided in electronic PDF Format. The data in the electronic file shall be arranged and indexed under basic categories. An index shall be included with bookmarks and identifying tabs

between sections and references to sections of specifications. The manual shall contain, but not limited to, the following types of information:

1. Cover sheet with name, address, telephone number of Contractor, General Contractor and major equipment suppliers.
 2. Catalog cuts of all equipment, etc. installed (Marked to identify the specific items used).
 3. Manufacturer's maintenance and overhaul instruction booklets including exploded views.
 4. Identification numbers of all parts and nearest sources for obtaining parts and services.
 5. Reduced scale drawings of the control system and a verbal description of how these controls operate.
 6. A copy of the final test and balance report.
 7. A copy of valve schedule and reduced scale drawings showing valve locations.
 8. Written summary of instructions to Owner.
 9. All manufacturers' warranties and guarantees.
 10. Contractors Warranty Letter.
- D. A periodic maintenance form that includes all of the equipment shall be provided with the maintenance manual. The form shall list each piece of equipment and how often maintenance is required (daily, weekly, monthly, annually). Opposite each task shall be squares for check-off for a full year (initials) to verify that the tasks are being done.

1.8 Handling

- A. See General Conditions and the General Requirements in Division 01 regarding material handling.
- B. Deliver packaged materials to job site in unbroken packages with manufacturer's label, and store to facilitate inspection and installation sequence. All items must be labeled and identified as to make, size and quality.

1.9 Substitutions

- A. See General Conditions and the General Requirements in Division 01 for substitution request procedures.
- B. In accordance with the General Conditions and the General Requirements in Division 01, Substitution and Product Options, all substitute items must fit in the available space, and be of equal or better quality including efficiency performance, size, and weight, and must be compatible with existing equipment. The Owner shall be the final authority regarding acceptability of substitutes.

1.10 Dimensions

- A. Before ordering any material or doing any work, the Contractor shall verify all dimensions, including elevations, and shall be responsible for the correctness of the

same. No extra charge or compensation will be allowed on account of differences between actual dimensions and measurements indicated on the drawings.

- B. Any differences, which may be found, shall be submitted to the DOC Project Manager for consideration before proceeding with the work.

1.11 Manufacturer's Directions

- A. All manufactured articles shall be applied, installed and handled as recommended by the manufacturer, unless specifically called out otherwise. Advise the DOC Project Manager of any such conflicts before installation.

1.12 Permits, Fees, Etc.

- A. The Contractor under each Division of these specifications shall arrange for a permit from the local authority. The Contractor shall pay for any inspection fees or other fees and charges required by ordinance, law, codes and these specifications.

1.13 Testing

- A. The Contractor under each section shall perform the various tests as specified and required by the Architect, Engineer and as required by applicable code, the State and local authorities. The Contractor shall furnish all labor, fuel and materials necessary for making tests.

1.14 Terminology

- A. Whenever the words "furnish", "provide", "furnish and install", "provide and install", and/or similar phrases occur, it is the intent that the materials and equipment described be furnished, installed and connected under this Division of the Specifications, complete for operation unless specifically noted to the contrary.
- B. Where a material is described in detail, listed by catalogue number or otherwise called for, it shall be the Contractor's responsibility to furnish and install the material.
- C. The use of the word "shall" conveys a mandatory condition to the contract.
- D. "This section" refers to the section in which the statement occurs.
- E. "The project" includes all work in progress during the construction period.
- F. In describing the various items of equipment, in general, each item will be described singularly, even though there may be a multiplicity of identical or similar items.

1.15 Schedule of Work

- A. The work under the various sections must be expedited and close coordination will be required in executing the work. The various trades shall perform their portion of the work at such times as directed so as to meeting scheduled completion dates, and to avoid delaying any other trade. The Owner will set up completion dates. Each contractor shall cooperate in establishing these times and locations and shall process work so as to ensure the proper execution of it.

1.16 Cooperation and Cleaning Up

- A. The Contractor for the work under each section of the specifications shall coordinate the Contractor's work with the work described in all other sections of the specifications to the end that, as a whole, the job shall be a finished one of its kind, and shall carry on the work in such a manner that none of the work under any section of these specifications shall be handicapped, hindered or delayed at any time.
- B. At all times during the progress of the work, the Contractor shall keep the premises clean and free of unnecessary materials and debris. The Contractor shall, on direction at any time from the Owner, clear any designated areas or area of materials and debris. On completion of any portion of the work, the Contractor shall remove from the premises all tools and machinery and all debris occasioned by the work, leaving the premises free of all obstructions and hindrances.

1.17 Warranty

- A. Unless a longer warranty is hereinafter called for, all work, materials and equipment items shall be warrantied for a period of one year after acceptance by the Owner. All defects in labor and materials occurring during this period, as determined by the Architect/Engineer, shall be repaired and/or replaced to the complete satisfaction of the Architect/Engineer. Guarantee shall be in accordance with Division 01.

1.18 Completion Requirements

- A. In accordance with the General Conditions and the General Requirements in Division 01, Project Closeout; before acceptance and final payment, the Contractor shall furnish:
 - 1. Accurate project record drawings, shown in red ink on prints, showing all changes from the original plans made during installation of the work.
 - 2. Contractor's One Year Warranty.
 - 3. All Manufacturers' Guarantees.
 - 4. Test and Balance Reports.
 - 5. Operation and Maintenance Manuals.

1.19 Inspection of Site – Remodel Projects

- A. The accompanying plans do not indicate completely the existing plumbing and mechanical installations. The bidders for the work under these sections of the specifications shall inspect the existing installations and thoroughly acquaint themselves with conditions to be met and the work to be accomplished in removing and modifying the existing work, and in installing the new work in the present building and underground serving to and from that structure. Failure to comply with this shall not constitute grounds for any additional payments in connection with removing or modifying any part of the existing installations and/or installing any new work.

1.20 Relocation of Existing Installations

- A. There are portions of the existing plumbing, mechanical and electrical systems, which shall remain in use to serve the finished building in conjunction with the indicated new

installations. By actual examination at the site, each bidder shall determine those portions of the remaining present installations, which must be relocated to avoid interference with the installations of new work of the Contractors particular trade and that of all other trades. All such existing installations, which interfere with new installations, shall be relocated by the Contractor.

1.21 Salvage Materials

- A. The Contractor shall remove existing equipment, duct, grilles and other items associated with the mechanical systems where no longer required for the project. Where such items are exposed to view or uncovered by any cutting or removal of general construction and has no continuing function (as determined by the Architect/Engineer), they shall be removed.
- B. All items or materials removed from the project shall be made available for the Owner's inspection. The Owner retains the option to claim any item or material. Contractor shall deliver any claimed item or material in good condition to the place designated by the Owner. All items not claimed become the property of the contractor and shall be removed from the site.

Part 2 PRODUCTS

2.1 Materials

- A. All equipment shall be regularly cataloged items of the manufacturer and shall be supplied as a complete unit in accordance with the manufacturer's standard specifications along with any optional items required for proper installation unless otherwise noted. Maintain manufacturer's identification, model number, etc. on all equipment at all times.
- B. Where more than one of an item is to be provided, all of the items shall be identical manufacture, make, model, color, etc.

2.2 Restricted Materials

- A. No materials containing asbestos in any form shall be allowed.
- B. No solder or flux containing lead shall be used on this project.
- C. Where materials or equipment provided by this Contractor are found to contain restricted materials, such items shall be removed and replaced with non-restricted materials items. Entire cost of restricted materials removal and disposal and cost of installing new items shall be the responsibility of the Contractor for those restricted materials containing items installed by the Contractor.

2.3 Electrical Motors

- A. Motors: Furnish electric motors designed for the specific application and duty applied, and to deliver rated horsepower without exceeding temperature ratings when operated on power systems with a combined variation in voltage and frequency not more than + 10% of rated voltage. Motors for pumps and fans shall be selected to be non-overloading.

- B. Verify from the drawings and specifications the available electrical supply characteristics and furnish equipment that will perform satisfactorily under the conditions shown and specified.
- C. All motors for use with equipment with variable frequency drives shall be inverter ready motors. Verify compatibility and sizing of motor with variable frequency drive.
- D. Size motors for 1.15 service factor and not to exceed 40° C temperature rise above ambient.
- E. Fractional horsepower motors to have self-resetting thermal overload switch.
- F. Provide Premium Efficiency, motors for all three phase motors one horsepower and larger. Standard efficiency motors will not be acceptable.

2.4 Identification for HVAC Piping and Equipment

- A. Plastic Nameplates: Laminated plastic with engraved letters.
- B. Plastic Tags: Laminated plastic with engraved letters, minimum 1-1/2 inches diameter.
- C. Plastic Pipe Markers: Factory fabricated, flexible, semi-rigid plastic, preformed to fit around pipe or pipe covering.
- D. Plastic Tape Pipe Markers: Flexible, vinyl film tape with pressure sensitive adhesive backing and printed markings.
- E. Plastic Underground Pipe Markers: Bright colored continuously printed plastic ribbon tape, for direct burial service.
- F. Label ceiling grid for mechanical equipment, valves and control components located above ceiling. Description: 3/4" x 3" vinyl label, 3.0 Mil self-adhesive vinyl similar to Dura Label Pro. Label color shall be black text on a white background. The label shall contain the equipment tag, valve tag or identification tag for control component.

2.5 Pipe Hangers and Supports

- A. Acceptable Manufacturers:
 - 1. Anvil.
 - 2. PHD Manufacturing, Inc.
 - 3. Michigan Hanger Company.
 - 4. B-Line Systems, Inc.
- B. Hydronic Piping:
 - 1. Conform to ANSI/MSS SP58.
 - 2. Hangers for Pipe Sizes 1/2 to 1-1/2 Inch: Malleable iron, adjustable swivel, split ring for steel pipe, copper swivel for copper pipe.
 - 3. Hangers for Hot Pipe Sizes 2 to 4 Inches and Cold Pipe Sizes 2 Inches and Larger: Carbon steel, adjustable, clevis.
 - 4. Hangers for Hot Pipe Sizes 6 Inches and Over: Adjustable steel yoke, cast iron roll, double hanger.

5. Multiple or Trapeze Hangers: Steel channels or strut with hanger rods. Cast iron roll and stand for hot pipe sizes 6 inches and over.
 6. Wall Support for Pipe Sizes to 3 Inches: Strut triangular bracket with pipe clamp and cushion insulator.
 7. Wall Support for Pipe Sizes 4 Inches and Over: Welded steel bracket and wrought steel clamp; adjustable steel yoke and cast iron roll for hot pipe sizes 6 inches and over.
 8. Vertical Support: Steel riser clamp.
 9. Floor Support for Pipe Sizes to 4 Inches and All Cold Pipe Sizes: Cast iron adjustable pipe saddle, locknut nipple, floor flange or steel support.
 10. Floor Support for Hot Pipe Sizes 6 Inches and Over: Adjustable cast iron roll and stand, steel screws, and concrete pier or steel support.
 11. Copper Pipe Support: Carbon steel ring, adjustable, copper plated with felt isolation pad or all copper ring or swivel.
- C. Shield for Insulated Piping 1-½ Inches and Smaller: 18 gauge galvanized steel shield over insulation in 180° segments, minimum 12 inches long at pipe support.
- D. Shield for Insulated Piping 2 Inches and Larger: Hard block, calcium silicate insert, 180° segment, 12 inch minimum length, block thickness same as insulation thickness, flame resistant vapor barrier covering and 18 gauge galvanized shield.
- E. Shields for Vertical Copper Pipe Risers: Galvanized steel pipe.
- F. Design hangers to allow installation without disengagement of supported pipe.
- G. Copper Plating: All hanger elements in metal-to-metal contact with copper pipe, except hanger rings with factory-applied 1/16 inch minimum thick plastic or tape cushion strip over all contact surfaces.
- H. Strut Type Pipe Hanging System: Unistrut P-1000 series; framing members shall be No. 12 gage formed steel channels, 1-5/8 inch square, conforming to ASTM A 653 GR33, one side of channel shall have a continuous slot with inturned lips; framing nut with grooves and spring 1/2 inch size, conforming to ASTM 675 GR60; screws conforming to ASTM A 307; fittings conforming to ASTM A 575; all parts enamel painted or electro-galvanized.

2.6 Hanger Rods

- A. Steel Hanger Rods: Threaded both ends, or continuous threaded.

2.7 Inserts

- A. Inserts: Malleable iron case of steel shell and expander plug for threaded connection with lateral adjustment, top slot for reinforcing rods, lugs for attaching to forms; size inserts to suit threaded hanger rods.

2.8 Flashing

- A. Metal Flashing: 26-gauge minimum galvanized steel.
- B. Metal Counter Flashing: 22 gauge minimum galvanized steel.

- C. Flexible Flashing: 47-mil thick sheet butyl, compatible with roofing.
- D. Caps: Steel, 22-gauge minimum; 16 gauge at fire resistant elements.

2.9 Equipment Curbs

- A. Fabricate curbs of steel beam, unless specifically called out otherwise.

2.10 Sleeves

- A. Sleeves for Pipes Through Non-fire Rated Floors: Form with 18 gauge galvanized steel for 4 inch diameter and larger, 22 gauge up to 3" diameter.
- B. Sleeves for Pipes Through Non-fire Rated Beams, Walls, Footings, and Potentially Wet Floors: Form with steel pipe or 18 gauge galvanized steel for 4 inch diameter and larger, 22 gauge up to 3" diameter.
- C. Sleeves for Pipes Through Fire Rated and Fire Resistive Floors and Walls, and Fireproofing: Prefabricated fire rated sleeves including seals, UL listed caulking system.
- D. Sleeves for Rectangular Ductwork: Form with galvanized steel.
- E. Fire Stopping Insulation: Mineral fiber type, non- combustible.
- F. Caulk: Fire stop sealant in compliance with ASTM E814, UL 1479 and Division 07.

2.11 Former Steel Channel

- A. Manufacturers:
 - 1. Allied Tube & Conduit Corp.
 - 2. B-Line Systems.
 - 3. Midland Ross Corporation, Electrical Products Division
 - 4. Unistrut Corp.
 - 5. Substitutions under provisions of Division 01.
- B. Product Description: Galvanized 12 gauge (2.8 mm) thick steel. With holes 1-1/2 inches (38 mm) on center.

2.12 Acceptable Manufacturers: Vibration Isolators and Seismic Restraint

- A. Vibration isolators and Seismic Restraint shall be manufactured by:
 - 1. Amber/Booth.
 - 2. Cooper Industries.
 - 3. International Seismic Application Technology.
 - 4. Kinetics Noise Control.
 - 5. Mason Industries.
 - 6. Vibro-Acoustics
 - 7. Substitutions: Items of same function and performance are acceptable in conformance with Division 01.

2.13 Vibration Isolators (Rotating Equipment Except Fans)

- A. Floor Mount: Closed spring mount with iso-stiff springs and limit stop for seismic restraint. Isolators are to be sized and selected by equipment manufacturer.
- B. Hangers: Closed spring hanger with acoustic isolator.
- C. Provide pairs of neoprene side snubbers or restraining springs where side torque or thrust may develop.
- D. Color code spring mounts, spring selected to operate at no greater than 2/3 solid deflection and have 1/4" ribbed neoprene pads.

2.14 Ventilating Systems Flexible Connections

- A. Fabricate of neoprene coated flameproof fabric a minimum of 2" wide, 3" wide for fan connectors, tightly crimped into metal edging strip and attach to ducting and equipment by screws or bolts at 6" intervals.

2.15 Limits of Vibration

- A. The factory is to statically and dynamically balance all rotating machinery, fans and pumps, etc. Do dynamic balancing at the operating speed of the motor.
- B. Select isolated equipment in accordance with the weight distribution, to produce uniform deflection on the vibration mounts. Deflection of vibration mounts shall be required to produce 95% vibration isolation efficiency, based on the equipment HP, rpm, location in regard to critical spaces and stiffness of the building supporting structural members, supporting the equipment.
- C. For fan-motor units in which the impeller is supported by the motor shaft, the motor and impeller shall be dynamically balanced as an integral unit.

2.16 Earthquake Bumpers and Snubbers

- A. Bumpers:
 - 1. Fabricate the bumper cradle of 6 X 4 X 3/8" angle iron minimum and provide with at least two holes for bolting to the floor.
 - 2. Attach one or more elastomeric mountings to pad the 6" leg of the angle iron.
 - 3. Design the mounting to deflect not more than 3/4" under the shock loading of 1 g in any direction in the horizontal plane.
 - 4. Manufacturer: Vibration Mounting Series "SR" seismic restraints, or similar.
- B. Snubbers:
 - 1. Interlocking steel members restrained by shock absorbent rubber materials.
 - 2. Elastomeric materials shall be replaceable and a minimum of 3/4" thickness.
 - 3. Maintain 1/8" air gap in all directions in design of snubber.
 - 4. Acceleration of 4 g's in any direction.
 - 5. All-directional restraint.
 - 6. Manufacturer: Mason Industries Z-1011 Seismic Snubber.

2.17 Seismic Bracing and Support of Systems and Components

A. General:

1. Seismic restraint designer shall coordinate all attachments with the structural engineer of record.
2. Design analysis shall include calculated dead loads, static seismic loads, and capacity of materials utilized for the connection of the equipment or system to the structure.
3. Analysis shall detail anchoring methods, bolt diameter, and embedment depth.
4. All seismic restraint devices shall be designed to accept without failure the forces calculated per the applicable building code and as summarized in installation requirements.
5. The total height of the structure (h) and the height of the system to be restrained within the structure (z) shall be determined in coordination with architectural plans and the General Contractor.

B. Friction from gravity loads shall not be considered resistance to seismic forces.

2.18 Seismic Bracing Components

A. Steel strut shall be 1-5/8 wide in varying heights and mig-welded combinations as required to meet load capacities and designs indicated. A material heat code, part number, and manufacturer's name shall be stamped on all strut and fittings to maintain traceability to material test reports.

1. Material for epoxy painted strut: ASTM A1011, SS, Grade 33.
2. Material for pre-galvanized strut: ASTM A653, SS, Gr. 33.
3. Material for Hot-Dip Galvanized strut: ASTM A1011, SS, Grade 33 and hot-dip galvanized after fabrication in accordance with ASTM A123.
4. Material for fittings and accessories: ASTM A907 Gr. 33, Structural Quality or ASTM A1011, SS, Gr.33.
5. Fittings and accessories: Products shall be of the same manufacturer as strut and designed for use with that product.

2.19 Concrete Housekeeping Pads

A. Cement shall conform to ASTM C150, type II. Aggregate shall conform to ASTM C33. Concrete shall be ready mixed in accordance with ASTM C94 and shall be designed for a minimum 28-day compressive strength of 3,000 psi.

B. Reinforcing Steel - Accurately place or support all reinforcing with galvanized metal chairs, spacers or hangers for the following clear concrete coverage of 1-1/2".

C. Post Installed Anchors

1. Epoxy anchors shall be threaded rod or reinforcing steel, installed with HIT-HY 150 Max-SD adhesive by Hilti per I.C.C. report ESR-3013, or approved equivalent.

2. The contractor may not use substitutes for post-installed anchors without prior approval of the engineer.
3. Install anchors as outlined in manufacturer's specifications, utilizing proper size and type of drill and proper hole cleaning, driving, and tightening techniques.

Part 3 EXECUTION

3.1 Drawings

- A. The drawings are partly diagrammatic, not necessarily showing all offsets or exact locations of piping and ducts, unless specifically dimensioned. The contractor shall provide all materials and labor necessary for a complete and operable system. Complete details of the building which affect the mechanical installation may not be shown. For additional details, see Electrical Drawings. Coordinate work under this section with that of all related trades.

3.2 Installations

- A. All work shall comply with the latest adopted applicable codes and ordinances including, but not limited to, the IMC, UPC, IBC, NEC, and IFC Standards; all local and state amendments to all codes and standards.
- B. Obtain and pay for all inspection fees, connection charges and permits as a part of the Contract.
- C. Compliance with codes and ordinances shall be at the Contractor's expense.
- D. Install in accordance with manufacturer's instructions.

3.3 Measurements

- A. Verify all measurements on the job site.
- B. Check all piping, ducts, etc. to clear openings.
- C. Rough-in dimensions shall be per manufacturer's recommendations and in compliance with current ADA and ANSI 117.1 standards.

3.4 Operating Instructions

- A. Before the facility is turned over to the Owner, instruct the Owner or Owner's personnel in the operation, care and maintenance of all systems and equipment under the jurisdiction of the Mechanical Division. These instructions shall also be included in a written summary in the Operating Maintenance Manuals.
- B. The Operation and Maintenance Manuals shall be utilized for the basis of the instruction. Provide a minimum of eight hours of onsite instruction to the owner designated personnel.
- C. When required by individual specification sections provide additional training on HVAC systems and equipment as indicated in the respective specification section.
- D. Provide schedule for training activities for review prior to start of training.

3.5 System Adjusting

- A. Each part of each system shall be adjusted and readjusted as necessary to ensure proper functioning of all controls, proper air distribution, elimination of drafts, noise and vibration.
- B. Balance air and water systems for volume quantities shown and as required to ensure even temperature and the elimination of drafts. Balancing shall be done by a qualified firm acceptable to the Engineer. Provide balancing log to the Engineer before substantial completion.

3.6 Cutting, Fitting, Repairing, Patching and Finishing

- A. Arrange and pay for all cutting, fitting, repairing, patching and finishing of work by other trades where it is necessary to disturb such work to permit installation of mechanical work. Perform work only with craftsmen skilled in their respective trades.
- B. Avoid cutting, insofar as possible, by setting sleeves, frames, etc. and by requesting openings in advance. Assist other trades in securing correct location and placement of rough-frames, sleeves, openings, etc. for ducts and piping.
- C. Cut all holes neatly and as small as possible to admit work. Include cutting where sleeves or openings have been omitted. Perform cutting in a manner so as not to weaken walls, partitions or floors. Drill holes required to be cut in floors without breaking out around holes.

3.7 Painting

- A. Perform all of the following painting in accordance with provisions of Division 09 with colors as selected by the Architect. Provide the following items as a part of mechanical work:
 - 1. Factory applied prime and finish coats on mechanical equipment.
 - 2. Factory applied prime and finish coat on all air registers, grilles and diffusers, unless otherwise specified.
 - 3. Factory applied prime coat on access doors.
 - 4. Pipe identification where specified.
- B. If factory finish on any equipment furnished is damaged in shipment or during construction, refinish to equal original factory finish.

3.8 Identification

- A. Tag all valves with heat resistant laminated plastic labels or brass tags engraved with readily legible letters. Securely fasten to the valve stem or bonnet with beaded chain. Provide a framed, typewritten directory under glass, and installed where directed. Provide complete record drawings that show all valves with their appropriate label.
- B. Label all equipment with heat resistant laminated plastic labels having engraved lettering ½" high. If items are not specifically listed on the schedules, consult the Engineer concerning designation to use.

- C. Identify piping to indicate contents and flow direction of each pipe exposed to view by a labeled sleeve in letters readable from floor at least once in each room and at intervals of not more than 20' apart and on each side of partition penetrations. Coloring scheme in accordance with ANSI A13.1-1981.

3.9 Pipe Hangers and Supports

- A. Support piping as follows:

Pipe Size	Max. Hanger Spacing	Hanger Diameter
½ to 1-¼ inch	6'-0"	3/8"
1-½ to 2 inch	10'-0"	3/8"
2-½ to 3 inch	10'-0"	½"
4 to 6 inch	10'-0"	5/8"

Notes:

^a See piping manufacturer installation instructions for additional requirements.

- B. Install hangers to provide minimum ½ inch space between finished covering and adjacent work.
- C. Place a hanger within 12 inches of each horizontal elbow.
- D. Use hangers with 1-½ inch minimum vertical adjustment.
- E. Support vertical piping at every floor.
- F. Where several pipes can be installed in parallel and at the same elevation, provide multiple or trapeze hangers.
- G. Support riser piping independently of connected horizontal piping.
- H. Provide transverse seismic support for all piping systems.

3.10 Inserts

- A. Provide inserts for placement in concrete formwork.
- B. Provide inserts for suspending hangers from reinforced concrete slabs and sides of reinforced concrete beams.
- C. Provide hooked rod to concrete reinforcement section for inserts carrying pipe over 4 inches.
- D. Where concrete slabs form finished ceiling, provide inserts to be flush with slab surface.
- E. Where inserts are omitted, drill through concrete slab from below and provide thru-bolt with recessed square steel plate and nut recessed into and grouted flush with slab.

3.11 Equipment Bases and Supports

- A. Provide equipment bases of where shown on plans and where required by equipment manufacturer installation instructions.
- B. Provide templates, anchor bolts, and accessories for mounting and anchoring equipment.

- C. Construct support of steel members. Brace and fasten with flanges bolted to structure.
- D. Provide housekeeping pads of concrete, extending 6 inches beyond supported equipment anchors, with the following minimum thicknesses:
 - 1. Boilers: 4"
 - 2. Air Handlers: 6"
 - 3. All Other Equipment: 4"
- E. Provide rigid anchors for pipes after vibration isolation components are installed.

3.12 Flashing

- A. Provide flexible flashing and metal counter-flashing where piping and ductwork penetrate weather or waterproofed walls, floors, and roofs.
- B. Provide acoustical flashing around ducts and pipes penetrating equipment rooms, installed in accordance with manufacturer's instructions for sound control.
- C. Provide curbs for mechanical roof installations 16 inches minimum high above roofing surface. Flexible sheet flash and counter-flash with sheet metal; seal watertight.
- D. Adjust storm collars tight to pipe with bolts; caulk around top edge. Use storm collars above roof jacks. Screw vertical flange section to face of curb.
- E. Provide acoustical flashing around ducts and pipes penetrating equipment rooms, installed in accordance with manufacturer's instructions for sound control.

3.13 Sleeves

- A. Size sleeves large enough to allow for movement due to expansion and contraction. Provide for continuous insulation wrapping.
- B. Set sleeves in position in construction. Provide reinforcing around sleeves.
- C. Extend sleeves through floors one inch above finished floor level. Caulk sleeves full depth and provide floor plate.
- D. Where piping or ductwork penetrates floor, ceiling, or wall, install sleeve, close off space between pipe or duct and adjacent work with fire stopping insulation and caulk seal. Use fire rated caulking where fire rated walls are penetrated. Provide close fitting metal collar or escutcheon covers at both sides of penetration.
- E. Install chrome plated steel escutcheons at finished surfaces.

3.14 Scope of Vibration Isolation Work

- A. All vibrating equipment and the interconnecting pipe shall be isolated to eliminate the transmission of objectionable noise and vibration from the structure.
- B. HVAC equipment shall be carefully checked upon delivery for proper mechanical performance, which shall include proper noise and vibration operation.
- C. All installed rotating equipment with excessive noise and/or vibration, which cannot be corrected in place, shall be replaced at no cost to Owner.

3.15 General Procedures – Vibration Isolation

- A. Select isolators in accordance with the manufacturer's recommendations and the equipment weight distribution to allow for proper static deflection of the isolators in relation to the span of the building structure supporting the equipment, considering the allowable deflection and weight of the structure.
- B. Install isolators so they can be easily removed for replacement.
- C. Mount all equipment absolutely level.
- D. Install all isolators per manufacturer's instructions.
- E. Install vibration isolators for mechanical motor driven equipment.
- F. Set steel bases for 1" clearance between housekeeping pad and base.
- G. All vibration isolated equipment shall be fitted with earthquake bracing and snubbers suitable for seismic control in accordance with the IBC.
- H. Piping vibration isolation flexible connections shall be installed at a 90° angle to equipment deflection direction unless otherwise noted.

3.16 Seismic Restraint

- A. General:
 - 1. All equipment, piping and ductwork shall be restrained to resist seismic/wind forces per the applicable building code(s) as a minimum. Restraint attachments shall be made by bolts, welds or a positive fastening method. Friction shall not be considered. All attachments shall be proven capable of accepting the required wind load by calculations. Additional requirements specified herein are included specifically for this project.
 - 2. Install seismic and wind restraint devices per the manufacturer's submittals. Any deviation from the manufacturer's instructions shall be reviewed and approved by the manufacturer.
 - 3. Attachment to structure for suspended equipment, pipe and duct: If specific attachment is not indicated, anchor bracing to structure at flanges of beams, at upper truss chords of bar joists, or at concrete members.
 - 4. Wall penetrations may be used as bracing locations provided the wall can provide adequate resistance without significant damage.
 - 5. Coordinate sizes and locations of cast-in-place inserts for post-tensioned slabs with seismic restraint manufacturer.
 - 6. Provide hanger rod stiffeners where indicated or as required to prevent buckling of rods due to seismic forces.
 - 7. Where rigid restraints are used on equipment, ductwork or piping, support rods for the equipment, ductwork or piping at restraint locations must be supported by anchors rated for seismic use. Post-installed concrete anchors must be in accordance with ACI 355.2.

8. Ensure housekeeping pads have adequate space to mount equipment and seismic restraint devices and shall also be large enough to ensure adequate edge distance for restraint anchor bolts to avoid housekeeping pad breakout failure.
- B. Concrete Anchor Bolts:
1. Identify position of reinforcing steel and other embedded items prior to drilling holes for anchors. Do not damage existing reinforcing or embedded items during coring or drilling. Notify the structural engineer if reinforcing steel or other embedded items are encountered during drilling. Locate and avoid pre- or post-tensioned tendons, electrical and telecommunications conduit, and gas lines.
 2. Do not drill holes in concrete or masonry until concrete, mortar, or grout has achieved full design strength.
 3. Mechanical Anchors: Protect threads from damage during anchor installation. Heavy-duty sleeve anchors shall be installed with sleeve fully engaged in the structural element to which anchor is to be fastened.
 4. Adhesive Anchors: Clean holes to remove loose material and drilling dust prior to installation of adhesive. Place adhesive in holes proceeding from the bottom of the hole and progressing toward the surface in such a manner as to avoid introduction of air pockets in the adhesive.
 5. Set anchors to manufacturer's recommended torque, using a torque wrench.
- C. Equipment Restraints:
1. Seismically restrain equipment all equipment. Install fasteners, straps and brackets as required to secure the equipment.
 2. Install seismic snubbers on HVAC equipment supported by floor-mounted, non-seismic vibration isolators. Locate snubbers as close as possible to vibration isolators and attach to equipment base and supporting structure as required.
 3. Install neoprene grommet washers on equipment anchor bolts where clearance between anchor and equipment support hole exceeds 1/8" (3.2 mm).
 4. Install bushing assemblies for mounting bolts for wall-mounted equipment, arranged to provide resilient media where equipment or equipment-mounting channels are attached to wall.
- D. Duct Systems:
1. Seismically restrain all ductwork listed below, using seismic cable restraints:
 - a. All ducts with cross-sectional area equal to or greater than 6 ft² (0.55 m²).
 - b. Any ductwork which if it were to fail would result in damage to a piece of equipment or building function that has a component importance factor of 1.5.
 - c. All ductwork weighing more than 17 lbs/ft (25 kg/m).
 2. "12-inch rule", where duct can be exempted from seismic restraint based on the length of the support rods, is accepted if one of the following conditions are met:

- a. The hangers shall be detailed to avoid significant bending of the hangers and their attachments. The maximum stress due to combined loading including bending in the hangers must be less than 21.6 ksi.
 - b. Isolation hangers are added to hanger rod to provide swivel joint and to prevent bending moment in hanger.
3. Space lateral supports a maximum of 30' o.c. (9 m), and longitudinal supports a maximum of 60' (18 m) o.c.
4. Duct risers shall be restrained at floor penetrations every 30' (9 m) maximum spacing.
5. Fire damper locations may be used as restraint locations for all directions except away from the damper.
6. Brace a change of direction longer than 12' (3.7 m).
7. Install restraint cables so they do not bend across edges of adjacent equipment or building structure.

E. Piping Systems:

1. For projects with a Seismic Design Category of C, provide seismic cable restraints on the following:
 - a. All piping systems assigned a component importance factor, I_p , of 1.5 with a nominal pipe diameter greater than 2" (50 mm) or trapeze-supported piping with combined operating weight over 10 lbs/ft (15 kg/m).
2. For projects with a Seismic Design Category of D, E or F, provide seismic cable restraints on the following:
 - a. All piping greater than 3" (75 mm) nominal diameter.
 - b. All piping systems assigned a component importance factor, I_p , of 1.5 with a nominal pipe diameter greater than 1" (25 mm) or trapeze-supported piping with combined operating weight over 10 lbs/ft (15 kg/m).
3. "12-inch rule", where pipe can be exempted from seismic restraint based on the length of the support rods, is accepted if one of the following conditions are met:
 - a. Hangers are detailed to avoid bending of the hangers and their attachment; and provisions are made for piping to accommodate expected deflections. The maximum stress due to combined loading including bending in the hangers must be less than 21.6 ksi.
 - b. Isolation hangers are added to hanger rod to provide swivel joint and to prevent bending moment in hanger.
4. Restraint spacing:
 - a. For ductile piping, space lateral supports a maximum of 40' (12 m) o.c., and longitudinal supports a maximum of 80' (24 m) o.c.
 - b. For non-ductile piping (e.g., cast iron, PVC) space lateral supports a maximum of 20' (6 m) o.c., and longitudinal supports a maximum of 40' (12 m) o.c.

- c. For piping with hazardous material inside (e.g., natural gas, medical gas) space lateral supports a maximum of 20' (6 m) o.c., and longitudinal supports a maximum of 40' (12 m) o.c.
 - d. For pipe risers, restrain the piping at floor penetrations using the same spacing requirements as above.
- 5. Brace a change of direction longer than 12' (3.7 m).
- 6. Longitudinal restraints for single pipe supports shall be attached directly to the pipe, not to the pipe hanger.
- 7. For supports with multiple pipes (trapezes), secure pipes to trapeze member with clamps approved for application.
- 8. Piping on roller supports shall include a second roller support located on top of the pipe at each restraint location to provide vertical restraint.
- 9. Install restraint cables so they do not bend across edges of adjacent equipment or building structure.
- 10. Install flexible metal hose loops in piping which crosses building seismic joints, sized for the anticipated amount of movement.
- 11. Install flexible piping connectors where adjacent sections or branches are supported by different structural elements, and where the connections terminate with connection to equipment that is anchored to a different structural element from the one supporting the connections as they approach equipment.
- 12. Coordinate seismic restraints with thermal expansion compensators, guides and anchor points. Thermal expansion anchor points shall be designed to accommodate seismic forces.

3.17 Installation of Equipment

- A. Unless otherwise indicated, mount all equipment and install in accordance with manufacturer's recommendations and approved submittals.
- B. Maintain manufacture recommended minimum clearances for access and maintenance.
- C. Where equipment is to be anchored to structure, furnish and locate necessary anchoring and vibration isolation devices.
- D. Furnish all structural steel, such as angles, channels, beams, etc. required to support all piping, ductwork, equipment and accessories installed under this Division. Use structural supports suitable for equipment specified or as indicated. In all cases, support design will be based upon data contained in manufacturer's catalog.
- E. Openings: Arrange for necessary openings in buildings to allow for admittance and reasonable maintenance or replacement of all equipment furnished under this Contract.
- F. Access Doors: Provide as necessary for reasonable maintenance of all equipment valves, controls, etc.

End of Section 23 05 00

Section 23 05 05 – Selective Demolition for Heating, Ventilating, and Air Conditioning (HVAC)

Part 1 GENERAL

1.1 Description

- A. Work specified in this Section includes the demolition, removal, and disposition of certain mechanical work.
- B. Drawings, the provisions of the Agreement, and Administrative Specification Sections apply to all work of this Section.

Part 2 PRODUCTS (Not Used)

Part 3 EXECUTION

3.1 Examination

- A. Prior to starting work, carefully inspect installed work of other trades and verify that such work is complete to the point where work of this Section may properly commence. Notify the Architect in writing of conditions detrimental to the proper and timely completion of the work.
- B. Do not begin installation until all unsatisfactory conditions are resolved. Beginning work constitutes acceptance of conditions as satisfactory.

3.2 Demolition, Removal and Disposition

- A. Saw-cut concrete as shown or required.
- B. Piping, Ductwork, And Equipment To Be Removed: Remove all piping, ductwork, and equipment as indicated on the Drawings.
- C. Piping Removed: Drawings do not show all existing piping which is to be removed. Unless indicated otherwise, where existing equipment has been removed, or its use replaced by new equipment, remove connecting piping back to the branch in the main so that there will be no dead ends or unused pipe lines in mechanical spaces at completion.
- D. Piping, Ductwork, Equipment, Control Wiring and Tubing To Be Removed: Remove all piping, ductwork, equipment, control wiring and tubing as indicated. Drawings do not show all existing piping, ductwork, equipment, control wiring and tubing which is to be removed. Unless indicated otherwise, where existing equipment has been removed, or its use replaced by new equipment, remove connecting piping and ductwork back to the branch in the main so that there will be no dead ends or unused pipe lines in mechanical spaces at completion.
- E. Materials To Owner: All items or materials removed from the project shall be made available for the Owner's inspection. The Owner retains the option to claim any item or material. The Contractor shall deliver any claimed item or material in good condition to

- the place designated by the Owner. All items not claimed become the property of the Contractor and shall be removed from the site by the Contractor.
- F. Materials To Owner: As indicated on the Drawings.
 - G. Re-use Of Materials: Only where indicated on Drawings.
 - H. Materials To Contractor: Materials shown or specified to be removed, other than the materials indicated to be turned over to Owner.
 - I. Protect any active piping and/or wiring encountered; remove, plug or cap utilities to be abandoned. Notify the DOC Project Manager of utilities encountered whose service is not known.
 - J. Debris Removal: Existing materials removed and not reinstalled or turned over to the Owner shall be immediately removed from the site and disposed of by the Contractor.
 - K. Repairs: Any portion of the facility damaged, cut back or made inoperable by this Contractor shall be repaired with similar materials as the existing structure and/or damaged item as instructed by the Architect.

End of Section 23 05 05

Section 23 05 19 – Meters and Gauges for HVAC Piping

Part 1 GENERAL

1.1 Summary

A. Section Includes:

1. Pressure Gauges.
2. Pressure Gauge Taps.
3. Thermometers.

B. PRODUCTS FURNISHED BUT NOT INSTALLED UNDER THE SECTION

1. Section 23 21 13 - Hydronic Piping: Installation of thermometer wells, pressure gauge tapings.
2. Section 23 31 00 – HVAC Ducts and Casings: Installation of thermometers and static pressure gauges.

1.2 Related Work

- A. Section 23 05 00 - Common Work Results for HVAC.
- B. Section 23 09 23 – Direct Digital Control System for HVAC
- C. Section 23 09 93 - Sequence of Operations for HVAC Controls.
- D. Section 23 21 16 - Hydronic Piping Specialties.
- E. Section 23 33 00 - Air Duct Accessories.

1.3 Reference Standards

- A. ASTM E1 - Specification for ASTM Thermometers.
- B. ASTM E77 - Verification and Calibration of Liquid-in-Glass Thermometers.
- C. AWWA C700 - Cold Water Meters - Displacement Type.
- D. AWWA C706 - Direct Reading Remote Registration Systems for Cold Water Meters.
- E. ASTM E1 - Standard Specification for ASTM Thermometers.

1.4 Submittals

- A. Product Data: Submit engineering data for each component, Include list which indicates use, operating range, total range and location for manufactured components.
- B. Submit manufacturer's installation instructions under provisions of Division 01.

1.5 Closeout Submittals

- A. Project Record Documents: Accurately record actual location of all instrumentation and gauges.
- B. Operation and Maintenance Data.

1.6 Warranty

- A. Furnish one-year manufacturer warranty for HVAC instrumentation.

Part 2 PRODUCTS

2.1 Instrumentation for HVAC

- A. Manufacturers:
1. Dwyer
 2. Trerice.
 3. Weiss.
 4. Marshaltown.
 5. Ashcroft.
 6. Enerpac.
 7. Peterson.
 8. Winters.
 9. Substitutions: In accordance with Division 01.

2.2 Pressure Gauges

- A. 4-1/2 inch diameter cast aluminum case, phosphor bronze bourbon tube, rotary bronze movement, brass socket, [with silicone fluid dampening] black figures on white background, one percent mid-scale accuracy, scale calibrated in psi. Model 600CB as manufactured by Trerice or approved equal.

2.3 Pressure Gauge Taps

- A. Gauge Isolation Valve: Lever handle ball valve, forged brass body, chrome plated brass ball, viton o-rings for maximum 150 psig.
- B. Needle Valve: Brass for maximum 150 psig.
- C. Pulsation Damper: Pressure snubber, brass with 1/4 inch connections.
- D. Coil Siphon: Brass, 1/4", male pipe thread each end.

2.4 Stem Type Thermometers

- A. Analog Thermometers: 9 inch scale, universal adjustable angle, organic spirits, lens front tube, cast aluminum case with blue/black metallic finish and clear Lexan window, extended brass stem, cast aluminum adjustable joint with positive locking device, 2 percent of scale accuracy to ASTM E77, scale calibrated in both degrees F and degrees C, range per schedule.
- B. Solar Digital Thermometers shall be adjustable angle type, 7" aluminum with epoxy finished. LCD display digits, switchable between F/C. Thermometer shall require no

batteries or external power source and, and have a resolution of 1/10°. Thermometer accuracy shall be 1% of reading or 1°, whichever is greater. Temperature range shall per schedule.

Part 3 EXECUTION

3.1 Installation

- A. Install in accordance with manufacturer's instructions.
- B. Provide two pressure gauges per pump, installing taps on suction and discharge of pump. Pipe to gauge with isolation valve to each tapping.
- C. Install thermometers in piping systems in sockets in short couplings Enlarge pipes smaller than 2-1/2 inch for installation of thermometer sockets. Select bulb length to reach centerline of pipe. Coat thermometer stem with conductive compound.
- D. Install thermometer sockets and flanges adjacent to controls system thermostat, transmitter, or sensors. Refer to Section 23 09 23.
- E. Provide instruments with scale ranges selected according to service with largest appropriate scale.
- F. Install gauges and thermometers in locations where they are easily read from normal operating level.
- G. Install solar thermometers in locations where solar cells are activated by fixed interior lighting.

3.2 Pressure Gauge Schedule

LOCATION	SCALE RANGE
Pumps less than 40' TDH	0 - 30 PSIG
Heating water system	0 - 30 PSIG
Glycol water system	0 - 30 PSIG

3.3 Thermometer Schedule

LOCATION	SCALE RANGE
Heating water system	0 - 200° F
Glycol water system	0 - 200° F
Condenser water system	0 - 200° F

3.4 Dial Thermometer Schedule

LOCATION	SCALE RANGE
Outside air	-40 - 120° F
Return air	0 - 100° F
Others	As applicable

3.5 Static Pressure and Filter Gauge Schedule

LOCATION	SCALE RANGE
Supply fan discharge	0 - 2 IN H ₂ O

End of Section 23 05 19

Section 23 05 93 – Testing, Adjusting, and Balancing for HVAC

Part 1 GENERAL

1.1 Work Included

- A. Air Systems:
 - 1. Constant Volume Air Systems.
 - 2. Existing HVAC Systems.
- B. Hydronic Systems:
 - 1. Constant Flow Systems.
 - 2. Primary-secondary Systems.

1.2 Scope

- A. Furnish the professional services of a qualified and approved balancing and testing firm to perform the work of this specification section.
- B. The work of this section includes but is not necessarily limited to:
 - 1. Testing and balancing existing hydronic heating and ventilation systems as indicated on drawings.
 - 2. Testing and balancing fans and air handling systems.
 - 3. Testing and balancing new liquid heat transfer systems.
 - 4. Working directly with the control subcontractor to obtain proper system adjustments.
- C. The work of this section does not include:
 - 1. Adjusting burners for proper combustion operation.
 - 2. Fire protection systems.
- D. Hydronic Balancing
 - 1. Balance all hydronic equipment and systems that are new or modified under this contract. Existing equipment and systems outside of this contract will not be balanced.
- E. Air Balancing
 - 1. The new and existing air systems throughout the building shall be balanced under this contract.

1.3 Applicable Codes and Standards

- A. SMACNA Manual for the Balancing and Adjustment of Air Distribution Systems.
- B. AMCA Publication 203, Field Performance Measurements.

- C. American Air Balancing Council (AABC) Recommended Procedures
- D. National Environmental Balancing Bureau (NEBB) Recommended Procedures

1.4 Qualification of the Balancing Firm or Company

- A. Subcontractor minimum qualifications include:
 - 1. Demonstrate satisfactory completion of five projects of similar scope in the State of Alaska during the past five years. Provide references if requested.
 - 2. NEBB Certified in Testing, Adjusting and Balancing of Air and Hydronic Systems.

1.5 Timing of Work

- A. Do not begin balancing and testing until the systems, including controls, are completed and in full working order.
- B. Schedule the testing and balancing work in cooperation with other trades.
- C. Complete the testing and balancing at least one week before the date of substantial completion and before any occupancy occurs

1.6 Contractor Responsibility to Balancing Agency

- A. Award the test and balance contract to an approved firm or company upon receipt of contract to allow the Balance and Testing Agency to schedule this work in cooperation with other trades involved and comply with completion date.
- B. Put all heating, ventilating and air conditioning systems, equipment and controls into full operation for the Balancing Agency and continue the operation of same during each working day of testing balancing.
- C. Provide scaffolding, ladders and access to each system for proper testing balancing.
- D. Ensure that the building enclosure is complete, including but not limited to, structural components, windows and doors installed, door hardware complete, ceilings complete, stair, elevator and mechanical shafts complete, roof systems complete, all plenums sealed, etc.
- E. Make any changes in pulleys, belts and dampers, or add any dampers as required for correct balance as recommended by the Balance and Testing Agency at no additional cost to the Owner.
- F. Complete installation, programming (including design parameters and graphics), calibration, and startup of all building control systems.
- G. Require that the building control system firm provide access to hardware and software, or onsite technical support required to assist the TAB effort. The hardware and software or the onsite technical support shall be provided at no cost to the TAB firm.

1.7 Report

- A. Certified Reports shall be included in project O & M manuals. Reports shall include: testing, adjusting, and balancing reports bearing the signature of the Test and Balance Agency Representative. The reports shall be certified proof that the systems have been tested, adjusted, and balanced in accordance with the referenced standards; are an accurate representation of how the systems have been installed; are a true representation of how the systems are operating at the completion of the testing, adjusting and balancing procedures; and are an accurate record of all final quantities measured, to establish normal operating values of the system. Follow the procedures and format specified below:
1. Draft Reports: Upon completion of testing, adjusting and balancing procedures, prepare draft reports on the approved forms. Draft reports may be hand written, but must be complete, factual, accurate, and legible. Organize and format draft reports in the same manner specified for the final reports.
 2. Final Reports: Upon verification and approval of the draft report; prepare final reports, typewritten, organized and formatted as specified below.
 3. Report Format: Report forms shall be those standard forms prepared by the referenced standard for each respective item and system to be tested, adjusted and balanced. Report shall be provided in electronic PDF Format. The data in the electronic file shall be arranged and indexed. Divide the contents into the below listed sections, with bookmarks for each section:
 - a. General Information and Summary.
 - b. Air Systems.
 - c. Hydronic Systems.
 - d. Temperature Control Systems.
 - e. System Deficiency Reports and Corrective Actions.
 4. Report Contents: Provide the following minimum information, forms and data:
 - a. General Information and Summary: Inside cover sheet to identify testing, adjusting, and balancing agency; contractor; owner, architect, engineer and project. Include addresses, contact names and telephone numbers. Also, include a certification sheet containing the name, address, telephone number and signature of the Certified Test and Balance Personnel. Include in this division a listing of the instrumentation used for the procedures along with the proof of calibration.
 - b. The remainder of the report shall contain the appropriate forms containing as a minimum, the information indicated on the standard report forms prepared by the AABC for each respective item and system. Prepare a schematic diagram for each item of equipment and system to

accompany each respective report form.

- c. Calibration Reports: Submit proof that all required instrumentation has been calibrated to tolerances specified in the referenced standards, within a period of six months prior to starting the project.

1.8 Submittals

- A. Submit in accordance with Division 01.
- B. Submit balancing agency qualifications and sample balancing forms.
- C. Provide list of equipment to be used and date of last calibration.
- D. Submit preliminary balance report a minimum of one week prior to substantial completion inspection.

Part 2 PRODUCTS

2.1 Instruments

- A. Maintain all instruments accurately calibrated and in good working order. Use instruments with the following minimum performance characteristics.
 - 1. Air Velocity Instruments: Direct reading in feet per minute, 2% accuracy.
 - 2. Static Pressure Instruments: Direct reading in inches' water gauge, 2% accuracy.
 - 3. RPM Instruments: Direct reading in revolutions per minute, .5% accuracy; or revolution counter accurate within 2 counts per 1,000.
 - 4. Pressure Readout: Direct reading in feet of water or PSI, .5% accuracy.
 - 5. Temperature Instruments - Direct reading in degrees F, +.5% accuracy.
 - 6. Water Flow Instruments: Differential pressure type; direct reading in feet of water or PSI, accuracy, suitable for readout balancing valve provided.
 - 7. Sound Measuring Instrument: Octave Band Analyzer which essentially complies to AASA Standards SI.6 1960 with a range of 24DB to 150 DB sound pressure level ref. .0002 microbar. Calibrate sound test instrument before use to a closed coupler and a driving loudspeaker that produces a know-sound pressure level at the microphone of the analyzer.

Part 3 EXECUTION

3.1 General Procedures for All Systems

- A. Start with new, clean filters.
- B. In cooperation with the control manufacturer's representative, coordinate

adjustments of automatically operated dampers and valves to operate as specified, indicated and/or noted.

- C. Use manufacturer's ratings on all equipment to make required calculations.
- D. Make final adjustments for each space per heating or cooling comfort requirement. State reason for variance from design CFM, i.e., "too noisy", "drafty", etc.
- E. Mark equipment and balancing device settings (including damper-control positions, valve position indicators, fan-speed-controls, and similar controls and devices) with paint or other suitable permanent identification material to show final settings.

3.2 Requirements for All Air Handling Systems

- A. Identify each diffuser, grille and register as to location and area.
- B. Identify and list size, type and manufacturer of diffusers, grilles, registers and all testing equipment.
- C. In readings and tests of diffusers, grilles and registers, include required FPM velocity and required CFM and test CFM after adjustments. If test apparatus is designed to read CFM directly, velocity reading may be omitted. Identify test apparatus used. Identify wide open (W.O.) runs.
- D. Check and record the following items:
 - 1. Air temperatures; mixed air, after coils, outside air, return air and supply air.
 - 2. Pressure drop at each coil, filter bank, etc.
 - 3. Operating suction and discharge pressure.
 - 4. Full nameplate data of all equipment.
 - 5. Rated and actual running amperage and voltage of all motors.
 - 6. Drive data including sheaves and belts and adjustments.
 - 7. Electrical overloads/heaters sizes and ranges of motors.

3.3 Balancing Low Velocity Constant Volume Ductwork

- A. Analyze system and identify major branches. Tabulate design CFM for each branch.
- B. Select the branch which appears to be the longest run from the fan or to have the highest static pressure requirements.
- C. Adjust other branch dampers or the fan to establish 110% design air flow through the selected branch.
- D. Adjust the air flow through each air inlet (exhaust systems) or outlet (supply systems) on the selected branch to within +5% of the requirements so that at least one branch damper serving an inlet (or outlet) is wide open.

- E. Proceed to another branch and set up 110% design airflow. Balance each inlet or outlet to within +5% of requirements, again leaving at least one wide open run. Repeat this process until all branches are balanced 110% airflow.
- F. Once each branch has been balanced at 110% flow with one wide open run on each branch, balance with branches together, leaving at least one branch damper wide open. At this point, adjust the fan delivery so that each branch is at about 110% design airflow. Adjust the branch dampers so that each inlet (or outlet) in the system is within 10% of the required airflow.
- G. Adjust the fan for design airflow.
- H. Read and record the airflow at each inlet and outlet.
- I. Secure each branch damper and mark the balanced position of the damper quadrant.
- J. Test and record entering and leaving air temperatures of coils.
- K. Test and record entering and leaving water temperatures of coils.
- L. Test and record static pressure drop across each filter and coil bank.

3.4 Fluid System Testing and Balancing

- A. Preparation of system - Phase I:
 - 1. Complete air balance before beginning fluid balance.
 - 2. Clean all strainers.
 - 3. Examine fluid in system to determine if treated and clean.
 - 4. Check pump rotation.
 - 5. Verify expansion tanks are not air bound and system full of fluid.
 - 6. Verify all air vents at high points of fluid systems are installed properly and are operating freely. Make certain all air is removed from circuiting system.
 - 7. Open all valves to full flow position including coil and heater stop valves, close bypass valves and open return line balancing cocks. Set temperature controls so that automatic valves are open to full flow through apparatus.
 - 8. Check and set operating temperature of boilers and heat exchangers to design requirements when balancing by temperature drop.
 - 9. Adjust all flows to 110% of design flows as shown.
- B. Test and Balance Procedure - Phase II:
 - 1. Set pumps to proper GPM delivery and set proper GPM delivery in main piping runs from boiler room. Note flow variations for additive alternates.
 - 2. Adjust flow of fluid through primary equipment.

3. Check leaving fluid temperatures and return fluid temperatures and pressure drop through major equipment. Reset to correct design temperatures.
 4. Check fluid temperature at inlet side of coils and other heat transfer equipment. Note rise or drop of temperatures from source.
 5. Balance each coil and all other heat transfer apparatus in system.
 6. Upon completion of flow readings and adjustments, mark all settings and record all data.
- C. Test and Balance Procedure - Phase III:
1. After making adjustments to coils and apparatus, recheck settings at pumps and major equipment. Readjust if required.
 2. Attach pressure gauges on each coil, then read pressure drop through coil at set flow rate on call for full flow through coil. Set pressure drop across bypass valve to match coil full flow pressure drop. This prevents unbalanced flow conditions when coils are on full bypass.
 3. Check and record the following items with flows set at 100% of design.
 - a. Inlet and leaving fluid and air temperatures at coils and major equipment.
 - b. GPM flow of each coil and major equipment.
 - c. Pressure drop of each coil and major equipment.
 - d. Pressure drop across bypass valve.
 - e. Pump operating suction and discharge pressures and final total developed head.
 - f. Pump GPM.
 - g. Rated and actual running amperage and voltage of pump motor.
 - h. Full nameplate data of all pumps and equipment.
 - i. Electrical overloads/heaters sizes and ranges of motors.
 4. Permanently mark adjusted position of all balancing valves. Stamp indicator plate of circuit setters and other balancing valves without memory stop.

End of Section 23 05 93

Section 23 07 00 - HVAC Insulation

Part 1 GENERAL

1.1 Section Includes

- A. Piping Insulation.
- B. Equipment Insulation.
- C. Ductwork Insulation.
- D. Jackets and Accessories.

1.2 Related Work

- A. Division 09 – Painting.
- B. Section 23 05 00 – Common Work Results for HVAC Systems.
- C. Section 23 05 19 – Meters and Gages for HVAC Piping.
- D. Section 23 21 13 – Hydronic Piping.
- E. Section 23 21 16 – Hydronic Specialties.
- F. Section 23 22 13 – Steam and Condensate Heating Piping.
- G. Section 23 22 16 – Steam and Condensate Heating Piping Specialties.
- H. Section 23 31 00 – HVAC Ducts and Casings.
- I. Section 23 33 00 – Air Duct Accessories.
- J. Section 23 82 16 – Air Coils.

1.3 References

- A. ASTM B209 - Aluminum and Aluminum-alloy Sheet and Plate.
- B. ASTM C195 - Mineral Fiber Thermal Insulating Cement.
- C. ASTM C450 - Standard Practice for Fabrication of Thermal Insulating Fitting Covers for NPS Piping, and Vessel Lagging.
- D. ASTM C518 - Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus.
- E. ANSI/ASTM C533 - Calcium Silicate Block and Pipe Thermal Insulation.
- F. ANSI/ASTM C534 - Standard Specification for Preformed Flexible Elastomeric Cellular Thermal Insulation in Sheet and Tubular Form.
- G. ANSI/ASTM C547 - Mineral Fiber Pipe Insulation (Preformed).
- H. ANSI/ASTM C552 - Cellular Glass Thermal Insulation.
- I. ANSI/ASTM C553 - Mineral Fiber Blanket Insulation.
- J. ANSI/ASTM C578 - Preformed, Block Type Cellular Polystyrene Thermal Insulation.
- K. ASTM C585 - Standard Practice for Inner and Outer Diameters of Rigid Thermal Insulation for Nominal Sizes of Pipe and Tubing (NPS System).

- L. ASTM C612 - Mineral Fiber Block and Board Thermal Insulation.
- M. ASTM C449 - Mineral Fiber Hydraulic-setting Thermal Insulating and Finishing Cement.
- N. ASTM C610 - Expanded Perlite Block and Pipe Thermal Insulation.
- O. ASTM C1071 - Standard Specification for Fibrous Glass Duct Lining Insulation (Thermal and Sound Absorbing Material).
- P. ASTM C1136 - Standard Specification for Flexible, Low Permeance Vapor Retarders for Thermal Insulation.
- Q. ASTM C1427 - Standard Specification for Preformed Flexible Elastomeric Cellular Thermal Insulation in Sheet and Tubular Form.
- R. ASTM D774 - Standard Test Method for Bursting Strength of Paper.
- S. ASTM D1000 - Standard Test Methods for Pressure-Sensitive Adhesive-Coated Tapes Used for Electrical and Electronic Applications.
- T. ASTM E84 - Surface Burning Characteristics of Building Materials.
- U. ASTM E96 - Standard Test Methods for Water Vapor Transmission of Materials.
- V. NFPA 255 - Surface Burning Characteristics of Building Materials.
- W. UL 723 - Surface Burning Characteristics of Building Materials.

1.4 Submittals

- A. Submit product data under provisions of Division 01.
- B. Include product description, thickness for each service, and locations.
- C. Submit manufacturer's installation instructions.

1.5 Quality Assurance

- A. Applicator: Company specializing in piping insulation application with three years minimum experience.
- B. Pipe insulation manufactured in accordance with ASTM C585 for inner and outer diameters.
- C. Materials: Flame spread/smoke developed rating of 25/50 in accordance with UL 723, ASTM E84, or NFPA 255.
- D. Factory fabricated fitting covers manufactured in accordance with ASTM C450.

1.6 Delivery, Storage, and Handling

- A. Division 01 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.
- B. Accept materials on site in original factory packaging, labeled with manufacturer's identification, including product density and thickness.
- C. Shipment of materials from manufacturer to installation location shall be in weather tight transportation.

- D. Protect from weather and construction traffic, dirt, water, chemical, and damage, by storing in original packaging.

1.7 Environmental Requirements

- A. Maintain ambient temperatures and conditions required by manufacturers of adhesive, mastics, and insulation cements.

1.8 Field Measurements

- A. Verify field measurements prior to fabrication.

1.9 Warranty

- A. Division 01- Execution and Closeout Requirements: Product warranties and product bonds.

Part 2 PRODUCTS

2.1 Acceptable Manufacturers

- A. Armacell.
- B. Certain-Teed.
- C. IMCOA.
- D. Johns Manville.
- E. Knauf.
- F. Owens-Corning.
- A. Manson.
- B. Nomaco.
- C. Pittsburgh - Corning.
- D. K-Flex USA.
- E. Armstrong.
- F. Substitutions: Under provisions of Division 01.

2.2 Insulation - Piping

- A. Type A: Glass fiber, rigid, molded, non-combustible insulation; ANSI/ASTM C547; 'k' value of 0.23 at 75° F, rated from 0° F to 850° F, vapor retarder jacket of Kraft paper bonded to aluminum foil, self-sealing lap and butt strips.
- B. Type B: Cellular glass; ANSI/ASTM C552; 'k' value of 0.29 at 75° F; 7.3 lbs./cu. ft. density.

2.3 Field Applied Piping Jacket

- A. Vapor Barrier Jackets: Kraft reinforced foil vapor barrier with self-sealing adhesive joints.

- B. PVC Jackets and solvent welding adhesive: One-piece, pre-molded type, fitting covers and jacketing material. Solvent welding adhesive.
- C. Aluminum Jackets: ASTM B209; 0.016 inch thick; corrugated or textured finish, longitudinal slip joints.
- D. Stainless Steel Jackets: Type 304 stainless steel; 0.010 inch thick; corrugated finish.
- E. Re-Wettable Canvas Jacketing: , Fiberglass cloth made from texturized yarns, impregnated throughout with an inorganic fire retardant asbestos free adhesive; 20x14 thread count, 14.5 oz./sq.yd, 0.04 inch thickness, 1,000° F upper temperature limit.

2.4 Insulation - Equipment

- A. Type C: Rigid fiberglass board with FSK outer facing. Johns Manville 814 FSK, 3.0 lbs./cu. ft. density, ASTM C612, K= .23 @ 75° F, 450° F maximum service temperature.
- B. Type D: Reusable Thermal Insulation Covers, HVAC Equipment: 2" thermal insulating wool, 2.4 lb./cu.ft. density, maximum temperature rating of 1000 Deg. F; Interior/Exterior Fabric: 17 oz./sq. yd. silicone coated fiberglass cloth, maximum temperature range of -80 to 500 Deg F; Securement: Lacing Anchors, fourteen gauge stainless steel with 1.5" diameter stainless steel speed washers; Sewing Thread: Kevlar/Stainless Steel S-110 Natural with stainless steel core, all blanket seems to be single sewn lock stitch interior seams, six to nine stitches per inch; Drawcord: 0.125" diameter #4 ultra-strength polyester.
- C. Type E: Reusable Valve Wrap Insulation Covers: Removable and reusable wraps packaged with a 1" thick fiberglass blanket insert to completely cover the insulated equipment. The outer cover of the shall be made of DuPont Tychem® QC that is secured with a Velcro closure. Tychem® QC consists of a durable Tyvek® substrate quality coated with polyethylene that is impermeable to water. K= .28 @ 100° F; Temperature Limits 0°F to 450°F; Water Vapor Transmission ASTM E 96 0.01 Perms at 37.8C/100F-RH/100%; Breaking Strength Grab (md/cd) ASTM D5034-90 43/49 lbs; Tearing Strength Trapezoid (md/cd) ASTM D1117-80 7/5 lbs; Weatherable Grade; UV resistant; White/gloss finish; UL25/50 rating and are non-combustible per ASTM E 136.

2.5 Insulation - Ductwork

- A. Type F: Exterior FSK Rigid Fiber Board Duct Insulation; ASTM C612, 'k' value of 0.23 at 75° F, 3.0 lb./cu. ft. density. 0.00035 inch foil scrim facing.

2.6 Field Applied Equipment and Ductwork Jackets

- A. Aluminum Jackets: ASTM B209; 0.016 inch thick; corrugated or textured finish, longitudinal slip joints.
- B. Stainless Steel Jackets: Type 304 stainless steel; 0.010 inch thick; corrugated finish.
- C. Re-Wettable Canvas Jacketing: Fiberglass cloth made from texturized yarns, impregnated throughout with an inorganic fire retardant asbestos free adhesive; 20x14 thread count, 14.5 oz./sq.yd, 0.04 inch thickness, 1,000° F upper temperature limit.

2.7 Insulation Accessories

- A. Adhesives: Waterproof and fire-retardant type.

- B. Lagging Adhesive: Fire resistive to NFPA 255.
- C. Impale Anchors: Galvanized steel, 12 gauge, self-adhesive pad.
- D. Joint Tape: Glass fiber cloth, open mesh.
- E. FSK Joint Tape; ASTM C1136 Foil-Scrim-Kraft (FSK) lamination coated with solvent acrylic pressure sensitive adhesive; capable of adhering to fibrous and sheet metal surfaces; tri-directionally reinforced 2x3 squares per inch fiberglass scrim; 9.5 mils thick, -40 to 240° F service temperatures.
- F. Tie Wire: Annealed steel, 16 gauge.
- G. Insulated pipe supports: Calcium silicate with galvanized steel jacket (min. 24 gauge); ANSI/ASTM C533; rigid white; 'k' value of 0.37 at 100° F, rated to 1,200° F.

Part 3 EXECUTION

3.1 Preparation

- A. Install materials after piping, equipment and ductwork has been tested and approved.
- B. Clean surfaces for adhesives.
- C. Prepare surfaces in accordance with manufacturer's recommendations.

3.2 Installation – Piping Insulation

- A. Install materials in accordance with manufacturer's recommendations, building codes and industry standards.
- B. Continue insulation vapor barrier through penetrations except where prohibited by code.
- C. Locate insulation and cover seams in least visible locations.
- D. Neatly finish insulation at supports, protrusions, and interruptions.
- E. For insulated pipes conveying fluids above ambient temperature, secure jackets with self-sealing lap or outward clinched, expanded staples. Bevel and seal ends of insulation at equipment, flanges, and unions. Insulate complete system, including under fitting jackets.
- F. Provide heavy density insulating material suitable for temperature between support shield and piping 1-½" inch diameter or larger. Insulation inserts shall not be less than the following lengths:

1-½" to 2-½" pipe size	10" long
3" to 6" pipe size	12" long
- G. Fully insulate all piping including all spaces under jacketing.
- H. Jackets:
 - 1. Indoor, Concealed Applications: Insulated pipes shall have vapor barrier jackets, factory-applied. Vapor barrier PVC fittings may also be used provided joints are sealed with solvent welding adhesive approved by the jacket manufacturer.

2. For pipe exposed in mechanical equipment rooms or in finished spaces below 10 feet above finished floor, finish with PVC jacket and fitting covers or metal jacket.

3.3 Schedule - Piping

PIPING	TYPE	PIPE SIZE	MINIMUM INSULATION THICKNESS
Heating Glycol/Water Supply and Return	A, B	1-1/4" and Smaller	1.5"
Heating Glycol/Water Supply and Return	A, B	1-1/2" and Larger	2"

3.4 Installation - Equipment

- A. Install materials in accordance with manufacturer's instructions.
- B. Do not insulate factory insulated equipment.
- C. Apply insulation as close as possible to equipment by grooving, scoring, and beveling insulation, if necessary. Secure insulation to equipment with studs, pins, clips, adhesive, wires, or bands. Minimum 2" overlap on blanket material.
- D. Fill joints, cracks, seams, and depressions with bedding compound to form smooth surface. On cold equipment, use vapor barrier cement.
- E. Cover insulation with metal mesh and finish with heavy coat of insulating cement.
- F. Do not insulate over nameplate or ASME stamps. Bevel and seal insulation around such.
- G. When equipment with insulation requires periodical opening for maintenance, repair, or cleaning, install insulation in such a manner that it can be easily removed and replaced without damage.
- H. Where canvas jacketing is indicated, apply mastic in sufficient thickness to completely cover the texture of the canvas material.

3.5 Schedule - Equipment

EQUIPMENT	INSULATION TYPE	THICKNESS
Air Separator	C, D	2"
Heat Exchangers/Converters	C, D	2"
Valves	E	2"

3.6 Installation - Ductwork Insulation

- A. Install materials in accordance with manufacturer's instructions.
- B. Provide insulation with vapor barrier when air conveyed may be below ambient temperature. Continue insulation with vapor barrier through penetration.

C. Exterior Insulation Application:

1. Secure insulation with vapor barrier with wires and seal jacket joints with vapor barrier adhesive or tape to match jacket.
2. Secure insulation without vapor barrier with staples, tape, or wires.
3. Install without sag on underside of ductwork. Use mechanical fasteners to prevent sagging. Secure insulation with mechanical fasteners on 15 inch centers maximum, on bottom and side of ductwork with dimension exceeding 20 inches. Seal vapor barrier penetrations by mechanical fasteners with vapor barrier adhesive. Stop and point insulation around access doors and damper operators to allow operation without disturbing wrapping.
4. Maximum 25% compression.

D. Where ductwork is scheduled for exterior insulation and is shown on the plans to be internally lined, the exterior insulation thickness may be reduced by the thickness of the lining. Where exterior insulation can be eliminated or reduced due to thickness of lining, overlap exterior insulation a minimum 24 inches over lined ductwork.

E. Where canvas jacketing is indicated, apply mastic in sufficient thickness to completely cover the texture of the canvas material.

3.7 Schedule - Ductwork

DUCTWORK	TYPE	INSULATION THICKNESS	FINISH
Combustion Air Duct	F	2"	CANVAS
Outside Air Intake Ducts	F	2"	CANVAS

End of Section 23 07 00

Section 23 08 00 - Mechanical Systems Commissioning

Part 1 GENERAL

1.1 Summary

A. Section Includes:

1. Mechanical commissioning description.
2. Mechanical commissioning responsibilities.

B. Related Sections:

1. Division 01 – Commissioning.
2. Section 23 33 00 – Air Ductwork Accessories: Product requirements for ductwork test holes.
3. Section 23 09 23 – Direct Digital Control System: Submittal and programming requirements.
4. Section 23 09 93 – Sequence of Operation for HVAC Controls.
5. Section 23 05 93 – Testing, Adjusting, and Balancing for HVAC: For requirements and procedures concerning testing, adjusting, and balancing of mechanical systems.

1.2 References

A. American Society of Heating, Refrigerating and Air-Conditioning Engineers:

1. ASHRAE Guideline 0-2005 – The Commissioning Process.

B. National Environmental Balancing Bureau:

1. NEBB - Procedural Standards for Building Systems Commissioning.

1.3 Commissioning Description

A. Mechanical commissioning process includes the following tasks:

1. Testing and startup of mechanical equipment and systems.
2. Equipment and system installation checks.
3. Assistance in functional performance testing to verify testing and balancing, and equipment and system performance.
4. Provide qualified personnel to assist in commissioning tests, including seasonal testing.
5. Complete and endorse functional performance test checklists provided by Commissioning Authority to assure equipment and systems are fully operational and ready for functional performance testing.
6. Provide equipment, materials, and labor necessary to correct deficiencies found during commissioning process to fulfill contract and warranty requirements.
7. Provide assistance to Commissioning Authority to develop, edit, and document system operation descriptions.

B. Equipment and Systems to be commissioned:

1. Pumps.
2. Piping systems.
3. Air handlers.
6. Ductwork.
7. Duct mounted heating coils.
8. Variable frequency drives.
9. Automatic temperature control system.
10. Testing, adjusting and balancing work.
11. Boilers.
12. Heating glycol – percent glycol/water concentration in system.

1.4 Commissioning Submittals

- A. Division 1 – Commissioning: Submittals.
- B. Draft Forms: Submit draft of system installation checklists, start-up plan, and functional performance test checklist.
- C. Test Reports: Indicate data on system installation checklists for each piece of equipment and system as specified.
- D. Field Reports: Indicate deficiencies preventing completion of equipment or system verification checks equipment or system to achieve specified performance.

1.5 Closeout Submittals

- A. Division 1 – Closeout Procedures: Closeout Submittals
- B. Project Record Documents: Record revisions to equipment and system documentation necessitated by commissioning.

1.6 Quality Assurance

- A. Perform Work in accordance with ASHRAE commissioning standards.
- B. Maintain one copy of each document on site.

1.7 Commissioning Responsibilities

- A. Equipment or System Installer Commissioning Responsibilities:
 1. Attend commissioning meetings.
 2. Ensure temperature controls installer performs assigned commissioning responsibilities as specified below.
 3. Ensure testing, adjusting, and balancing agency performs assigned commissioning responsibilities as specified.
 4. Ensure subcontractors perform assigned commissioning responsibilities.
 5. Ensure participation of equipment manufacturers in appropriate startup, testing, and commissioning activities when required by individual equipment specifications.

6. Develop startup and installation checklists using manufacturer's startup procedures and functional performance checklists for equipment and systems to be commissioned.
 7. During installation check and startup process, execute HVAC related portions of checklists for equipment and systems to be commissioned.
 8. Perform and document completed startup and system operational checkout procedures, providing copy to Commissioning Authority.
 9. Coordinate with equipment manufacturers to determine specific requirements to maintain validity of warranties.
 10. Provide personnel to assist Commissioning Authority during equipment or system functional performance tests.
 11. Prior to functional performance tests, review test procedures to ensure feasibility, safety and equipment protection and provide necessary written alarm limits to be used during tests.
 12. Prior to startup, inspect, check, and verify correct and complete installation of equipment and system components for verification checks included in commissioning plan. When deficient or incomplete work is discovered, ensure corrective action is taken and re-check until equipment or system is ready for startup.
 13. Provide factory supervised startup services for equipment and systems where required in Division 23. Coordinate work with manufacturer and Commissioning Authority.
 14. Perform installation checks and startup on all equipment and systems to be commissioned.
 15. Assist Commissioning Authority in performing functional performance tests on equipment and systems as specified.
 16. Other responsibilities as described in Division 01 – Commissioning.
- B. Temperature Controls Installer Commissioning Responsibilities:
1. Attend commissioning meetings.
 2. Review design for ability of systems to be controlled including the following:
 - a. Confirm proper hardware requirements exist to perform functional performance testing.
 - b. Confirm proper safeties and interlocks are included in design.
 - c. Confirm proper sizing of system control valves and actuators and control valve operation will result capacity control identified in Contract Documents.
 - d. Confirm proper sizing of system control dampers and actuators and damper operation will result in proper damper positioning.
 - e. Confirm sensors selected are within device ranges.
 - f. Review sequences of operation and obtain clarification from Contracting Officer.
 - g. Indicate delineation of control between packaged controls and building automation system, listing BAS monitor points and BAS adjustable

control points.

- h. Provide written sequences of operation for packaged controlled equipment. Equipment manufacturers' stock sequences may be included, when accompanied by additional narrative to reflect Project conditions.
 3. Inspect, check, and confirm proper operation and performance of control hardware and software provided in other Division 23 sections.
 4. Submit proposed procedures for performing automatic temperature control system point-to-point checks to Commissioning Authority and Contracting Officer.
 5. Inspect check and confirm correct installation and operation of automatic temperature control system input and output device operation through point-to-point checks.
 7. Demonstrate system performance and operation to Commissioning Authority during functional performance tests including each mode of operation.
 8. Provide control system technician to assist during Commissioning Authority verification check and functional performance testing.
 9. Provide control system technician to assist testing, adjusting, and balancing agency during performance of testing, adjusting, and balancing work.
- C. Testing, Adjusting, and Balancing Agency Commissioning Responsibilities:
1. Attend commissioning meetings.
 2. Participate in verification of testing, adjusting, and balancing report for verification or diagnostic purposes. Repeat sample of 20 percent of measurements contained in testing, adjusting, and balancing report as selected by Commissioning Authority.
- D. Commissioning Authority is the Engineer of Record or other Designee of the Contracting Agency.

1.8 Commissioning Meetings

- A. Division 01 - Commissioning: Project Meetings.
- B. Attend initial commissioning meeting and progress commissioning meetings as required by Commissioning Authority.

1.9 Scheduling

- A. Division 01 – Construction Schedule: Construction Schedule Requirements
- B. Prepare schedule indicating anticipated start dates for the following:
 1. Piping system pressure testing.
 2. Piping system flushing and cleaning.
 3. Ductwork cleaning.
 4. Ductwork pressure testing.
 5. Equipment and system startups.
 6. Automatic temperature control system checkout.

7. Testing, adjusting, and balancing.
8. HVAC system orientation and inspections.
- C. Schedule seasonal tests of equipment and systems during peak weather conditions to observe full-load performance.
- D. Schedule occupancy sensitive tests of equipment and systems during conditions of both minimum and maximum occupancy or use.

1.10 Coordination

- A. Division 01 – Construction Schedule: Coordination.
- B. Notify Commissioning Authority minimum of 2 weeks in advance of the following:
 1. Scheduled equipment and system startups.
 2. Scheduled automatic temperature control system checkout.
 3. Scheduled start of testing, adjusting, and balancing work.
- C. Coordinate programming of automatic temperature control system with construction and commissioning schedules.

Part 2 - PRODUCTS - Not Used

Part 3 - EXECUTION

3.1 Installation

- A. Install additional balancing dampers, balancing valves, access doors, test ports, and pressure and temperature taps required by Commissioning Authority.
- B. Place mechanical systems and equipment into full operation and continue operation during each working day of commissioning.
- C. Install replacement sheaves and belts to obtain system performance, as requested by Commissioning Authority.
- D. Install test holes in ductwork and plenums as required for balancing and as requested by Commissioning Authority for taking air measurements.
- E. Prior to start of functional performance test, install replacement filters in equipment.

3.2 Commissioning

- A. Seasonal Sensitive Functional Performance Tests:
 1. Test heating equipment at winter design temperatures.
 2. Test cooling equipment at summer design temperatures with fully occupied building.
 3. Participate in testing delayed beyond Final Completion to test performance at peak seasonal conditions.
- B. Be responsible to participate in initial and alternate peak season test of systems required to demonstrate performance.

- C. Occupancy Sensitive Functional Performance Tests:
1. Test equipment and systems affected by occupancy variations at minimum and peak loads to observe system performance.
 2. Participate in testing delayed beyond Final Completion to test performance with actual occupancy conditions.

End of Section 23 08 00

Section 23 09 23 – Direct Digital Controls System

Part 1 GENERAL

1.1 Summary

- A. Provide new DDC controls for all new equipment installed under this project and tie into existing building DDC system. Install graphics of new equipment at the control system front end. Contractor shall include costs for all network wiring and coordination with the owner for IP Address connection.

1.2 Section Includes

- A. Control equipment
- B. Software
- C. Programming

1.3 Related Sections

- A. Section 23 05 00 – Common Work Results for HVAC.
- B. Section 23 09 93 - Sequence of Operation for HVAC Controls.

1.4 References

- A. ASHRAE 85 - Automatic Control Terminology for Heating, Ventilating, Air Conditioning
- B. ANSI/ASHRAE 135-2004 Data Communication Protocol for Building Automation and Control Systems (BACnet)
- C. ASME MC8S.1 - Terminology for Automatic Control
- D. NEMA EMCI - Energy Management Systems Definitions

1.5 Quality Assurance

- A. The direct digital control equipment provided shall be designed, furnished, installed, tested, certified and placed into service by a Control Contractor who is regularly engaged in the installation of direct digital control systems in Alaska. The Control Contractor shall maintain an office in Alaska with parts and maintenance personnel to ensure prompt response (24 hour maximum) to an emergency call during the one year correction period.
- B. The Control Contractor shall be able to demonstrate that they have experience designing and installing direct digital control systems of comparable type and size to that called for in these Specifications.
- C. The Control Contractor, if other than the manufacturer, shall hold a manufacturer's franchise or license to design and install control systems for that manufacturer.
- D. The control contractor shall insure that all devices connected to the state network are fully patched, maintained and meet the state's security office requirements to participate in the Wide Area Network environment.
- E. Within two weeks after award of contract submit to the Project Manager the following items for Contractor qualification:

1. Name of manufacturer and proof that the Control Contractor holds a manufacturer's franchise or license to design and install the proposed control system.
2. Proof of Alaskan Office, with full time service representative.
3. List of Alaskan buildings with names, addresses, and phone numbers of Owners which are representative of direct digital control systems that have been installed by the Control Contractor. Include a brief description and approximate control system construction cost of each system submitted.

1.6 Equipment and Shop Drawing Review Submittals

- A. Prior to programming, ordering of equipment, or installation of any portion of the system submit the following in a single tabbed and indexed package for review by the Project Manager.
1. System architecture diagram showing power supply to each component; interconnection of direct digital controllers, building management station, and peripherals; and indication of proposed location of direct digital controllers.
 2. Sequence of operations. Print sequence of operations on the schematic control diagrams so that the relevant sequence is on the same diagram with the control schematic it describes. The Sequence of Operations provided in the Contract Documents is written in directive language. Rewrite the sequence of operations to be submitted to the Owner in language that explains the sequences of operation. Remove all directives to the Contractor.
 3. Schematic control diagrams 11 inches by 17 inches minimum paper size with upper case lettering, minimum 1/16 inch high plotted from digitized files in AutoCAD format. Clearly indicate wire and terminal labels, set points, reset schedules, switch over points, signal ranges, and other points required to completely describe the system. Show interface with any existing control systems. Depict circuitry on schematic control diagrams to allow circuits to be traced from connection to connection using one of the following methods:
 - a. Diagram each wire or tube depicting full length of circuit from connection to connection.
 - b. Reference each wire to a uniquely labeled terminal. Depict terminals on a sequentially labeled terminal strip showing attached wires and the device labels of the components attached at the other end. If the wiring label used is different than the terminal label indicate the wire label. In addition provide ladder diagrams indicating current or air flow through circuitry components.
 - c. Construct digitized schematic control diagrams using a symbol library so that symbols for similar equipment are common. Use separate layers or line type designations for the following items:
 - 1) Device Symbols
 - 2) Equipment Symbols
 - 3) Ductwork
 - 4) Piping
 - 5) Wiring

4. Valve and damper schedules
5. Subpanel and panel face layouts.
6. Control components data sheets, installation, operation, and adjustment instructions. Further index and tab this section of the submittal by item number.
 - a. Each control component shall be identified with a separate item number. Separate each item with a divider sheet with plastic index tabs.
 - b. Provide two alphabetical listings of all items included in the binder in an index at the front of the binder. One index shall list items by functional name. The other index shall list items by symbol used in the control diagrams.
 - c. Each sheet or page shall indicate the specific item(s) proposed for this project. Delete or cross out all other items.
7. Orientation and training instruction schedule and course outlines.
8. Printed copies of graphic screens and tabular screens.

1.7 Operation and Maintenance Manuals

- A. Operation and Maintenance Manuals must be submitted for review, reviewed by the Project Manager, corrected in accordance with review comments, and accepted by the Project Manager before a request for final or substantial completion inspection will be considered by the Project Manager.
- B. The Operation and Maintenance Manual shall include the information required for the equipment review submittal, updated as required to reflect current as-built conditions, plus the following:
 1. A brief customized guide to system operation prepared for the proprietary programming and interfacing software. Include copies of the guide in the Operation and Maintenance Manual, laminated between two plastic sheets for use away from the workstations. The guide shall include:
 - a. Log on procedure.
 - b. Custom commands with examples.
 - c. Procedure for accessing interactive video display screens, changing set points, acknowledging alarms, creating history logs, and reviewing history logs.
 - d. List of history logs.
 - e. List of interactive video display screens.
 - f. List of commands required to back up the building management system and start up the system after a computer failure.
 - g. List of commands required to back up individual direct digital controllers and start them up after a controller failure.
 2. Maintenance information and parts lists for control components.
 3. Complete system as-built wiring diagrams indicating the following:
 - a. Wiring for all control and power circuits indicating the voltage and breaker location for each circuit.

- b. Wiring for direct digital controllers and interface panels.
 - c. Terminal number or code name for terminals in direct digital controllers and interface panels with unused terminals marked "spare".
 - d. Assigned name, address, and engineering units for direct digital controller input and output terminals.
 - e. Location, identification tag, type, function, and wiring for sensors, switches, relays, damper and valve operators, and other control system components.
 4. List of software with current revision numbers, vendor name and support telephone numbers.
 5. Indicate on the Record Drawings the location of control devices and panels that are not physically attached to mechanical equipment and that are not already indicated on the construction documents.
 6. Include copies of programming and variable printouts for the direct digital control computers created to fulfill the sequence of operation requirements. Include the following information:
 - a. Print date and time on each page with the sequence of operation corresponding to the program listing on that page.
 - b. List and describe variables used. Where applicable, variable names referring to system components shall also be referenced to names used on system Shop Drawings.
 - c. Block Programming diagrams if block programming is used.
 7. Provide reloadable backup copy of programming and variable printouts for the direct digital control computers created to fulfill the sequence of operation requirements. Provide on CD-ROM disk.
 8. Provide digitized copies of as built schematic control diagrams, wiring diagrams, and graphic screens recorded on CD-ROM disk in AutoCad or PDF drawing format.
 9. Provide a print out of the configuration files for each controller. Place controller specific print out in specific controller cabinet.
 10. Provide other information required for the Owner to properly troubleshoot and maintain the control system.
- C. Submit index table of histories to be provided as part of final inspection for review concurrently with Operation and Maintenance Manual.
- D. Published and bound building management system software or hardware manuals are not required to be included in the three ring "Operation and Maintenance Manual". Provide one copy of each published and bound building management system software or hardware manual required for the maintenance and operation of building management system to the Project Manager one week prior to request for substantial completion. Provide a separate index sheet describing each separately provided bound manual as part of the "Operation and Maintenance Manual".
- E. Provide editing facilities used in the developing of the building management system so that any custom programming required to apply the building management system to this project is accessible to a trained operator for viewing, editing, or creating similar

software structures. List software that cannot be changed by the operator with model and version number. Any custom software is considered the property of the owner with full right to copy. This software is required to work across the BACNET/IP network.

- F. After the final inspection and subsequent punch list inspections update each copy of the Operation and Maintenance Manual to reflect final as-built conditions.

1.8 Systems Demonstration

- A. The Contractor will completely check out, calibrate and test all connected hardware and software to ensure that the system performs in accordance with the approved specifications and sequences of operation.
- B. Building management station demonstration will consist of:
1. Running each specified report.
 2. Display and demonstrate each data entry to show site specific customizing capability. Demonstrate parameter changes.
 3. Step through penetration tree, display all graphics, demonstrate dynamic update and direct access to graphics.
 4. Execute digital and analog commands in graphic mode.
 5. Demonstrate update, and alarm responsiveness.
 6. Demonstrate digital system configuration graphics with interactive upload and download, and demonstrate specified diagnostics.
 7. Demonstrate programming with point options of beep duration, beep rate, alarm archiving and color banding.
- C. Provide complete demonstration of system operation to the owners representative at the project substantial completion inspection. The Contractor will demonstrate to the Owner's satisfaction that all equipment and systems operate in accordance with the sequence of operation as outlined under Section 23 09 93. Demonstration will include all equipment controlled by the Direct Digital Control System.

1.9 Warranty

- A. Under provisions of Division 01.
- B. All components, system software, parts and assemblies will be guaranteed against defects in materials and workmanship for one year from acceptance date.
- C. Labor to troubleshoot, repair, reprogram, or replace system components will be furnished by the Contractor at no charge to the owner during the warranty period.
- D. All corrective software modifications made during warranty service periods will be updated on all user documentation and on user and manufacturer archived software disks.

1.10 Final Inspection Supplemental Data

- A. Final inspection supplemental data must be submitted for review, reviewed by the Project Manager, corrected in accordance with review comments, and accepted by the

Project Manager before a request for final or substantial completion inspection will be considered by the Project Manager.

Part 2 PRODUCTS

2.1 Acceptable Vendors

- A. Siemens Building Technologies

2.2 System Description and Architecture

- A. Direct digital control (DDC) is defined as a control technique through which the process variable is continuously monitored by a direct digital controller which accomplishes loop control by calculating a control solution for output to a control device.
- B. Building Automation System (BAS) is defined as the computer hardware, peripherals, software, and custom programming required to provide the programming, overriding and other indicated BAS functions.
- C. Building Management Station (BMS) is defined as a file server microprocessor or workstation microprocessor containing the BAS software and custom programming in memory.
- D. Provide direct digital controls unless otherwise indicated. Provide direct digital controls and connect to the existing DDC system that communicates with the State's local intranet. Install direct digital controllers and the panels, sensors, transducers, switches, operators, control valves, control dampers, and other devices required to perform the automatic control and monitoring functions described herein and indicated on the Drawings.
- E. The control contractor shall coordinate with the Owner's IT personnel on connection of the new DDC devices to the existing DDC system. The control contractor shall be responsible for providing all cabling, equipment and labor required for the connection. Devices connected to the state network must be fully patched, maintained and meet the state's security office requirements to participate in the Wide Area Network environment.
- F. Provide direct digital controllers capable of performing its designated control functions in a completely independent manner and continuing its primary control functions during network communications failure.
- G. Network all direct digital controllers to allow for single point system programming and monitoring from the building management system and for the sharing of point information and control instructions.
- H. Operator communications with the system shall be through the building management system.

2.3 Direct Digital Controllers

- A. General
 - 1. Provide modular direct digital controllers unless otherwise indicated. Application specific controllers may be used in lieu of modular direct digital controllers for unit heaters and cabinet unit heaters.

2. Control points monitored or controlled by a direct digital controller shall be individually addressable. Full history accumulation shall be possible for all control points. Use of multiplexers is not acceptable.
3. Provide direct digital controllers meeting the following criteria:
 - a. FCC Part 15, Subpart J: Class A Compliance.
 - b. UL listed for control of mechanical systems or temperature regulating systems.
 - c. Diagnostic LED indication of device transmit and receive data communications, normal operation, abnormal operation and control relay operation indication. Provide direct digital controllers with self diagnostics programming that continuously monitors the proper operation of the microcomputer controller and reports malfunctions to the operator through the building management system. Log such overrides.
 - d. Its own microcomputer controller, power supply, input/output modules, and termination modules.
 - e. Commanded override capability through the building management system via network communications and through direct connection to the portable operator terminal. Annunciate such overrides to the workstations.
 - f. Be capable of full operation either as a completely independent unit or as a part of the entire control system. Provide each direct digital controller with equipment required for interface to its associated input and output devices.
 - g. The same set of programming languages. Do not use programming customized specifically for this project that is inaccessible to a trained operator. All accessible programming becomes the property of the Owner without regard to copyright.
 - h. Have a minimum point name length of 8 alphanumeric characters.
 - i. Be capable of retaining volatile memory for a minimum of 24 hours after loss of power to the microcomputer controller using a self-recharging battery. Loss of power to any direct digital controller shall not affect operation of other system direct digital controllers. Loss of power to any direct digital controller shall be reported to the operator through the building management system as a maintenance alarm. Upon resumption of power, the direct digital controller shall resume full operation without operator intervention. The direct digital controller shall also automatically reset its clock such that proper operation of timed sequences is possible without the need for manual reset of the clock. Each direct digital controller shall retain its operating system memory in non-volatile memory.
 - j. Have a minimum of one operator service port for the connection of a laptop. The service port shall be either a built-in RS-232 data terminal port, RJ-45 or RJ-11 type jack which connects to the portable operator terminal. Connection of a service device to a service port shall not cause the direct digital controller to lose communications with its peers or

- other networked controllers. Provide the manufacturers' proprietary software for this programming function of the direct digital controllers.
- k. Automatic control and monitoring functions shall be executed within direct digital controllers. Execute loop control via direct digital control algorithms. The direct digital controllers shall permit development of control loops that support any of the following control modes:
- 1) Two-position: on/off, open/closed, pulse width modulated, etc.
 - 2) Proportional (P): Causes actuator to stroke to a position proportional to the offset from setpoint. Provide with positive positioning actuator or potentiometer feedback from actuator, and proportional band adjustment.
 - 3) Integral (I): Causes actuator to change position in response to offset from setpoint and accumulated time of offset. Provide with adjustable gain.
 - 4) Derivative (D): Adjusts signal to actuator based on rate of change in offset from setpoint. Provide with adjustable gain. Apply only in conjunction with proportional and integral control.
 - 5) Proportional plus integral (PI).
 - 6) Proportional-integral-derivative (PID).
- l. Provide direct digital controllers that allow development of operator programmable control strategies and alarm conditions, capable of incorporating arithmetic, Boolean, and time delay logic. The arithmetic functions shall permit complex variable relationships (i.e. square root, exponential) as well as the more simple relationships (i.e. +, -, /, x). Provide the following logic constructs: and; or; not; nor; equal to; not equal to; less than; greater than; minimum of a group; and maximum of a group. Provide time delay values adjustable in seconds, minutes, hours, days, and date of year.
- m. Provide direct digital controllers capable of using each of the following input and output types.
- 1) Analog input within the range of 0-10 VDC, and 4-20 ma.
 - 2) Digital input, sensing dry contact closure.
 - 3) Pulse accumulator input able to totalize pulse input at a minimum rate of 2 hertz.
 - 4) Temperature input providing automatic conversion to temperature selectable in either degrees F or C.
 - 5) Digital output capable of pulsed momentary and maintained output with a minimum resolution of 0.10 seconds and selectable from 0.10 to 3200 seconds.
 - 6) Analog voltage output providing an output from 0-20 VDC with a resolution of 0.10 VDC.
- n. Analog I/O shall be non pulsing direct current. Inputs shall withstand continuous shorting 120 VAC referenced to ground, and transient voltages to ± 1500 volts for 50 microseconds. Inputs shall have a

minimum accuracy of ± 15 mV, and a resolution of 4.8 mV from 0 deg F to 100 deg F ambient. Outputs shall have a minimum accuracy of 2 percent output span and a minimum resolution of 1 percent output span.

- o. Provide direct digital controllers that allow each control loop to be fully operator definable in terms of:
 - 1) Sensors/actuators.
 - 2) Setpoints.
 - 3) Control modes.
 - 4) Gains.
 - 5) Control actions.
 - 6) Sampling times.
- p. Provide direct digital controllers that permit the generation of job-specific control strategies that can be activated in any of the following ways:
 - 1) Continuously.
 - 2) At a particular time of day.
 - 3) On a pre-defined date.
 - 4) When specific variable reads a selected value or state.
 - 5) When a piece of equipment has run for a certain period of time.
 - 6) When specific variable changes state.

B. Network Controllers:

- 1. Provide network controllers programmable from a building management station, or laptop service tool. Provide a minimum of one network controller meeting the following criteria:
 - a. Ethernet network communications with BACNET/IP protocol fully compliant with IEEE 802.3 and supporting third party communication devices such as transceivers, bridges, and routers with connections for 10BaseT and 100BaseT cabling. Provide controller using OPC client / server protocol. SuiteLink Certified FastDDE. DDE servers are not acceptable.
 - b. 4 communication ports, RS485 or RS232.
 - c. Provide network controllers capable of retaining volatile memory for a minimum 36 hours upon power loss to the microcomputer controller using rechargeable batteries.

C. Modular Direct Digital Controllers.

- 1. Provide modular direct digital controller with the capability of utilizing the following input and output types. If the I/O hardware is modular the controller must utilize these types without the necessity of changing the backframe:
 - a. Analog input.
 - b. Digital input.
 - c. Pulse accumulator input.

- d. Temperature input.
 - e. Digital output.
 - f. Analog voltage output.
 - g. Analog current output.
 - 2. Provide modular controllers with a minimum of 8 input and 8 output locations. If I/O hardware modules plug on to a base, cover unused locations with a blank cover.
 - 3. Each controller shall have a minimum of one spare input and one spare output.
 - 4. Provide manual overrides where indicated. Digital outputs to have hand off auto switch. Analog outputs to have hand off auto switch interlocked with a potentiometer allowing the value of the output signal to be manually adjusted while the output is overridden in hand. Manual override function may be provided as part of separate manual override module for analog outputs and as part of a field mounted relay for digital outputs.
 - 5. Leave every 10th assignable item as spare for the Owner's future use. This includes software entities such as blocks, variables, and flags. Therefore any assignable item ending in 0 shall be left as spare.
 - 6. If non structured programming or I/O is utilized, 10 percent of total point space and available programming area shall remain unused, and 10 percent unused I/O modules shall be plugged in to the back frame in proportional distribution and type to the point distribution and type used on the project.
 - 7. Where controllers are installed together on the same back panel surface and are connected together with a conduit system allowing future conductor installation the required spare I/O may reside on a single controller. Provide 10 percent unused inputs and 10 percent unused outputs in proportional distribution and type to the point distribution and type used on the project.
- D. Applications Specific Direct Digital Controllers.
- 1. General:
 - a. (EEPROM) to provide the indicated sequence of operations. Control parameters including schedules, setpoints, and alarm points for EEPROM direct digital controllers shall be operator definable through the building management station to meet the needs of Application specific controllers may use non-volatile reprogrammable memory the individual application. All other direct digital controller shall be fully programmable using the building management station.
- E. Building Automation System (BAS) is defined as the computer hardware, peripherals, software, and custom programming required to provide the programming, overriding and other indicated BAS functions.
- F. Building Management Station is defined as a file server microprocessor or workstation microprocessor containing the BAS software and custom programming in memory.
- G. Provide direct digital controls unless otherwise indicated. Provide a direct digital control system consisting of a method to communicate with the remote building management system, one or more direct digital controllers, and the panels, sensors, transducers, switches, operators, control valves, control dampers, and other devices

required to perform the automatic control and monitoring functions described herein and indicated on the Drawings.

2.4 Building Automation System

A. General:

1. The facility is already equipped with a Building Automation System (BAS) that was installed by Siemens Building Technologies.
2. All new equipment and programming shall be compatible with the existing BAS.

2.5 Sensors

A. General:

1. Provide sensors with specified output type for remote sensing of temperature, pressure, and flow rate. Factory calibrate for the specific application.
2. Provide two wire sensors and transmitters. Whenever transmitters are indicated or are required as part of sensor provide transmitters with 4-20ma signal output.

B. Space Temperature:

1. Thermistor or RTD with minimum 32-150 deg F range, accuracy of plus or minus 0.4 deg F over full range, and maximum drift of 0.1 deg F/year. Removable covers with tamper proof fasteners.
2. When temperature sensor is connected to an application specific controller provide with an RJ-11 jack so that a portable operators terminal can be connected at the temperature sensor.
3. Provide sensor without temperature indication and setpoint adjustment.

C. Duct Air Temperature, Probe Type:

1. Thermistor or RTD with minimum 32 deg F to 150 deg F range, accuracy of plus or minus 0.4 deg F over full range, and maximum drift of 0.1 deg F/year.
2. Handy box enclosure, with probe length suitable for duct size.

D. Duct Air Temperature, Averaging Type:

RTD continuous sensing element inside copper tube with minimum 32 deg F 150 deg F range, accuracy of plus or minus 0.75 deg F over full range, and maximum drift of 0.1F/year. Provide Sensor element length suitable for complete duct coverage.

E. Fluid Temperature:

1. Thermistor or RTD with minimum 30 deg F to 230 deg F range, accuracy of plus or minus 1.0 deg F over full range, and maximum drift of 0.5 deg F per year.
2. Insertion bulb type including well to allow removal of element without draining system.

F. Fluid Pressure:

1. Semi-conductor strain gauge pressure transducer with range 150 percent of operating pressure and over pressure tolerance of 200 percent of range

- pressure, plus or minus 2 percent accuracy over full range, and maximum drift of 1 percent full range per year.
- 2. Watertight enclosure.
- 3. Provide with brass or stainless steel snubber and pigtail on steam applications.
- 4. Provide with gate or ball valve isolation.
- G. Current Sensor:
 - 1. Current transformer and conditioning circuitry to convert 0-20 amps AC line current to 0-5 VDC input directly, and 20 to 5,000 amps AC using an auxiliary current transformer.

2.6 Switches

- H. Push Button Switch:
 - 1. Momentary contact, stackable contact blocks, 30.5 mm operator.
- I. Key Operated Switch:
 - 1. Key operated, momentary contact, stackable contact blocks, 30.5 mm operator.
- J. Low Voltage Thermostats – Space Temperature
 - 1. Adjustable setpoint, adjustable calibration of setpoint, room temperature indication, setpoint index, adjustable heat anticipator.
 - 2. Switching through SPDT mercury switch with coiled bimetal temperature sensing.
 - 3. Heating thermostats: 55 deg F to 75 deg F minimum setpoint adjustment range.
 - 4. Combination heating and cooling thermostats: 55 deg F to 85 deg F minimum setpoint adjustment range. Dual setpoint. Adjustable deadband, 0 deg F to 10 deg F.
 - 5. Covers: Removable and without temperature or setpoint indication unless specifically indicated otherwise. Setpoint adjustment shall require cover removal.
- K. Line Voltage Thermostat - Space Temperature
 - 1. Provide where non-DDC space temperature control is indicated.
 - 2. Adjustable setpoint, room temperature, and setpoint indication.
 - 3. Switching through SPDT contacts rated 16 amp inductive current at 120V.
 - 4. Setpoint range: 50 deg F to 80 deg F minimum setpoint adjustment range.
 - 5. Removable setpoint adjustment knob.
 - 6. Covers: Removable and without temperature or setpoint indication unless specifically indicated otherwise.
 - 7. Mount covers to bases with tamper proof fasteners.
- L. Current Operated Switches:
 - 1. Provide current sensing relays for status of fans or pumps as called out in sequence of operation. Provide with field adjustable current setpoint range suitable for application.

2. Internal circuits powered by induced line current.

2.7 Control Relays

- A. General: Provide relays rated for current and voltage requirements of controlled equipment.
- B. Panel Mounted Relays:
 1. Plug in type, with DIN rail mountable plug in sockets. IDEC RH series or equal.
 2. UL listed.
- C. Field Mounted Relays:
 1. Solid state packaged relay including relay, LED indicator, provisions for mounting, transient protection and housing. Functional Devices RIB T series or equal.
 2. Where manual override is required provide with a Hand-Off-Auto switch.
 3. Provide internal separation between class 1 and class 2 wiring including separate wire ways or nipples.
 4. UL listed.

2.8 Gauges and Indicators

- A. Panel Display:
 1. 4-20ma signal input. 3-1/2 digit LED display, 3/32 DIN compatible, scalable to appropriate engineering units.
- B. Differential Pressure - Air:
 1. Diaphragm actuated 4-3/4 inches O.D. dial with magnetically coupled needle, ± 2 percent accuracy full scale. Scale range to match sensor or switch.

2.9 Control Valves

- A. Two-way straight through hot water and chilled water control valves: Single seated with polished stainless steel stem, spring loaded teflon packing, equal percentage V-port throttling characteristics, and fully rated for 125 PSIG with 240 deg F fluid temperature.
- B. Three-way mixing hot water and chilled water control valves: Polished stainless steel stem, spring loaded teflon packing, constant total flow over full plug travel characteristics, and fully rated for 125 PSIG with 240 deg F fluid temperature.
- C. Finned tube radiation control valves: Forged brass body, stainless steel base plate and bearing plate, chrome plated brass stem, paddle and stem seal assembly compatible with heating system fluid, fully rated for 125 PSIG, 200 deg F fluid temperature. Powerhead replaceable without removal of valve body from system. Powerhead secured to valve body with machine screws and sealed with O ring.
- D. Sizing: Modulating control valves shall be correctly selected for service and flow of system served. A pressure drop of 3 psi shall be used as a sizing guideline unless specifically noted otherwise in project documents. Two position shutoff valves shall be

line size. Valves shall be constructed for tight shutoff and shall have minimum close of pressure rating greater than maximum system pump head pressure.

- E. Provide valves that do not require removal of valve body from pipe to replace packing.

2.10 Damper and Valve Actuators

A. General:

1. Where exposed to outdoor air or air temperatures lower than 50 deg F provide completely weatherproof actuators with internal heaters to allow normal operation at minus 50 deg F.
2. Provide spring return to normal position type actuators except at fin tube radiation valves and variable air volume terminal units where fail to last position actuators are acceptable.
3. Provide actuators of the following signal types:
 - a. Modulating Electronic Actuators. Actuator to convert electronic 1-10VDC or 4-20mA analog signal to a linear, positive positioning stroke. Provide actuators that utilize less than 8VDC or 14ma signal range with linear potentiometer feedback to controller, incorporated into control loop programming. Provide modulating electronic actuators for modulating control except as indicated.
 - b. Tri-State Reversing Electric Actuators. Actuator to reverse or hold position depending on contact closure state. Provide with linear potentiometer feedback to controller, incorporated in control loop programming. Tri-state reversing electric actuators may be used for terminal unit and fin tube radiation control.
 - c. Two Position Electric Actuator. Direct mounting actuator to open or close depending on contact closure state.

2.11 Variable Frequency Drives

- A. Scope: Furnish complete Variable Frequency Drives (VFD) for AHU-2 and as specified on the drawings and schedules. All standard and optional features shall be included within the VFD enclosure unless otherwise specified. VFD's shall be equipped with a factory furnished communication interface to allow direct connection to the floor level network of the BAS system via a twisted, shielded pair. The VFD shall reside and be addressed as a floor level network device on the BAS. Coordinate with BAS manufacturer to achieve this functionality.
- B. Construction: The VFD shall include the following basic features:
1. The VFD shall be housed in a NEMA 1 enclosure.
 2. The following operator controls shall be located on the front of the enclosure:
 - a. Run/stop selector switch to start and stop the motor
 - b. Auto/manual selector switch
 - c. Manual speed potentiometer
 - d. Power on pilot light to indicate that VFD being supplied by the power line.

- e. Fault pilot light to indicate that the VFD has tripped on a fault condition
 - f. Digital meter with selector switch to indicate percent speed and % load.
 - g. Volt meter and amp meter.
 - h. Disconnect switch.
- 3. Two sets of Form C, dry contacts to indicate when the VFD is in the run mode.
- 4. Two sets of Form C, dry contacts to indicate when the VFD is in the fault mode.
- 5. When input power returns to normal following a fault trip for undervoltage, overvoltage, or phase loss, the VFD shall automatically restart. The VFD shall not automatically restart following fault trips due to overload or overcurrent.
- 6. Factory minimum-level spare fuse kit.
- 7. Relay for RED signal from motor.
- 8. Input circuit breaker.
- 9. Engraved nameplate with pump or fan designation.
- C. Protective Requirements: The VFD shall include the following protective features:
 - 1. Current limiting semiconductor fused for the power input.
 - 2. Separate overload relay for each motor controlled.
 - 3. Protection against input power undervoltage, overvoltage and phase loss.
 - 4. Protection against output current overload and overcurrent.
 - 5. Protection against overtemperature within the VFD.
 - 6. Protection against overvoltage on the DC bus.
 - 7. Any disconnect switches between VFD and the motor shall include an auxiliary contact interlocked to the VFD fault trip circuit.
 - 8. DC bus discharge circuit for protection of service personnel.
- D. Adjustments: The VFD shall include the following adjustments available via potentiometers inside the enclosure:
 - 1. Maximum speed, adjustable 50-100% base speed.
 - 2. Minimum speed, adjustable 0-50% base speed.
 - 3. Acceleration time, adjustable 2-60 seconds.
 - 4. Deceleration time, adjustable 2-60 seconds with override circuit to prevent nuisance trips if deceleration time is set too short.
 - 5. Current limit, adjustable 1-110%.
- E. Special Requirements: The following special features shall be included in the VFD enclosure. The unit shall maintain its UL or ETL listing:
 - 1. In the automatic mode, the VFD shall be controlled by a speed reference signal from the BAS system via the building level network.
 - 2. Provide one(1) plug-in test meter to provide a quick means for monitoring the different signals within the VFD for start-up and troubleshooting.

3. Where the building walls are not suitable for mounting the VFD, a floor stand kit shall be provided.
 4. Provide drives with "dual speed step-over circuit" to preclude operation at undesired speeds. Two speed set points are to be field adjustable with set point adjustment mounted in the drive.
- F. Quality Assurance: To ensure quality and minimize infantile failures at the job site, the VFD shall be burned in at an ambient of 40 Deg C minimum for at least 24 hours. The VFD shall be operating a dynamometer and the load and speed shall be cycled during the test. All optional and special features shall be functionally tested at the factory for proper operation.
- G. Start-up Service: The manufacturer shall provide start-up service in the form of a factory trained service technician. The service technician shall verify correct installation, start-up the drive and check for proper operation.
- H. Warranty: The VFD shall be warranted by the manufacturer for a period of thirty-six (36) months from the date of shipment. The warranty shall include parts, labor, travel costs, and living expenses incurred by the manufacturer to provide factory-authorized service.
- I. Manufacturer: ABB, model to match existing VFD installed on AHU-1.

2.12 Wiring and Raceways

- A. Provide wiring and raceway complying with the National Electrical Code, Division 26, and State and Local Codes and Ordinances.
- B. Provide wiring and raceway complying with the National Electrical Code, and State and Local Codes and Ordinances.
- C. Raceways:
1. EMT, metal duct, IMC, surface metal raceways, or totally enclosed metal trough with flexible metal tubing unless otherwise noted.
 2. Provide rigid steel conduit raceways when raceway is buried or embedded in concrete.
 3. Provide 18 inches minimum to 36 inches maximum flexible metal conduit of galvanized steel construction for final connection to control devices. For connections to pipe mounted devices, and to devices in damp, wet, or exterior locations, or in mechanical rooms containing boilers or steam converters, provide oil-resistant liquid-tight flexible metal conduit.
 4. Provide EMT connectors with rain tight compression fittings and insulated throats.
 5. Wire mould is generally not allowed except as approved on a case-by-case basis with the owner's representative.
- D. Wiring:
1. Provide wire with copper stranded conductors. Provide color or number coded jackets.

2. Low voltage wiring from control components to input/output modules: 20 gauge minimum foil-shielded cable rated 100 VDC at 80 deg C.
3. Provide plenum rated cable whenever wire is run without conduit.
4. Provide communications network wiring meeting the gauge, impedance, capacitance, resistance and shielding requirements specified by the manufacturer of the connected devices.
5. Identify wires and cables with permanent self-laminating machine print labeling system. Provide labels capable of receiving 8 characters of type written text, with minimum print on area of 1 inch by 1/2 inch, and protected by a clear sheath.
6. Support or bundle wire with self locking, UL listed cable ties. Provide 40 lb rated cable ties incorporating a stainless steel locking insert. Provide UL 94V-0 flammability rated, halar cable ties when installed without panel enclosure.
7. Provide cable tie anchors designed for mechanical anchoring, allowing removal of cable tie without removal of anchor, capable of accepting at a minimum a number 8 screw. Adhesive cable tie anchors are allowed only on the interior surface of panel doors.

2.13 Panels

A. General:

1. UL listed, not over 24 inches wide by 42 inches high, constructed of 14 U.S.S gauge steel except that enclosures less than 20 inches in both dimensions may be 16 gauge. Provide multi-section or multiple individual panels as required. Hoffman or equal.
2. Equipped with subpanels, as necessary.
3. Provide track mounted terminals with integral permanent labeling system. Integral screws for securing connected wires. Voltage and amperage ratings to match terminated wire ratings.
4. Provide nylon insulated crimp connectors with voltage and amperage rating matching connected wire ratings unless terminal strip is designed to connect to connected wire type without using a crimp connector.
5. Indicating lamps on panel shall be long life type, rated for a minimum life of 10,000 hours.

B. Interior Enclosures:

1. Piano hinged front with latch and lock.
2. Baked enamel finish
3. Concealed enclosures may be standard electrical boxes.

2.14 Firestopping

- A. Capable of maintaining an effective barrier against flame, heat, and smoke. Metalines, Dow, 3M, or equal.
- B. Provide installations classified in Underwriter's Laboratories (UL) Building Materials Directory or listed in the Warnock Hersey International Directory.

- C. Paintable where exposed to view.
- D. Waterproof in plumbing chases.
- E. Provide the product of more than one manufacturer if required to provide listed installations throughout.

Part 3 EXECUTION

3.1 General

- A. Modify existing control system devices as indicated. Extend and modify the existing wiring and control system power source to accommodate indicated direct digital control system devices.
- B. Before beginning installation of new system components, test the existing system devices that are being reused in modified control systems for proper operation and report any devices in need of replacement or repair to the Project Manager. At the option of the Project Manager, he will issue a contract amendment to replace or repair the defective devices or he will have Owner maintenance personnel replace or repair the defective devices. The Contractor shall be responsible for providing new devices to replace existing devices that are not brought to the Project Manager's attention before beginning installation of new system components.
- C. Work must comply with industry standards except when more restrictive tolerances or specified requirements indicate more rigid standards. Perform work by persons qualified to produce workmanship of specified quality. If required by the State of Alaska workers shall be licensed. If requested provide copy of license.
- D. Do not install control devices in locations where they are subject to damage or malfunction due to normally encountered ambient temperatures.
- E. Mount damper operators and other control devices secured to insulated ductwork on brackets such that the device is external of the insulation.
- F. Schematics and diagrams, when indicated on the Drawings, show approximate functional relationships and sequences only. All required devices are not shown. Contractor is responsible for providing all components required for a complete functioning system selected to meet the specific functional requirements of each application.
- G. Hard wire control devices. Do not use power line carriers.
- H. Ensure that the direct digital controller network, N2, and power wiring will support both a 10 percent increase in network length, and a 10 percent increase in controllers similar to those installed without having to add additional network repeaters, increase power wire size or circuit breaker capacity.
- I. Unless indicated otherwise, connect the primary sensing input and the associated output for each control loop to the same controller. A secondary or resetting input may be attached to any controller and communicated over the network.
- J. After the final inspection and subsequent punch list inspections provide wiring schematic and Control Drawings with written sequence of operations, 11 inches by 17 inches in size, reduced from the as-built Control Drawings. Provide one copy in each Operation and Maintenance Manual, and one copy laminated in heavy clear plastic, at

- its applicable control panel. Provide one set of backup tapes and disks necessary to restart and reload all programmable devices used in the control system.
- K. Tune control loops to respond quickly to control fluctuations without hunting.
 - L. Label control devices mounted in the field and within control cabinets with 1/4 inch high white embossed letters and black tape background. Dymo or equal. Symbol to match symbol used on Control Drawings.
 - M. Additional work under this contract may be required due to oversights by the owner's specification. This additional work may be requested and authorized by the project manager based on informal estimates in writing, email or otherwise. The contractor shall be requested to breakout hourly rates on the bid schedule for this work by craft and/or discipline.
 - N. Provide digital (.txt, .csv) file of complete tag/block name dictionary of all physical and virtual points used under the physical point list and control logic referenced in Sequence of Operation. This will be used for owner developed graphics.

3.2 Demolition

- A. Remove existing valves, dampers, operators, sensors, and controllers that are replaced by new devices or that are not reused. Present all removed equipment to owner for first right of refusal before disposing of equipment. Review copy of existing system "As-Built" control schematics for existing device location and extent of required demolition.
- B. Patch holes in existing ductwork at removed sensors that are not reused with sheet metal patches of equal gauge or heavier material sheet metal that are seal airtight with adhesive and then screwed or pop riveted to the ductwork.
- C. Existing conduit and wiring may be reused when available and when wiring is rated for application. Remove existing unused conductors.
- D. Demolish unused pneumatic tubing back to main air connection. Plug tubing with brass fittings.
- E. Repairs: Any portion of the facility damaged, cut back or made inoperable shall be repaired with similar materials as the existing structure and/or damaged item as instructed by the DOC Project Manager.

3.3 Shut Down of Existing Systems

- A. This is a Correctional Facility with portions of the building operating 24/7. Schedule any required shutdowns with the Department of Corrections Project Manager. Provide a minimum of 72 hours written notification to the Project Manager before performing any system shutdowns.
- B. This building depends on operation of the ventilation systems for space heating and cooling. During system shutdowns the contractor is responsible for maintaining all spaces within the building at a minimum temperature of 72 deg F. and maximum of 77 deg F.

3.4 Wiring and Raceways

- A. Permanently label electrical or electronic wiring at each end indicating location and the device at opposite end. At the direct digital controller end use either the I/O address, if

- it describes the connected device, or the unique control device tag used on the control schematics. At the device end indicate both the terminal number and the controller connected at the other end. For color coded multi-conductor cable, label cable sheath not individual conductors.
- B. At field devices where conductors are not wired to terminal strips wire using a unique color for each conductor connected to that device.
 - C. Install wiring in a neat and orderly manner generally running along building lines.
 - D. Support low voltage wiring run without conduit at a maximum of 4 feet between anchors.
 - E. Seal conduit penetrations at floor and wall penetrations with firestopping installed as indicated. Note that this applies to all floor and wall penetrations, not just fire barrier penetrations. At all mechanical rooms or other rooms containing floor drains, except those with slab on grade floors, make penetration watertight and extend sleeve 3 inches above the floor.
 - F. Wire all electrical controls and switches furnished under this Section of the Specifications.
 - G. Make wire connections using factory fabricated jack assemblies, terminal strips, or solder connections. Use crimp connectors on stranded wire unless connecting to terminal strips approved for direct stranded wire connection. Insulate solder connections with heat shrink tubing. Field connections in control power wiring circuits may be made using wire nuts.
 - H. Avoid splices in signal wire, where unavoidable connect with solder connections and label on each side of splice. Use identical wire type and color on each side of splice.
 - I. Connect each direct digital controller diagnostic port to an RJ-11 jack on the room sensors. If there are more than one room sensor per controller, connect to one and indicate that sensor on As-builts Drawings.
 - J. Conceal wiring in finished areas. Unless otherwise noted, install wiring inside conduit or fully enclosed metallic raceway.
 - K. Low voltage wiring installed in concealed accessible locations may be run without conduit. Sleeve wiring at wall penetrations.
 - L. Metal raceways crossing expansion joints make provision for 3-way movement. For conduits 1 & 1/2 inch and larger use O-Z type DX fittings, or equal.
 - M. At raceway penetrations of the vapor barrier provide a double splice patch (one on each side of vapor barrier) by cutting a square piece of vapor barrier 12 inches larger on all sides than the pipe. Cut a round hole in the center of the square splice patch, smaller than the pipe, to form a stretched fit. Force the pipe through the splice patch and tape all sides to the vapor barrier and seal the vapor barrier to the pipe at the penetration with an adhesive compatible with the vapor barrier material.
 - N. Securely seal at the warm end, raceways running from a warm area to a cold area. Seal with a silicone not harmful to wire insulation. Ductseal or equal.
 - O. Install all wiring in accordance with National Electrical Code, and State and Local Codes and Ordinances.

3.5 Panels

- A. Provide third party listed panel assemblies.
- B. Mount control devices other than sensors and operators in panels on the panel face and the subpanel surface. Removal of devices shall not require removal of subpanel. Do not mount devices on panel sides.
- C. Wire control devices mounted in control panels through permanently and sequentially labeled terminal strips.
- D. Arrange panels and junction boxes in a clear, logical manner, installed to allow easy servicing and labeling.
- E. Arrange control devices such that inadvertent operation of push-buttons, switches, etc. will not result in a jammed or inoperable system caused by component or device failure.
- F. Arrange push buttons in groups according to type of service, such as starting and stopping of fans, remote temperature indication, etc.
- G. Label panels, control switches, and panel mounted gauges with minimum 1/2 inch high by 1/16 inch thick, black, laminated plastic with white core. "Setonply" by Seton Nameplate Corp. or equal. Engrave with 1/4 inch high characters identifying the switch or gauge by the description indicated on the Control Drawings. Attach labels to panels with mechanical fasteners with a maximum head size of 3/16 inch. Adhesive backing is not sufficient to provide secure mounting.

3.6 Sensors and Switches

- A. Mount room sensors about 48 inches above finished floor, with any operable portion no higher than 48 inches, unless otherwise indicated. Where adjacent to light switches mount at same height as switches to provide a clean horizontally aligned installation unless doing so requires the operable portion to be above 48 inches. Key sensor protection covers identically. Deliver two sets of keys to Owner.
- B. Fill immersion fluid temperature sensor wells with heat conducting compound. At 1-1/2 inches and smaller piping install wells in pipe tees one size larger than line size.
- C. Provide sensors and thermostats installed on exterior surfaces with insulated bases such that actual room temperature not wall surface temperature is sensed.
- D. Provide cast aluminum ventilating, nonbreakable shields and mounting brackets for sensors which are indicated to have protective covers.
- E. Provide averaging sensors in air handling unit casings or in areas where stratification is likely to occur. Provide averaging element of sufficient length to accurately indicate the average duct temperature.
- F. Protect averaging or capillary tubes where they penetrate duct with rubber grommet and seal with clear silicon. Support averaging or capillary tubes with copper capillary clips which maintain a minimum tubing bend radius of 1 inch.
- G. Wherever a panel mounted display is indicated provide sensor with an associated 4-20ma transmitter. Provide an associated 4-20ma panel mounted display and label indicating point name and engineering units.

3.7 Control Power Supply

- A. Provide electric power to control devices from control system power circuit or from device or equipment being controlled.
- B. Carry a dedicated ground wire to controllers from the associated breaker panel. Do not use the conduit system for grounding purposes.
- C. Provide UPS power supply at all control panels.

3.8 Testing and Adjusting

- A. Upon completion of the installation start up the system, perform necessary testing and run diagnostics, and adjust the system to ensure proper operation.
- B. Coordinate the final adjustments and "fine tuning" of control functions and devices so that the building, the mechanical systems, and the control systems operate and respond as an integrated comfortable and energy efficient component of this facility.
- C. Upon completion of start up test existing smoke detectors to ensure fan shutdown. Note that test of circuitry is sufficient.

3.9 Special Tools and Spare Parts

- A. Provide one set of special tools required to adjust control devices. This includes allen wrenches and other special tools. This does not include common tools such as pliers, adjustable wrenches, flat blade or Phillips screwdrivers. This set shall be provided during Owner instruction period and proper use shall be demonstrated to Owner personnel during said period.
- B. Provide five (5) spares of each size fuse and two (2) spares of each size panel lamp used in the mechanical control system. Spares to be turned over to Owner at time of Owner instruction.

3.10 Database Archival and Upgrade

- A. Provide a complete database backup CD for the building management system and each direct digital controller to the Owner at final inspection. If software modifications are required during the warranty period update CD.

3.11 Orientation and Training

- A. Provide 16 hours of on-site orientation and training to Owner personnel designated by the Project Manager. Orientation and training sessions shall be conducted by a factory trained manufacturers representative familiar with the systems software, hardware, and accessories. Limit training time per day to 4 hours. Complete training and orientation according to the following schedule:
 - 1. 8 hours of instruction after acceptable performance of the system hardware and software has been established and prior to final inspection.
 - 2. 8 hours of instruction six months after final inspection.
- B. Submit proposed training dates and instruction session course outlines for acceptance by Project Manager.

- C. Provide instructions on the all the operations listed in the initial course outline during the first 4 hour training session. On subsequent sessions communicate in advance with facility supervisor to determine which operations require additional instruction.
- D. Initial course outline:
 - 1. Determine the control strategies that have been defined for a specific piece of equipment.
 - 2. Utilize X-Y graphing and histories as an aid for control loop tuning.
 - 3. Enable or disable control strategies.
 - 4. Assign sensors and/or actuators to a control strategy.
 - 5. Simulate control strategies with substituted inputs or outputs.
 - 6. Define appropriate control loop algorithms and choose optimum loop parameters for loop control.
 - 7. Add/delete control loops to the system.
 - 8. Add/delete points to the system.
 - 9. Label parameters and variables with names or acronyms of a minimum of eight letters.
 - 10. Select points to be alarmable and define the alarm state(s).
 - 11. Download programming to the system after all direct digital controllers and building management station program memory has been lost.
 - 12. Process stored historical data and display and printout data in tabular and graphical formats.
 - 13. Diagnose system malfunctions.
 - 14. Change system operating sequences

3.12 Final Inspection Requirements

- A. Final inspection data must be submitted for review, reviewed by the DOC Project Manager, corrected in accordance with review comments, and accepted by the DOC Project Manager before a request for final or substantial completion inspection will be considered by the DOC Project Manager.
- B. Prior to the final inspection, review and test entire installation for conformance with contract documents. Test shall include thorough field check of sequence of operations for each system and piece of equipment including simulation of all possible modes of operation. With the call for inspection, verify in writing that this system review and test has been performed and anything not conforming to contract documents shall be so noted.
- C. During inspection Contractor personnel shall provide on-site assistance to inspection personnel required for a complete and thorough inspection.
- D. During inspection Contractor personnel shall demonstrate that the control system performs in accordance with the contract documents. Provide material and personnel required to perform the demonstration.

End of Section 23 09 23

Section 23 09 93 - Sequence of Operation

Part 1 GENERAL

1.1 Section Includes

- A. Heating Glycol.
- B. Glycol Storage Tank.
- C. Duct Heating Coils.
- D. Administrative Air Handling Unit.

1.2 Related Sections

- A. Section 23 05 00 – Common Work Results for HVAC.
- B. Section 23 21 23 – Hydronic Pumps.
- C. Section 23 31 00 - HVAC Ducts and Casings.
- D. Section 23 52 23 - Cast Iron Boilers.
- E. Section 23 82 16 - Air Coils.
- F. Section 23 09 23 - Direct Digital Control System.

1.3 System Description

- A. This Section defines the manner and method by which controls function. Requirements for each type of control system operation are specified. Equipment, devices, and system components required for control systems are specified in other Sections.

1.4 Submittals

- A. Submit under provisions of Division 01.
- B. Submit diagrams indicating mechanical system controlled and control system components. Label with settings, adjustable range of control and limits. Include written description of control sequence.
- C. Include flow diagrams for each control system, graphically depicting control logic.
- D. Include draft copies of graphic displays indicating mechanical system components, control system components, and controlled function status and value.

1.5 Project Record Documents

- A. Submit documents under provisions of Division 01.
- B. Accurately record actual setpoints and settings of controls, including changes to sequences made after submission of shop drawings.

Part 2 PRODUCTS - Not Used

Part 3 EXECUTION

3.1 Heating Glycol Control (B-1, B-2, BP-1, BP-2, CP-1, CP-2, CP-3, HXP-1, and Existing Heat Exchanger)

A. Alarms:

1. B-1 and B-2 Low Supply Water Temperature.
2. Low Building Return Water Temperature.
3. Heat Exchanger low discharge temperature.
4. Low system pressure.
5. CP-1, CP-2, CP-3 Pump Fail.
6. CP-1, CP-2, CP-3 VFD Fault.
7. HXP-1 Pump Fail.

B. Manual Control and Indication:

1. B-1 and B-2 H-O-A Control.
2. B-1 and B-2 HGS temperature indication.
3. B-1 and B-2 HGR desired temperature adjustment.
4. Boiler lead-lag selection.
5. Boiler lead-lag indication.
6. Boiler lead/lag alternator setting.
7. Main hydronic loop HGS/HGR temperature indication.
8. Main hydronic loop HGS/HGR pressure indication.
9. Heat Exchanger HXGS/HXGR temperature indication.
10. HXP-1 H-O-A Control.
11. HXP-1 On-Off Indication.
12. CP-1, CP-2, CP-3 H-O-A Control
13. CP-1, CP-2, CP-3 On-Off Indication.
14. CP-1, CP-2, CP-3 Speed.
15. Outdoor temperature reset adjustment.
16. Alarm setpoints.

C. Automated Control:

1. Hydronic Loop Temperature: The existing waste heat exchanger will serve as the primary source of heat for the building. When the outside air temperature drops below 65 F (adjustable) the heat exchanger circulation pump HPX-1 and building circulation pumps CP-1, CP-2, and/or CP-3 will turn on. In the event that the waste heat exchanger is not supplying adequate heat to the building, the boiler controller will operate the boilers and boiler pumps to maintain the building loop temperature. The boilers and boiler pumps shall start, stop, and the burners shall stage to maintain the main hydronic loop temperature. The

boiler control panel will alternate the boilers between lead-lag every 200 hours (adjustable).

2. The main hydronic loop desired temperature shall be reset based on adjustable outside temperature. Initial settings as follows:

Outside Temperature	Loop HGS Temperature
0° F	190° F
60° F	150° F

3. Building Circulation Pump Control:
 - a. The lead pump variable frequency drive will modulate to maintain 15 psi (adjustable) as measured by pump integral pressure sensor. When the lead pump speed reaches 90% speed (adjustable) the first lag pump will start and both pumps will operate at the same speed to meet the pressure setpoint. When the lead and first lag pump speeds reach 90% the second lag pump will start and all pumps will operate at the same speed to meet the pressure setpoint. When the lag pump speeds drop to 50%, they will reverse the cascade sequence in the same order they turned on.
 - b. Upon failure of the lead pump, the first lag pump shall operate. Upon failure of the first lag pump the second lag pump shall operate. Lead/lag pump operation shall alternate every 200 hours rotating between all three pumps.

3.2 Glycol Storage Tank

- A. Alarms:
 1. Low fluid level.
- B. Digital Control and Monitoring:
 1. Alarms.
- C. Automated Control:
 1. The control panel supplied with the glycol tank will provide an alarm via dry contact for low fluid level in the tank.

3.3 Duct Heating Coils

- A. Alarms:
 1. Low space temperature.
- B. Digital Control and Monitoring:
 1. Space temperature setpoint.
 2. Space temperature indication.
 3. Control valve position.
 4. Coil supply air temperature indication.

C. Automated Control:

1. The reheat coils are controlled by an application specific DDC controller using electric actuation. The space served by the coil is controlled in Occupied and Unoccupied modes as follows:
 - a. Occupied: The controller monitors the room temperature sensor and modulates the heating valve to maintain the space temperature at set point.
 - b. Unoccupied: The reheat coil is controlled using the Unoccupied space temperature set point. The controller may reset to the Occupied mode for a predetermined time period upon a signal from the control system or manually at the room sensor.

3.4 Administration Air Handling Unit (AHU-2)

A. Alarms:

1. Low S/A temperature (50° F adjustable).
2. Filter high differential pressure.
3. Freeze alarm.
4. Smoke detection.

B. Digital Control and Monitoring:

1. H-O-A control.
2. On-off indication
3. Outside temperature reset adjustment.
4. Speed indication (% of full load).
5. O/A temperature setpoint.
6. O/A temperature indication.
7. S/A temperature setpoint.
8. S/A temperature indication.
9. M/A temperature setpoint.
10. M/A temperature indication.
11. R/A temperature indication.
12. Heating coil control valve position.
13. Filter differential pressure.
14. Morning warmup S/A setpoint.
15. Morning warmup R/A setpoint.
16. Schedule override request.
17. Alarm setpoints.

C. Automated Control:

1. Operation Mode: Day and night mode of operation will be controlled by a seven (7) day programmable schedule.
2. Morning Warmup: At the beginning of day mode, fan starts at 100% R/A and 85% fan speed. Heating coil modulates to maintain 80° F (adjustable) S/A setpoint. When R/A temperature rises to 65° F (adjustable) the system will switch to day mode operation. Optimum start/stop programming with historical multiplier shall be utilized to determine exact start up time to meet daytime setpoint in the building per the owner's schedule.
3. Day mode operation:
 - a. The O/A dampers shall be set for a 30% minimum position. Fan speed shall be set for 60% of full load.
 - b. The S/A temperature sensor will modulate the O/A dampers, R/A dampers and heating coil control valve in sequence to maintain supply temperature setpoint. M/A minimum temperature setpoint of 45 deg. F. When O/A damper is 100% open fan speed will increase up to 100% of full load to meet the cooling demand. Supply temperature setpoint shall be set to maintain the zone with the greatest cooling demand. Provide cooling with dry bulb economizer operation.
 - c. On low temperature alarm (initially 40° F, adjustable), sensed with S/A sensor, the fan shall stop, O/A dampers will fully close, R/A dampers will fully open, heating valve control valve will go to full open. Provide automatic reset.
 - d. Air handling unit smoke detector shall be wired directly to the addressable fire alarm system. Air handling unit fan motor starter shall be connected to the fire alarm system to stop fan motor on alarm. DDC system shall verify fan shut down and shall close the outside air damper and shut down respective relief fans and close the motorized dampers. Coordinate with Division 26. Detection of smoke at the air handling unit smoke detector shall shut down AHU-2.
 - e. Night mode operation: During night mode of operation the fan shall be off, O/A damper shall be fully closed, R/A damper fully open.

End of Section 23 09 93

Section 23 11 13 - Facility Fuel-Oil Piping

Part 1 GENERAL

1.1 Work Included

- A. Fuel Oil Piping - Above Ground.
- B. Unions and Flanges.
- C. Valves.
- D. Pipe Hangers and Supports.
- E. Relief Valves.
- F. Strainers.
- G. Flexible Connectors.
- H. Fuel Oil Dearator / Filter.

1.2 Related Work

- A. Section 23 05 00 - Common Work Results for HVAC.
- B. Section 23 05 93 - Testing, Adjusting, and Balancing for HVAC.
- C. Section 23 52 23 - Cast Iron Boilers.

1.3 References

- A. American Society of Mechanical Engineers:
 - 1. ASME B16.3 - Malleable Iron Threaded Fittings.
 - 2. ASME B31.1 - Power Piping.
 - 3. ASME B31.9 - Building Services Piping.
 - 4. ASME B36.10M - Welded and Seamless Wrought Steel Pipe.
 - 5. ASME Section IX - Boiler and Pressure Vessel Code - Welding and Brazing Qualifications.
- B. ASTM International:
 - 1. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
 - 2. ASTM F708 - Standard Practice for Design and Installation of Rigid Pipe Hangers.
- C. American Welding Society:
 - 1. AWS A5.8 - Specification for Filler Metals for Brazing and Braze Welding.
 - 2. AWS D1.1 - Structural Welding Code - Steel.
- D. International Mechanical Code – IMC, latest adopted edition.
- E. National Fire Protection Association:
 - 1. NFPA 30 - Flammable and Combustible Liquids Code.

2. NFPA 31 - Standard for the Installation of Oil-Burning Equipment.
- F. Underwriters Laboratories Inc.:
 1. UL 567 - Pipe Connectors for Flammable Liquids and Combustible Liquids and LP-Gas.
 2. UL 842 - Valves for Flammable Fluids.
 3. UL 913 - Intrinsically Safe Apparatus and Associated Apparatus for Use in Class I, II, and III, Division 1, Hazardous Locations.

1.4 Submittals

- A. Submittal Procedures under provisions of the Division 01.
- B. Product Data:
 1. Piping: Submit data on pipe materials, fittings, and accessories. Submit manufacturers catalog information.
 2. Valves: Submit manufacturer's catalog information with valve data and ratings for each service.
 3. Fuel Piping Specialties: Submit manufacturer's catalog information including capacity, rough-in requirements, and service sizes.
- C. Test Reports: Submit written test results for piping system pressure test.
- D. Manufacturer's Installation Instructions: Submit piping system, piping accessories and Tank Inventory and Leak Detection System

1.5 Closeout Submittals

- A. Project Record Documents: Record actual locations of valves, piping system, and system components.
- B. Project Record Documents: Record actual locations of piping mains with invert elevations and valves.
- C. Operation and Maintenance Data under provisions the Division 01.

1.6 Quality Assurance

- A. Perform Work in accordance with NFPA 31.
- B. Perform Work in accordance with authority having jurisdiction.

1.7 Qualifications

- A. Installer: Company specializing in performing work of this section with minimum three years documented experience or approved by manufacturer.

1.8 Delivery, Storage, and Handling

- A. Deliver, store and handle under the provisions of the Division 01.
- B. Accept valves on site in shipping containers with labeling in place. Inspect for damage.

- C. Protect piping and fittings from soil and debris with temporary end caps and closures. Maintain in place until installation.

1.9 Environmental Requirements

- A. Under the provisions of the Division 01.
- B. Do not install underground piping when bedding is wet or frozen.

1.10 Field Measurements

- A. Verify field measurements prior to fabrication.

1.11 Warranty

- A. Under the provisions of the Division 01.

Part 2 - PRODUCTS

2.1 Fuel Oil Piping – Above Ground

- A. Steel Pipe: ASTM A53/A53M or ASME B36.10M Schedule 40 black.
 - 1. Fittings: ASME B16.3, malleable iron.
 - 2. Joints in Mechanical Room: Threaded for pipe 2 inch and smaller or Viega MegaPress.

2.2 Unions

- A. Class 150, malleable iron, threaded.

2.3 Gate Valves

- A. No allowed.

2.4 Globe Valves

- A. Not Allowed.

2.5 Ball Valves

- A. 1/4 inch to 1 inch: MSS SP 110, Class 125, two-piece, threaded ends, bronze body; chrome plated bronze ball, reinforced Teflon seats, blow-out proof stem, lever handle, UL 842 listed for flammable liquids and LPG, full port.

2.6 Check Valves

- A. Swing Check Valves
 - 1. 2 inches and Smaller: MSS SP 80, Class 150, bronze body and cap, bronze seat, Buna-N disc, threaded ends.
- B. Spring Loaded Check Valves:
 - 1. 2 inches and Smaller: MSS SP 80, Class 150 bronze body, in-line spring lift check, silent closing, Buna-N disc, integral seat, threaded ends.

2.7 Hangers and Supports

- A. Conform to NFPA 31.
- B. Hangers for Pipe Sizes 1/2 to 1-1/2 inch: Malleable iron or Carbon steel, adjustable swivel, split ring.

2.8 Flexible Connectors

- A. Manufacturers:
 - 1. Flex-Hose Co., Inc.
 - 2. Flex-Weld, Inc.
 - 3. The Metraflex Company.
 - 4. Substitutions: Under the provisions of the Division 01.
- B. 2 inches and Smaller: Corrugated Type 304 stainless steel inner hose with single layer of Type 304 stainless steel exterior braiding. Maximum working pressure 200 psig.

2.9 Acceptable Manufacturer – De-Aerator / Filter

- A. Tigerholm.
- B. Substitutions: None.

2.10 De-Aerator Fuel Filters

- A. UL listed fuel oil de-aerator, converts single pipe supply to two-pipe system complete with fusible valve and integral fuel filter, Tigerholm Tigerloop Combi.

Part 3 - EXECUTION

3.1 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.

3.2 Installation - Pipe Hangers and Supports

- A. Install hangers and supports in accordance with ASTM F708, MSS SP 69 and MSS SP 89.
- B. Install hangers to provide minimum 1/2 inch space between finished covering and adjacent work.
- C. Place hangers within 12 inches of each horizontal elbow.
- D. Install hangers to allow 1-1/2 inch minimum vertical adjustment. Design hangers for pipe movement without disengagement of supported pipe.
- E. Where installing several pipes in parallel and at same elevation, provide multiple pipe hangers or trapeze hangers.
- F. Provide clearance in hangers and from structure and other equipment for installation of insulation and access to valves and fittings.

3.3 Installation – Aboveground Piping

- A. Install fuel oil piping in accordance with IMC and NFPA 31.
- B. Route piping in orderly manner and maintain gradient.
- C. Install piping to conserve building space and not interfere with use of space.
- D. Group piping whenever practical at common elevations.
- E. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment.
- F. Sleeve pipe passing through partitions, walls and floors. Refer to Section 23 05 00.
- G. Install fire stopping at fire rated construction perimeters and openings containing penetrating sleeves and piping.
- H. Provide clearance for installation of insulation and access to valves and fittings.
- I. Provide access where valves and fittings are not exposed.
- J. Where pipe support members are welded to structural building framing, scrape, brush clean, weld, and apply one coat of zinc rich primer.
- K. Install identification on piping systems Refer to Section 23 05 00.
- L. Install valves with stems upright or horizontal, not inverted.
- M. Protect piping systems from entry of foreign materials by temporary covers, completing sections of the Work, and isolating parts of completed system.

End of Section 23 11 13

Section 23 21 13 – Hydronic Piping

Part 1 GENERAL

1.1 Work Included

- A. Pipe and Pipe Fittings.
- B. Valves.
- C. Heating Water Piping System.
- D. Glycol Water Piping System.

1.2 Related Work

- A. Section 23 05 00 - Common Work Results for HVAC.
- B. Section 23 05 19 – Meters and Gages for HVAC Piping.
- C. Section 23 07 00 - HVAC Insulation.
- D. Section 23 09 23 - Direct Digital Control System for HVAC.
- E. Section 23 21 16 - Hydronic Specialties.
- F. Section 23 21 23 - Hydronic Pumps.
- G. Section 23 52 23 - Cast Iron Boilers.
- H. Section 23 73 00 - Indoor Central Air-Handling Units.

1.3 Regulatory Requirements

- A. Conform to ANSI/ASME B31.9.

1.4 Quality Assurance

- A. Valves: Manufacturer's name and pressure rating marked on valve body.
- B. Welding Materials and Procedures: Conform to ANSI/ASME SEC 9, and applicable state labor regulations.
- C. Welders Certification: In accordance with ANSI/ASME SEC 9.

1.5 Submittals

- A. Submit product data under provisions of Division 01.
- B. Include data on pipe materials, pipe fittings, valves, and accessories.
- C. Include welders certification of compliance with ANSI/ ASME SEC 9.

1.6 Warranty

- A. Polypropylene pipe and fittings shall be covered by a factory warranty for 30 years to be free of defects in materials or manufacturing.

1.7 Delivery, Storage, and Handling

- A. Deliver products to site under provisions of Division 01.

- B. Store and protect products under provisions of Division 01.
- C. Deliver and store valves in shipping containers with labeling in place.

Part 2 PRODUCTS

2.1 Heating Water and Glycol Piping, Above Ground

- A. Steel Pipe: ASTM A53, Schedule 40, for sizes 4 inch and over, black.
 - 1. Fittings: ANSI/ASTM B16.3, malleable iron or ASTM A234, steel welding type fittings.
 - 2. Joints: Screwed, or ANSI/AWS D1.1, welded.
- B. Copper Tubing: ASTM B88, Type L, hard drawn.
 - 1. Fittings: ANSI/ASME B16.50 Wrought Copper and Copper Alloy Braze-Joint Pressure Fittings.
 - 2. Joints: ASTM B32, solder, Grade 95TA or ANSI/AWS A5.8, BCuP silver braze; Flux: ASTM B813. Brazed required for piping 2" and larger.
 - 3. Press Fittings: Viega ProPress Fittings are allowed. Sealing elements for press fittings shall be EPDM. Sealing elements shall be factory installed or an alternative supplied by fitting manufacturer. Press end shall have Smart Connect feature design leakage path. Smart Connect™ (SC Feature) In ProPress ½" to 4" dimensions the Smart Connect Feature assures leakage of liquids and/or gases from inside the system past the sealing element of an un-pressed connection. The function of this feature is to provide the installer quick and easy identification of connections which have not been pressed prior to putting the system into operation.
- C. Polypropylene Pipe (PP-RCT):
 - 1. Polypropylene (PP-RCT) piping in SDR 11 [SDR 7.3] [SDR 9] [SDR 17] in accordance with *ASTM F2389*.
 - 2. Pipe and fittings shall be manufactured from a beta crystalline PP-RCT resin meeting the short-term properties and long-term strength requirements of ASTM F 2389 and CSA B137.11. The piping shall be extruded with a middle layer that has glass fiber content to restrict thermal expansion.
 - 3. Fittings shall be manufactured from a PP-RCT resin meeting the short-term properties and long-term strength requirements of ASTM F 2389. All fittings shall comply with NSF 14, ASTM F 2389 and CSA B137.11. Fittings may be either socket fusion through nominal 5 inch, electrofusion through 8 inch or butt fusion in nominal 2 inch through 24 inch sizes. Electrofusion may also be performed in nominal sizes 10 inch through 24 inch by means of the use of electrofusion couplings as applied on butt fusion fittings and pipe.
 - 4. Valves shall be manufactured in accordance with pipe and fitting specifications and shall comply with the performance requirements of ASTM F 2389 and CSA B137.11.

5. Where pipe will be exposed to direct UV light for more than 30 days, it shall be provided with a Factory applied, UV-resistant coating or alternative UV protection.

2.2 Equipment Drains and Overflows

- A. Copper Tubing: ASTM B88, Type L, hard drawn.
 1. Fittings: ANSI/ASME B16.18 cast bronze, or ANSI/ASME B16.29 solder wrought copper.
 2. Joints: ASTM B32, solder, Grade 95TA or ANSI/AWS A5.8, BCuP silver braze; Flux: ASTM B813.
- B. PVC Pipe: ASTM D1785, Schedule 40, and Schedule 80 for sizes 8 inch and larger, or ASTM D2241, SDR 21 or 26.
 1. Fittings: ASTM D2466 or D2467, PVC.
 2. Joints: ASTM D2855, solvent weld.
- C. ABS Pipe: ASTM D2680 or D2751.
 1. Fittings: ASTM D2751.
 2. Joints: ASTM D2235, solvent weld.

2.3 Flanges, Unions, and Couplings

- A. Pipe Size 2 Inches and Under: 150 psig malleable iron unions for threaded ferrous piping; bronze unions for copper pipe, soldered joints.
- B. Pipe Size Over 2 Inches: 150 psig forged steel slip-on flanges for ferrous piping; bronze flanges for copper piping.
- C. Grooved and Shouldered Pipe End Couplings: Malleable iron housing clamps to engage and lock, designed to permit some angular deflection, contraction, and expansion; C-shape elastomer composition sealing gasket for operating temperature range from -30° F to 230° F; steel bolts, nuts, and washers; galvanized couplings for galvanized pipe.

2.4 Gate Valves

- A. Gate valves will not be permitted. Use ball or butterfly valves for isolation.

2.5 Globe Valves

- A. Globe valves will not be permitted. Use ball or butterfly valves for throttling.

2.6 Acceptable Manufacturers – All Valve Types

- A. Apollo.
- B. Crane.
- C. FNW.
- D. Hammond.
- E. Milwaukee.

- F. NIBCO.
- G. Red-White Valve Corp.
- H. Substitutions: Under provisions of Division 01.

2.7 Ball Valves

- A. Up to 2 Inches: 600 PSI CWP Bronze two piece body, full port, forged brass, chrome plated ball, Teflon seats and stuffing box ring, lever handle, solder or threaded ends. Seat material to be compatible with fluid handled.
- B. Over 2 Inches: Cast steel, two piece body, full port chrome plated steel ball, Teflon seat and stuffing box seals, lever handle, flanged. Seat material to be compatible with liquid handled.

2.8 Plug Cocks

- A. Up to 2 Inches: Bronze body, bronze tapered plug, non-lubricated, Teflon packing, threaded ends, with one wrench operator for every ten plug cocks.
- B. Over 2 Inches: 285 CWP Cast iron body and plug, pressure lubricated, Teflon packing, flanged ends, with wrench operator with set screw.

2.9 Butterfly Valves

- A. Over 2 Inches: 200 PSI CWP Ductile iron body, aluminum bronze disc, EPDM seat for service to 250° F, lug ends, extended neck, 10 position lever handle.

2.10 Swing Check Valves

- A. Up to 2 Inches: Bronze 45° swing disc, solder ends.
- B. Over 2 Inches: Iron body, bronze trim, 45° swing disc, renewable disc and seat, flanged ends.

2.11 Spring Loaded Check Valves

- A. Iron body, bronze trim, stainless steel spring, renewable composition disc, screwed, wafer or flanged ends.

2.12 Relief Valves

- A. Bronze body, Teflon seat, stainless steel stem and springs, automatic, direct pressure actuated, capacities ASME certified and labeled.

2.13 Hydronic System Cleaner

- A. Acceptable Products:
 - 1. CH2O Boil Out Liquid
 - 2. Oatey Hercules Boiler and Heating System Cleaner.

Part 3 EXECUTION

3.1 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.
- D. After completion, fill, clean, and treat systems.

3.2 Installation

- A. Route piping in orderly manner, plumb and parallel to building structure, and maintain gradient.
- B. Install piping to conserve building space, and not interfere with use of space and other work.
- C. Group piping whenever practical at common elevations.
- D. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment. Refer to Section 23 05 00.
- E. Provide clearance for installation of insulation, and access to valves and fittings.
- F. Provide access where valves and fittings are not exposed.
- G. Slope piping and arrange systems to drain at low points. Use eccentric reducers to maintain top of pipe level.
- H. Where pipe support members are welded to structural building framing, scrape, brush clean, and apply one coat of zinc rich primer to welding.
- I. Prepare pipe, fittings, supports, and accessories for finish painting. Refer to Division 09.
- J. Install valves with stems upright or horizontal, not inverted.
- K. Support all piping in accordance with International Mechanical Code and Manufacturer installation instructions. Where there is a conflict between requirements of the Mechanical Code and Manufacturer installation instructions, the more restrictive requirement shall apply.
- L. Polypropylene piping shall not be installed in any locations used as a return air plenums. Transition to copper or steel piping prior to routing piping through a return air plenum.
- M. Fusion Welding of Joints for Polypropylene Piping:
 - 1. Install fittings and joints using socket-fusion, electrofusion, or butt-fusion as applicable for the fitting or joint type. All fusion-weld joints shall be made in accordance with the pipe and fitting manufacturer's specifications and product standards.
 - 2. Fusion-weld tooling, welding machines, and electrofusion devices shall be as specified by the pipe and fittings manufacturer.
 - 3. Prior to joining, the pipe and fittings shall be prepared in accordance with ASTM F 2389 and the manufacturer's specifications.

4. Joint preparation, setting and alignment, fusion process, cooling times and working pressure shall be in accordance with the pipe and fitting manufacturer's specifications.

3.3 Application

- A. Use grooved mechanical couplings and fasteners only in accessible locations.
- B. Install unions downstream of valves and at equipment or apparatus connections.
- C. Install brass male adapters each side of valves in copper piped system. Sweat solder adapters to pipe.
- D. Install ball or butterfly valves for shut-off and to isolate equipment, part of systems, or vertical risers.
- E. Install ball or butterfly valves for throttling, bypass, or manual flow control services.
- F. Provide spring loaded check valves on discharge of condenser water pumps.
- G. Provide $\frac{3}{4}$ inch ball drain valves at main shut-off valves, low points of piping, bases of vertical risers, and at equipment.

3.4 Cleaning of the Hydronic System

- A. Cleaning scope shall only apply to the new work performed under this contract.
- B. Prior to starting work, verify system is complete. Thoroughly flush and drain the system. Clean all strainer baskets and start-up screens on pump suction diffusers. Re-install strainer baskets and start-up screens and refill system.
- C. Fill the hydronic piping systems with the system cleaner in accordance with cleaning compound directions for use.
- D. Boil out system for a minimum period of four (4) hours or as recommended by system cleaner start-up instructions at a system design operating temperature.
- E. Upon completion of boil out, completely flush system and drain all low points. Remove and clean and re-install all strainer baskets. Remove start-up screens on pump suction diffusers.
- F. Fill system with glycol as indicated on the plans. Feed water to system through make-up line with pressure regulator, venting system high points. Set to fill at 12 psig. Pressure system cold at 5 psig, adjust when hot to 12 psig. See Specification Section 23 21 16 for glycol fill procedures.
- G. Submit a written and signed statement to the Owner that the above referenced cleaning procedures have been completed.

3.5 Testing

- A. Test all heating water and glycol piping hydrostatically at 100 psig or 150 percent of working pressure, whichever is greater, for a period of 4 hours. Observe piping during this period and repair all leaks.

End of Section 23 21 13

Section 23 21 16 – Hydronic Specialties

Part 1 GENERAL

1.1 Work Included

- A. Expansion Tanks.
- B. Air vents.
- C. Strainers.
- D. Pump Suction Fittings.
- E. Combination Pump Discharge Valves.
- F. Balance valves.
- G. Relief valves.
- H. Glycol specialties.
- I. Hydraulic separators.
- J. Brazed Plate Heat Exchangers

1.2 Related Work

- A. Section 23 21 13 - Hydronic Piping.

1.3 References

- A. ANSI/ASME - Boilers and Pressure Vessels Code.

1.4 Regulatory Requirements

- A. Conform to ANSI/ASME Boilers and Pressure Vessels Code Section 8D for manufacture of tanks.
- B. Handle and dispose of hydronic glycol in accordance with local, state, and federal requirements, and project specifications.

1.5 Quality Assurance

- A. Manufacturer: For each product specified, provide components by same manufacturer throughout.

1.6 Submittals

- A. Submit product data under provisions of Division 01 and Section 23 05 00.
- B. Submit design data in sufficient detail to verify that heat exchangers meet or exceed specified requirements.
- C. Submit heat exchanger mounting rack design from contractor for engineer approval.

1.7 Delivery, Storage, and Handling

- A. Deliver products to site under the provisions of Division 01.
- B. Store and protect new and existing products under the provisions of Division 01.

1.8 Extra Stock

- A. Provide one extra 55 gallon drum of premixed 50/50 propylene glycol and water.

Part 2 PRODUCTS

2.1 Expansion Tanks

- A. Amtrol.
- B. Taco.
- C. Bell & Gossett.
- D. Substitutions: Under provisions of Division 01.

2.2 Expansion Tanks

- A. Construction: Welded steel, tested and stamped in accordance with Section 8D of ANSI/ASME Code; supplied with National Board Form U-1, rated for working pressure of 125 psig, with flexible EPDM diaphragm sealed into tank, and steel mounting base.
- B. Accessories: Pressure gauge and air-charging fitting, tank drain; precharge to 15 psig.

2.3 Acceptable Manufacturers – Air Vents

- A. Taco.
- B. Amtrol.
- C. Bell & Gossett.
- D. Substitutions: Under provisions of Division 01.

2.4 Air Vents

- A. Manual Type: Disk type vent with built-in check valve for manual or automatic operation, discs replaceable without draining system, 1/8 inch shank, rated at 50 psi.
- B. Float Type: Brass or semi-steel body, copper float, stainless steel valve and valve seat; 1/8 inch NPT connection to atmosphere with drain piping suitable for system operating temperature and pressure; with isolating valve.
- C. High Capacity Automatic Air Vent: Cast iron body, stainless steel and brass trim, EPDM diaphragm, rated for 250°F, 2 PSIG through 150 PSIG, 3/4 inch system connection, 3/8 inch NPT connection to atmosphere with drain piping. Provide with isolation valve and strainer upstream of vent.

2.5 Acceptable Manufacturers – Strainers

- A. Bell & Gossett.
- B. Taco.
- C. Armstrong.
- D. Substitutions: Under provisions of Division 01.

2.6 Strainers

- A. Size 2 inch and Under: Screwed brass or iron body for 175 psig working pressure, Y pattern with 1/32 inch stainless steel perforated screen.
- B. Size 2-½ inch to 4 inch: Flanged iron body for 175 psig working pressure, Y pattern with 3/64 inch stainless steel perforated screen.
- C. Size 5 inch and Larger: Flanged iron body for 175 psig working pressure, basket pattern with 1/8 inch stainless steel perforated screen.

2.7 Acceptable Manufacturers – Pump Suction Fittings

- A. Taco.
- B. Bell & Gossett.
- C. Armstrong.
- D. Substitutions: Under provisions of Division 01.

2.8 Pump Suction Fittings

- A. Fitting: Angle pattern, cast-iron body, threaded for 2 inch and smaller, flanged for 2-½ inch and larger, rated for 175 psig working pressure, with inlet vanes, cylinder strainer with 3/16 inch diameter openings, disposable fine mesh strainer to fit over cylinder strainer, and permanent magnet located in flow stream and removable for cleaning.
- B. Accessories: Adjustable foot support, blowdown tapping in bottom, gauge tapping in side.

2.9 Acceptable Manufacturers – Combination Pump Discharge Valves

- A. Bell & Gossett.
- B. Taco.
- C. Armstrong.
- D. Substitutions: Under provisions of Division 01.

2.10 Combination Pump Discharge Valves

- A. Valves: Straight or angle pattern, flanged cast-iron valve body with bolt-on bonnet for 175 psig operating pressure, non-slam check valve with spring-loaded bronze disc and seat, stainless steel stem, and calibrated adjustment permitting flow regulation.

2.11 Acceptable Manufacturers – Balance Valves

- A. Armstrong.
- B. Taco.
- C. Bell & Gossett.
- D. Substitutions: Under provisions of Division 01.

2.12 Balance Valves

- A. Angle or straight pattern, inside screw globe valve for 125 psig working pressure, with bronze body and integral union for screwed connections, renewable composition disc, plastic wheel handle for shut-off service, and lockshield key cap and set screw memory bonnet for balancing service.

2.13 Acceptable Manufacturers – Relief Valves

- A. Watts.
- B. Taco.
- C. Bell & Gossett.
- D. Substitutions: Under provisions of Division 01.

2.14 Relief Valves

- A. Bronze body, Teflon seat, stainless steel stem and springs, automatic, direct pressure actuated, capacities ASME certified and labeled.

2.15 Acceptable Manufacturers – Glycol Storage Tanks

- A. Axiom.
- B. Wessles.
- C. Substitutions: Under provisions of Division 01.

2.16 Glycol Storage Tanks

- A. HDPE storage/mixing tank with cover; pump suction hose with inlet strainer; pressure pump with thermal cut-out; integral pressure switch; integral check valve; cord and plug; pre-charged accumulator tank with EPDM diaphragm; manual diverter valve for purging air and agitating contents of storage tank; 10 to 25 psi pressure adjustable regulating valve complete with pressure gauge; integral replaceable strainer; built-in check valve; union connection; low level pump cut-out. Pressure pump shall be capable of running dry without damage. Provide unit with RIA10-1, Low pressure alarm panel with Remote monitoring dry contracts. Unit shall be completely pre-assembled and certified by a recognized testing agency to CSA standard C22.2 No 68.

2.17 Heating Glycol

- A. Glycol Solution: Inhibited propylene glycol and water solution mixed 50-50 suitable for operating temperatures of -28° F.

2.18 Acceptable Manufacturers – Hydraulic Separators

- A. Caleffi.
- B. Spirotherm.
- C. Substitutions: Under provisions of Division 01.

2.19 Hydraulic Separators

- A. ANSI flanged connections sized per plans, epoxy resin painted steel body, temperature range 32-210°F with insulation, maximum working pressure 150 psi. Supplied with: automatic air vent valve ½" M connection with automatic check valve and brass body, drain valve with hose connection thread and brass body, pre-formed insulation shell of double density closed cell expanded PEX.

2.20 Acceptable Manufacturers – Brazed Plate Heat Exchangers

- A. SWEP International.
- B. Alfa-Laval.
- C. Danfoss.
- D. Kelvion.
- E. Taco.
- F. Tranter.
- G. Bell & Gossett
- H. Substitutions: Under provisions of Division 01.

2.21 Brazed Plate Heat Exchangers

- A. Plates: Stainless steel Type 316/316L, vacuumed brazed together with high temperature copper braze, ASME Compliant.
- B. Connections: Flanged.
- C. Max. working pressure 150 psig, max. working temperature 350 Degrees F.

Part 3 EXECUTION

3.1 Installation and Application

- A. Install specialties in accordance with manufacturer's instructions to permit intended performance.
- B. Where large air quantities can accumulate, provide enlarged air collection standpipes.
- C. Provide manual air vents at system high points and as indicated.
- D. For automatic air vents, provide vent tubing to glycol tank if in mechanical room. Where a drain is not available run discharge to a 12"x12"x6" high galvanized, watertight pan located in an accessible location.
- E. Provide valved drain and hose connection on strainer blow down connection.

- F. Provide pump suction fitting on suction side of base mounted centrifugal pumps. Remove temporary strainers after cleaning systems.
- G. Provide combination pump discharge valve on discharge side of base mounted centrifugal pumps.
- H. Support pump fittings with floor mounted pipe and flange supports.
- I. Provide shutoff valves on water inlet to terminal heating units such as heating coils and unit heaters.
- J. Provide balancing valves on water outlet from terminal heating units.
- K. Provide relief valves on heat exchangers.
- L. Select system relief valve capacity so that it is greater than make-up pressure reducing valve capacity. Select equipment relief valve capacity to exceed rating of connected equipment.
- M. Pipe relief valve outlet to glycol tank.
- N. Where one line vents several relief valves, make cross sectional area equal to sum of individual vent areas.
- O. Clean and flush glycol system before adding glycol solution.
- P. Feed glycol solution to system through make-up line with pressure regulator, venting system high points. Set to fill at 12 psig. Pressure system cold at 5 psig, adjust when hot to 12 psig.
- Q. Perform tests determining strength and pH of glycol and water solution and submit written test results.
- R. Install thermometer wells and pressure gauge tappings on heat exchanger inlets and outlets.
- S. Install valved drains at heat exchanger low point connections.
- T. On heat exchanger heated outlet install thermometer well for temperature regulator sensor, and ASME rated pressure relief valve.

3.2 Storage and Reuse of Existing Glycol

- A. Drain heating glycol from the hydronic system to the extent necessary to perform the work under this contract.
- B. Glycol shall be stored in containers intended for this application, onsite in a location approved by the Owner.
- C. Glycol shall be filtered prior to or during installation into the hydronic system using nylon monofilament mesh with glazed finish, passing 100 micron spheres.
- D. New premixed glycol shall be added as needed to finish filling system.

3.3 Air Vent Application Schedule

Location	Type
Terminal heating units, mains below	Manual

Terminal heating units, mains above	None
Heating mains, at high points in system	Automatic
Combination air separator/strainers	High capacity

Note: For terminal heating units, mains above unit, install branch piping connections at bottom of mains or 45° from bottom to allow air migration to mains.

End of Section 23 21 16

Section 23 21 23 – Hydronic Pumps

Part 1 GENERAL

1.1 Work Included

- A. Inline Circulators.
- B. Vertical In-line Pumps.
- C. Base-Mounted Pumps.

1.2 Related Work

- A. Section 23 05 00 - Common Work Results for HVAC.
- B. Section 23 05 19 – Meters and Gages for HVAC Piping.
- C. Section 23 09 23 - Direct Digital Control System for HVAC.
- D. Section 23 21 13 - Hydronic Piping.
- E. Section 23 21 16 - Hydronic Piping Specialties.

1.3 References

- A. ANSI/UL 778 - Motor Operated Water Pumps.

1.4 Quality Assurance

- A. Manufacturer: Company specializing in manufacture, assembly, and field performance of pumps with minimum three years' experience.
- B. Alignment: Base mounted pumps shall be aligned by qualified millwright and alignment certified.

1.5 Submittals

- A. Submit product data under provisions of Division 01.
- B. Submit certified pump curves showing performance characteristics with pump and system operating point plotted. Include NPSH curve when applicable.

1.6 Operation and Maintenance Data

- A. Submit operation and maintenance data under provisions of Division 01.
- B. Include installation instructions, assembly views, lubrication instructions, and replacement parts list.

1.7 Delivery, Storage, and Handling

- A. Deliver products to site under provisions of Division 01.
- B. Store and protect products under provisions of Division 01.

1.8 Extra Parts

- A. Provide one extra set of mechanical seals for pumps.

Part 2 PRODUCTS

2.1 Acceptable Manufacturers – Inline Circulators

- A. Grundfos.
- B. Bell & Gossett.
- C. Taco.
- D. Armstrong.
- E. Substitutions: Under provisions of Division 01.

2.2 General Construction Requirements

- A. Balance: Rotating parts, statically and dynamically.
- B. Construction: To permit servicing without breaking piping or motor connections.
- C. Pump Motors: Operate at 1750 rpm unless specified otherwise.
- D. Pump Connections: Flanged.

2.3 Inline Circulators

- A. Type: Maintenance free, self-lubricated, 3 speed industrial/commercial single stage, direct drive circulator.
- B. Casing: Cast iron.
- C. Impeller: Type 304 stainless steel.
- D. Bearings: Upper and lower radial bearings to be aluminum oxide ceramic, tungsten carbide shaft bearing surfaces.
- E. Shaft: Stainless steel with type 430F.

2.4 Acceptable Manufacturers - VFD Vertical Inline Pumps

- A. Grundfos.
- B. Bell & Gossett.
- C. Taco.
- D. Armstrong.
- E. Substitutions: Under provisions of Division 01.

2.5 VFD Vertical Inline Pumps

- A. Type: Vertical, VFD, close coupled, for inline mounting, for 175 psig working pressure.
- B. Casing: Cast iron, with suction and discharge gauge port, casing wear ring, seal flush connection, drain plug, flanged suction and discharge.
- C. Impeller: 304 stainless steel.
- D. Shaft: 431 stainless steel.
- E. Seal: 304 stainless steel with tungsten carbide seal faces and EDPM O-rings.

- F. Motor: Totally Enclosed Fan Cooled (TEFC) with a standard NEMA C-Face, Class F insulation with a Class B temperature rise. Motor drive end bearings shall be adequately sized so that the minimum L10 bearing life is 17,500 hours at the minimum allowable continuous flow rate for the pump at full rated speed.
- G. VFD: PWM (Pulse Width Modulation) design using current IGBT (Insulated Gate Bipolar Transistor) technology. Internal solid-state overload protection designed to trip within the range of 125-150% of rated current. Protection against input transients, phase imbalance, loss of AC line phase, over-voltage, under-voltage, VFD over-temperature, and motor over-temperature.
- H. Integral Controls: Microprocessor based, standard product developed and supported by the pump manufacturer. Capable of receiving a remote analog set-point (4-20mA or 0-10 VDC) as well as a remote on/off (digital) signal. Capable of being automatically adjusted by a system pressure compensating function. As flow increases the discharge pressure shall increase linearly as flow approaches design capacity. System compensation percentage shall be field adjustable.

2.6 Acceptable Manufacturers

- A. Goulds.
- B. Bell & Gossett.
- C. Taco.
- D. Armstrong.
- E. Substitutions: Under provisions of Division 01.

2.7 Base Mounted Pumps

- A. Type: Centrifugal, single stage, direct connected.
- B. Casing: Cast iron, split volute, single or double suction, rated for greater of 150 psi or 1.25 times actual working discharge pressure, renewable bronze wearing rings, flanged suction and discharge.
- C. Impeller: Bronze, fully enclosed, keyed to shaft.
- D. Shaft: High grade alloy steel with copper, bronze or stainless steel shaft sleeves.
- E. Bearings: Oil lubricated roller or ball bearings with oil reservoirs. Provide oil seal and integral dirt and water seal at each end of reservoir.
- F. Drive: Flexible coupling with coupling guard.
- G. Seals: Carbon rotating against a stationary ceramic seat.
- H. Seals: Packing gland with minimum four rings Teflon impregnated packing.
- I. Baseplate: High grade heat treated cast iron or reinforced heavy steel with integral drain rim grout base.

Part 3 EXECUTION

3.1 Installation

- A. Install pumps in accordance with manufacturer's instructions.
- B. Provide access space around pumps for service. Provide no less than minimum as recommended by manufacturer.
- C. Ensure pumps operate at specified system fluid temperatures without vapor binding and cavitation, are non-overloading in parallel or individual operation, and operate within 25 percent of midpoint of published maximum efficiency curve.
- D. Decrease from line size with long radius reducing elbows or reducers.
- E. Support piping adjacent to pump such that no weight is carried on pump casings. In-line pumps are supported by adjacent piping.
- F. For close coupled or base mounted pumps, provide supports under elbows on pump suction and discharge line sizes 4 inches and over.
- G. Provide line sized shut-off valve and strainer on pump suction, and line sized combination pump discharge valve on pump discharge.
- H. Provide air cock and drain connection on horizontal pump casings.
- I. Provide drains for bases and seals, piped to and discharging into floor drains.
- J. Lubricate pumps before start-up.
- K. Qualified millwright shall check, align, and certify base mounted pumps prior to start-up.
- L. Provide side-stream filtration system for heating water, glycol, systems. Install across pump with flow from pump discharge to pump suction from pump tapplings.

End of Section 23 21 23

Section 23 31 00 – HVAC Ducts and Casings

Part 1 GENERAL

1.1 Work Included

- A. Low pressure ducts.
- B. Duct cleaning.

1.2 Related Work

- A. Section 23 05 00 – Common Work Results for HVAC.
- B. Section 23 05 93 - Testing, Adjusting and Balancing for HVAC.
- C. Section 23 07 00 – HVAC Insulation.
- D. Section 23 33 00 – Air Duct Accessories.
- E. Section 23 37 00 - Air Inlets and Outlets.

1.3 References

- A. ASHRAE - Handbook 1981 Fundamentals; Chapter 33 - Duct Design.
- B. ASHRAE - Handbook 1983 Equipment; Chapter 1 - Duct Construction.
- C. ASTM A 90 - Weight of Coating on Zinc-Coated (Galvanized) Iron or Steel Articles.
- D. ASTM A 525 - General Requirements for Steel Sheet, Zinc- Coated (Galvanized) by the Hot-Dip Process.
- E. ASTM A 527 - Steel Sheet, Zinc-Coated (Galvanized) by Hot-Dip Process, Lock Forming Quality.
- F. NFPA 90A - Installation of Air Conditioning and Ventilating Systems.
- G. NFPA 90B - Installation of Warm Air Heating and Air Conditioning Systems.
- H. SMACNA - HVAC Duct Construction Standards.
- I. UL 181 - Factory-Made Air Ducts and Connectors.

1.4 Definitions

- A. Duct Sizes: Inside clear dimensions. For lined ducts, maintain sizes inside lining.
- B. Low Pressure: Three pressure classifications: ½ inch WG positive or negative static pressure and velocities less than 2,000 fpm; 1 inch WG positive or negative static pressure and velocities less than 2,500 fpm and 2 inch WG positive or negative static pressure and velocities less than 2,500 fpm.

1.5 Regulatory Requirements

- A. Construct ductwork to NFPA 90A standards.

1.6 Submittals

- A. Submit shop drawings under provisions of Division 01.
- B. Indicate duct fittings, particulars such as gauges, sizes, welds, and configuration prior to start of work for low pressure systems.

1.7 Delivery, Storage, and Handling

- A. Deliver products to site under provisions of Division 01.
- B. Store and protect products under provisions of Division 01.

Part 2 PRODUCTS

2.1 Materials

- A. General: Non-combustible or conforming to requirements for Class 1 air duct materials, or UL 181.
- B. Steel Ducts: ASTM A527 galvanized steel sheet, lock-forming quality, having zinc coating of 1.25 oz. per sq. ft. for each side in conformance with ASTM A90.
- C. Aluminum Ducts: ANSI/ASTM B209; aluminum sheet, alloy 3003-H14. Aluminum Connectors and Bar Stock: Alloy 6061-T6 or of equivalent strength.
- D. Fasteners: Rivets, bolts, or sheet metal screws.
- E. Sealant: Non-hardening, water resistant, fire resistive, compatible with mating materials; liquid used alone or with tape, or heavy mastic.
- F. Hanger Rod: Steel, galvanized; threaded both ends, threaded one end, or continuously threaded.

2.2 Low Pressure Ductwork

- A. Fabricate and support in accordance with SMACNA HVAC Duct Construction Standards and ASHRAE handbooks, except as indicated. Provide duct material, gauges, reinforcing, and sealing for operating pressures indicated.
- B. Size round ducts installed in place of rectangular ducts in accordance with ASHRAE table of equivalent rectangular and round ducts. No variation of duct configuration or sizes permitted except by written permission.
- C. Construct T's, bends, and elbows with radius of not less than 1-½ times width of duct on centerline. Where not possible and where rectangular elbows are used, provide air foil turning vanes. Where acoustical lining is indicated, provide turning vanes of perforated metal with glass fiber insulation.
- D. Increase duct sizes gradually, not exceeding 15° divergence wherever possible. Divergence upstream of equipment shall not exceed 30°; convergence downstream shall not exceed 45°.

- E. Provide easements where ductwork conflicts with piping and structure. Where easements exceed 10 percent duct area, split into two ducts maintaining original duct area.
- F. Use crimp joints with or without bead for joining round duct sizes 12 inch and smaller with crimp in direction of air flow.
- G. Use double nuts and lock washers on threaded rod supports.

Part 3 EXECUTION

3.1 Installation

- A. Provide openings in ductwork where required to accommodate thermometers and controllers. Provide pitot tube openings where required for testing of systems, complete with metal can with spring device or screw to ensure against air leakage. Where openings are provided in insulated ductwork, install insulation material inside a metal ring.
- B. Locate ducts with sufficient space around equipment to allow normal operating and maintenance activities.
- C. During construction provide temporary closures of metal or taped polyethylene on open ductwork to prevent construction dust from entering ductwork system.

3.2 Ductwork Application Schedule

Air System	Material
Low Pressure Supply (Heating Systems)	Steel
Return and Relief	Steel
General Exhaust	Steel
Outside Air Intake	Steel

End of Section 23 31 00

Section 23 33 00 – Air Duct Accessories

Part 1 GENERAL

1.1 Work Included

- A. Volume control dampers.
- B. Air turning devices.
- C. Flexible duct connections.
- D. Duct access doors.
- E. Duct test holes.
- F. Turning vanes.
- G. Control dampers.

1.2 Related Work

- A. Section 23 05 00 – Common Work Results for HVAC.
- B. Section 23 31 00 – HVAC Ducts and Casings.

1.3 References

- A. NFPA 90A - Installation of Air Conditioning and Ventilating Systems.
- B. SMACNA - HVAC Duct Construction Standards.

1.4 Submittals

- A. Submit product data under provisions of Division 01.
- B. Provide shop drawings for shop fabricated assemblies indicated, including volume control dampers, duct access doors, duct test holes. Provide product data for hardware used.

Part 2 PRODUCTS

2.1 Volume Control Dampers

- A. Fabricate in accordance with SMACNA HVAC Duct Construction Standards, and as indicated.
- B. Fabricate splitter dampers of material same gauge as duct to 24 inches size in either direction, and two gauges heavier for sizes over 24 inches.
- C. Fabricate splitter dampers of single thickness sheetmetal to streamline shape. Secure blade with continuous hinge or rod. Operate with minimum 1/4 inch diameter rod in self aligning, universal joint action flanged bushing with set screw.
- D. Fabricate single blade dampers for duct sizes to 9-1/2 x 30 inch.

- E. Fabricate multi-blade damper of opposed blade pattern with maximum blade sizes 12 x 72 inch. Assemble center and edge crimped blades in prime coated or galvanized channel frame with suitable hardware.
- F. Except in round ductwork 12 inches and smaller, provide end bearings. On multiple blade dampers, provide oil-impregnated nylon or sintered bronze bearings.
- G. Provide locking, indicating quadrant regulators on single and multi-blade dampers. Where rod lengths exceed 30 inches provide regulator at both ends. Where volume dampers are located above gypsum or other non-accessible ceilings, extend damper rods to ceiling and install recessed concealed regulator with adjustable cover for flush installation, with cover. Exposed portions shall be chrome plated. Regulator shall include spring washer, lock nut, coupling, ninety degree screw or gear drive and rod as required, Young Regulator or equal.
- H. On insulated ducts mount quadrant regulators on stand-off mounting brackets, bases, or adapters.

2.2 Acceptable Manufacturers – Air Turning Devices

- A. Duro-Dyne.
- B. Substitutions: Under provisions of Division 01.

2.3 Air Turning Devices

- A. Multi-blade device with blades aligned in short dimension; steel or aluminum construction; with individually adjustable blades, mounting straps.

2.4 Acceptable Manufacturers – Flexible Duct Connections

- A. Duro-Dyne.
- B. Substitutions: Under provisions of Division 01.

2.5 Flexible Duct Connections

- A. Fabricate in accordance with SMACNA HVAC Duct Construction Standards, and as indicated.
- B. UL listed fire-retardant neoprene coated woven glass fiber fabric to NFPA 90A, minimum density 20 oz. per sq. yd., approximately 3 inches wide, crimped into metal edging strip.
- C. Leaded vinyl sheet, minimum 0.55 inch thick, 0.87 lbs. per sq. ft., 10 dB attenuation in 10 to 10,000 Hz range.

2.6 Acceptable Manufacturers – Duct Access Doors

- A. Duro-Dyne.
- B. Ruskin.
- C. Hart & Cooley.
- D. Substitutions: Under provisions of Division 01.

2.7 Duct Access Doors

- A. Fabricate in accordance with SMACNA HVAC Duct Construction Standards and as indicated.
- B. Review locations prior to fabrication.
- C. Fabricate rigid and close-fitting doors of galvanized steel with sealing gaskets and quick fastening locking devices. For insulated ductwork, install minimum one inch thick insulation with sheet metal cover.
- D. Access doors smaller than 12 inches square may be secured with sash locks.
- E. Provide two hinges and two sash locks for sizes up to 18 inches square, three hinges and two compression latches with outside and inside handles for sizes up to 24 x 48 inches. Provide an additional hinge for larger sizes.
- F. Access doors with sheet metal screw fasteners are not acceptable.

2.8 Duct Test Holes

- A. Cut or drill temporary test holes in ducts as required. Cap with neat patches, neoprene plugs, threaded plugs, or threaded or twist-on metal caps.
- B. Permanent test holes shall be factory fabricated, air tight flanged fittings with screw cap. Provide extended neck fittings to clear insulation.

2.9 Turning Vanes

- A. Double Width: Air foil design double width galvanized turning vanes with 2 inch inside radius.
- B. Single Width: Single galvanized turning vane with 2 inch radius and minimum 1" trailing straight leg.
- C. Acoustical Vanes: Double width vanes with inner vane of perforated galvanized steel with 3/32 inch holes on 5/32 inch spacing. Fill space between vanes with minimum 1.5 lb/cu ft glass fiber duct liner.

2.10 Acceptable Manufacturers – Control Dampers

- A. Ruskin.
- B. Greenheck.
- C. Louvers and Dampers, Inc.
- D. Substitutions: Under provisions of Division 01.

2.11 Control Dampers

- A. Multi-blade, Opposed blade action, control dampers of extruded aluminum, with airfoil type blades of maximum six inch width, blades positioned across short air opening dimension, field replaceable extruded vinyl sealed edges, linked together in rattle-free manner, non-corrosive molded synthetic bearings, square or hexagonal axles for positive locking connection to blades and linkage, with documented leakage rate not to exceed 6 CFM/sq. ft. at 4 inch W.G.

Part 3 EXECUTION

3.1 Installation

- A. Install accessories in accordance with manufacturer's instructions.
- B. Provide balancing dampers at points on low pressure supply, return, and exhaust systems where branches are taken from larger ducts as required for air balancing. Use splitter dampers only where indicated. Locate dampers a minimum 15 feet upstream of all air inlets and outlets.
- C. Provide flexible connections immediately adjacent to equipment in ducts associated with fans and motorized equipment.
- D. Provide duct access doors for inspection and cleaning before and after filters, coils, fans, automatic dampers, and elsewhere as indicated. Provide minimum 8 x 8 inch size for hand access, 18 x 18 inch size for shoulder access, and as indicated.
- E. Provide duct test holes where required for testing and balancing purposes.
- F. Provide double width turning vanes at all constant cross-section rectangular duct elbows at 2" spacing across elbow diagonal. Provide at rectangular reducing elbows single width turning vanes with trailing edge sat 2" spacing across elbow diagonal.

End of Section 23 33 00

Section 23 37 00 - Air Outlets and Inlets

Part 1 GENERAL

1.1 Work Included

- A. Security grilles.

1.2 References

- A. ADC 1062 - Certification, Rating and Test Manual.
- B. AMCA 500 - Test Method for Louvers, Dampers and Shutters.
- C. ANSI/NFPA 90A - Installation of Air Conditioning and Ventilating Systems.
- D. ARI 650 - Air Outlets and Inlets.
- E. ASHRAE 70 - Method of Testing for Rating the Air Flow Performance of Outlets and Inlets.
- F. SMACNA - HVAC Duct Construction Standard.

1.3 Quality Assurance

- A. Test and rate performance of air outlets and inlets in accordance with ADC Equipment Test Code 1062 and ASHRAE 70.
- B. Test and rate performance of louvers in accordance with AMCA 500.

1.4 Regulatory Requirements

- A. Conform to ANSI/NFPA 90A.
- B. Earthquake tabs, in seismic zones, in accordance with IBC Standards.

1.5 Submittals

- A. Submit product data under provisions of Division 01.
- B. Provide product data for items required for this project.
- C. Review requirements of outlets and inlets as to size, finish, and type of mounting prior to submitting product data.

Part 2 PRODUCTS

2.1 Acceptable Manufacturers – Security Grilles

- A. Titus.
- B. Price.
- C. Krueger.
- D. Substitutions: Under provisions of Division 01.

2.2 Security Grilles

- A. Maximum security grilles shall have 0.125" aluminum face with 5/16" diameter holes on 7/16" staggered centers. The sleeve shall be 0.125" aluminum and shall be stitch welded to the face and along the entire length of all sleeve seams.
- B. Minimum security grilles with fixed deflection louvers shall be parallel to the long dimension of the grille. Grilles to be constructed of 3/16" thick aluminum on 1/2" centers, set at 0° deflection, with heavy vertical aluminum tubes on 6" centers passing through the center of each louver. Vertical supports shall be welded to the frame on both ends. The frame shall be 1/8" thick aluminum extrusion welded at the corners. Grilles shall be of all welded construction. The sleeve shall be 0.09" aluminum welded securely to the frame.
- C. The grille finish shall be "mill finish".

Part 3 EXECUTION

3.1 Installation

- A. Install items in accordance with manufacturers' instructions and contract documents.
- B. All diffusers/grilles installed in secure areas shall be firmly anchored to prohibit removal or tampering from the face. No fasteners (screws, clips, etc.) shall be accessible in secured areas.
- C. Provide balancing dampers on duct take-off to grilles regardless of whether dampers are specified as part of the diffuser, or grille and register assembly.

End of Section 23 37 00

Section 23 51 00 - Breechings, Chimneys, and Stacks

Part 1 GENERAL

1.1 Section Includes

- A. Manufactured double wall chimneys for fuel fired equipment.

1.2 Related Sections

- A. Section 23 07 00 - HVAC Insulation: Breeching insulation.
- B. Section 23 52 23 - Cast Iron Boilers.
- C. Section 26 27 26 - Wiring Devices.

1.3 References

- A. ANSI/ASTM A167 - Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.
- B. ANSI/ASTM A525 - Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process, General Requirements.
- C. ANSI Z95.1 (NFPA 31) - Standard for the Installation of Oil Burning Equipment.
- D. ASHRAE - Handbook, Equipment Volume, Chapter "Chimney, Gas, Vent, and Fireplace Systems."
- E. SMACNA - HVAC Duct Construction Standards - Metal and Flexible.
- F. UL 378 - Standard for Draft Equipment.

1.4 Definitions

- A. Breeching: Vent Connector to appliance.
- B. Chimney: Primarily vertical shaft enclosing at least one vent for conducting flue gases outdoors.
- C. Smoke Pipe: Round, single wall vent connector.
- D. Vent: That portion of a venting system designed to convey flue gases directly outdoors from a vent connector or from an appliance when a vent connector is not used.
- E. Vent Connector: That part of a venting system that conducts the flue gases from the flue collar of an appliance to a chimney or vent, and may include a draft control device.

1.5 Design Requirements

- A. Factory built vents and chimneys used for venting natural draft appliances shall comply with NFPA 211 and be UL listed and labeled.

1.6 Submittals

- A. Submit product data under provisions of Division 01.
- B. Submit product data indicating construction, materials, general layout, and dimensions.

1.7 Qualifications

- A. Manufacturer: Company specializing in the manufacture of products specified in this Section with minimum three years documented experience.

1.8 Regulatory Requirements

- A. Conform to NFPA 31 for installation of oil burning appliances and equipment.

Part 2 PRODUCTS

2.1 Manufacturers

- A. Selkirk.
- B. Hart & Cooley.
- C. Van Packer.
- D. Substitutions: Under provisions of Division 01.

2.2 Pre-Manufactured Type "L" Chimney

- A. Provide insulated double wall metal stacks, tested to UL 103 HT and UL listed, for use with building heating equipment, in compliance with NFPA 211.
- B. Fabricate with 1 inch minimum air space between walls. Provide 1" of ceramic fiber insulation in the space between walls. Construct inner jacket of minimum 20 gauge ANSI/ASTM A167 Type 430 stainless steel. Construct outer jacket of Type 430 stainless steel 22 gauge.
- C. Provide accessories each bearing factory applied UL label.
 - 1. Chimney Support: Consists of an adjustable support plate and ceiling penetration trim ring.
 - 2. Ventilated Roof Thimble: Consists of roof penetration, vent flashing with spacers and storm collar.
 - 3. Stack Cap: Consists of conical rainshield with inverted cone for partial rain protection with low flow resistance.
 - 4. Barometric Damper: Consists of round opening in side of chimney with counter balanced gravity damper for air intake to help induce updraft in chimney.
- D. Model P1 as manufactured by Schebler or approved equal.

Part 3 EXECUTION

3.1 Installation

- A. Install in accordance with manufacturer's instructions.
- B. Provide double wall, insulated chimney continuous from appliance outlet to exterior termination.
- C. Install in accordance with recommendations of ASHRAE -Handbook, Equipment Volume, Chapter "Chimney, Gas, Vent, and Fireplace Systems", and NFPA 54.
- D. Install breechings with minimum of joints. Align accurately at connections, with internal surfaces smooth.
- E. Support breechings from building structure, rigidly with suitable ties, braces, hangers and anchors to hold to shape and prevent buckling. Support vertical breechings and stacks at 12 foot spacing, to adjacent structural surfaces, or at floor penetrations. Refer to SMACNA HVAC Duct Construction Standards - Metal and Flexible for equivalent duct support configuration and size.
- F. Pitch breechings with positive slope up from fuel-fired equipment to stack.
- G. For all double wall vents, maintain UL listed minimum clearances from combustibles. Assemble pipe and accessories as required for complete installation.
- H. Install vent dampers, locating close to draft hood collar, and secured to breeching.
- I. Assemble and install stack sections in accordance with NFPA 82, industry practices, and in compliance with UL listing. Join sections with acid-resistant joint cement to ANSI/ASTM C105. Connect base section to foundation using anchor lugs.
- J. Level and plumb stacks.
- K. Clean breechings and stacks during installation, removing dust and debris.
- L. At appliances, provide slip joints permitting removal of appliances without removal or dismantling of breechings or stacks.
- M. For oil fired appliances, provide Type L Chimney continuously from appliances through roof cap.
- N. No single wall vent connectors or breechings are permitted.

End of Section 23 51 00

Section 23 52 23 - Cast Iron Boilers

Part 1 GENERAL

1.1 Section Includes

- A. Boilers.
- B. Controls and boiler trim.
- C. Hot water/glycol connections.
- D. Fuel connection.

1.2 Related Sections

- A. Section 23 05 00 – Common Work Results for HVAC.
- B. Section 23 21 13 - Hydronic Piping.
- C. Section 23 21 16 - Hydronic Specialties.
- D. Section 23 09 23 – Direct Digital Control System.
- E. Section 26 27 26 – Wiring Devices.

1.3 References

- A. AGA - Directory of Certified Appliances and Accessories.
- B. ANSI/ASME SEC4 - Boiler and Pressure Vessel Codes - Rules for Construction of Heating Boilers.
- C. ANSI/ASME SEC8D - Boilers and Pressure Vessel Codes - Rules for Construction of Pressure Vessels.
- D. ANSI/NFPA 70 - National Electrical Code.
- E. ANSI/UL 726 - Oil-Fired Boiler Assemblies.
- F. HI (Hydronics Institute) - Testing and Rating Standard for Cast Iron and Steel Heating Boilers.

1.4 Submittals

- A. Submit product data under provisions of Division 01.
- B. Submit product data indicating gross input/output, I-B-R net rating, fuel type, electrical requirements, accessories, trim, controls, general layout, dimensions, and size and location of connections.

1.5 Quality Assurance

- A. Manufacturer: Company specializing in manufacturing the products specified in this Section with minimum three years experience.

1.6 Regulatory Requirements

- A. Conform to ANSI/NFPA 70 code for internal wiring of factory wired equipment.
- B. Conform to ANSI/ASME SEC4 and SEC 8D for boiler construction.
- C. Units: UL labeled.

1.7 Delivery, Storage, and Handling

- A. Deliver products to site under provisions of Division 01.
- B. Store and protect products under provisions of Division 01.
- C. Protect units before, during, and after installation from damage to casing by leaving factory shipping packaging in place until immediately prior to final acceptance.

1.8 Warranty

- A. Provide one year pro-rated warranty under provisions of Division 01.
- B. Warranty: Include coverage for cast iron boiler sections.

Part 2 PRODUCTS

2.1 Manufacturers

- A. Weil McLain.
- B. Burnham.
- C. Hydrotherm.
- D. Substitutions: Under provisions of Division 01.

2.2 Manufactured Units

- A. Hot water boilers suitable for natural draft insulated jacket, sectional cast iron heat exchanger, oil burning system, refractory, controls, and boiler trim.

2.3 Fabrication

- A. Assemble from cast iron sections with 30 psig ANSI/ASME Boilers and Pressure Vessels Code Rating.
- B. Provide clean-out and access doors, observation ports, and relief openings to flue passages.
- C. Provide structural base of aluminized steel lined with high temperature mineral fiber insulating panels.
- D. Provide glass fiber insulated steel jacket, finished with factory applied baked enamel.

2.4 Heating Glycol Boiler Trim

- A. Combination water pressure and temperature gauge, and ASME 30 psi rated pressure relief valve, sized to boiler gross output.

- B. Low water cut-off with manual reset to automatically prevent burner operation when boiler water falls below safe level, with power failure automatic reset.
- C. Electronic operating temperature controller to operate boilers and maintain boiler water temperature:
 - 1. Microprocessor based temperature controller with NEMA 1 full cover enclosure for wall mounting. Unit programming through face mounted navigation buttons. LCD screen display.
 - 2. Ambient temperature range 32 to 122° F, capable of controlling up to 4 on/off boilers as well as the system pump (with pump sequencing option).
 - 3. 120 Volt AC, 60 Hz, 7 VA, 1150 VA max. power supply.
 - 4. 230 Volt AC, 2 VA relays.
 - 5. NTC thermistor sensor, 10k-Ohm at 77 deg. F.
 - 6. Includes outdoor sensor 070, 2 of Universal Sensor 082, and 500 Ohm resistor.
 - 7. Model 274 Boiler Control manufactured by Tekmar Control Systems, or equal.
- D. Redundant high limit temperature controller for burner to prevent boiler water temperature from exceeding safe system temperature.
- E. Boiler air vent.

2.5 Fuel Burning System

- A. Burner Operation: Low-High-Low firing as indicated on plans, with low fire position for ignition.
- B. Oil Burner: High pressure atomizing type for No. 2 oil with combustion air blower, fuel pump, hinged flame inspection port, cadmium sulfide flame sensor, electrodes, ignition transformer, and oil nozzle.
- C. Oil Burner Safety Controls: Energize burner motor and electric ignition, limit time for establishment of main flame, monitor flame continuously during burner operation and stop burner on flame failure with manual reset necessary, solenoid oil delay valve opens after burner motor energized and closes when de-energized.
- D. Controls: Provide pre-packaged control panel suitable for controlling the number of boilers shown on the drawings complete with lead-lag operation, enable-disable and outdoor air reset. Controller will control the boilers to maintain the building loop heating setpoint as described in Section 23 09 93 Sequence of Operation for HVAC Controls.
- E. Oil Filter and De-aerator: Fuel oil de-aerator with spin-on filter, 20 gph maximum nozzle capacity, 30 gph maximum return flow, 50 gph maximum oil flow, 20-105° F operating temperature, 105° F maximum ambient temperature, 8 psi maximum feed line operating pressure, 1/4-inch NPT connections, No. 1 and 2 fuel oil, F100-10

replacement element, 10 micron element media, epoxy inside element canister, UL listed. Tigerloop ULTRA from Westwood Products, Inc. or approved equal.

2.6 Performance

- A. Performance rating shall be in accordance with HI - Testing and Rating Standard for Cast Iron and Steel Heating Boilers.

Part 3 EXECUTION

3.1 Installation

- A. Install in accordance with manufacturer's instructions.
- B. Provide for connection to electrical service. Refer to Section 26 27 26.
- C. Provide connection of gas service in accordance with ANSI/AGA Z223.1.
- D. Pipe relief valves to glycol tank.

3.2 Manufacturer's Field Services

- A. Prepare and start systems under provisions of Division 01.
- B. Submit written report after start-up including control settings and performance chart of control system.
- C. Provide boiler set-up and adjustment before firing. Submit results of combustion test prior to final acceptance, including: Overfire and flue collar draft, CO₂ (CO for gas), net stack temperature, smoke number, and percent efficiency. Tests are to be run by approved technician specializing in boiler maintenance.

End of Section 23 52 23

Section 23 73 00 - Air Handling Units with Coils

Part 1 GENERAL

1.1 Work Included

- A. Packaged air handling units.

1.2 Related Work

- A. Division 01 - Temporary Heating, Cooling, and Ventilating.
- B. Section 23 05 00 – Common Work Results for HVAC.
- C. Section 23 07 00 – HVAC Insulation.
- D. Section 23 31 00 – HVAC Ducts and Casings.
- E. Section 23 33 00 – Air Duct Accessories: Flexible duct connections.
- F. Section 23 73 00 – Indoor Central Air Handling Units.
- G. Section 23 82 16 - Air Coils.

1.3 References

- A. AMCA 99 - Standards Handbook.
- B. AMCA 210 - Laboratory Methods of Testing Fans for Rating Purposes.
- C. AMCA 300 - Test Code for Sound Rating Air Moving Devices.
- D. AMCA 301 - Method of Publishing Sound Ratings for Air Moving Devices.
- E. AMCA 500 - Test Methods for Louver, Dampers, and Shutters.
- F. ANSI/AFBMA 9 - Load Ratings and Fatigue Life for Ball Bearings.
- G. ANSI/AFBMA 11 - Load Ratings and Fatigue Life for Roller Bearings.
- H. ANSI/UL 900 - Test Performance of Air Filter Units.
- I. ARI 410 - Forced-Circulation Air-Cooling and Air-Heating Coils.
- J. ARI 430 - Standard for Central-Station Air-Handling Units.
- K. ARI 435 - Standard for Application of Central-Station Air- Handling Units.
- L. NFPA 90A - Installation of Air Conditioning and Ventilation Systems.
- M. SMACNA - Low Pressure Duct Construction Standards.

1.4 Quality Assurance

- A. Fan Performance Ratings: Conform to AMCA 210 and bear the AMCA Certified Rating Seal.
- B. Sound Ratings: AMCA 301; tested to AMCA 300 and bear AMCA Certified Sound Rating Seal.
- C. Fabrication: Conform to AMCA 99.

- D. Filter Media: ANSI/UL 900 listed, Class I or Class II, approved by local authorities.
- E. Air Coils: Certify capacities, pressure drops, and selection procedures in accordance with ARI 410.
- F. Air Handling Units: Product of manufacturer regularly engaged in production of components who issues complete catalog data on total product.

1.5 Submittals

- A. Submit shop drawings and product data under provisions of Division 01.
- B. Shop drawings shall indicate assembly, unit dimensions, weight loading, required clearances, construction details, and field connection details.
- C. Unit will be moved into space in sections. Provide information on individual section sizes and weights before unit assembly.
- D. Product data shall indicate dimensions, weights, capacities, ratings, fan performance, motor electrical characteristics, and gauges and finishes of materials.
- E. Provide fan curves with specified operating point clearly plotted.
- F. Submit sound power levels for both fan outlet and casing radiation at rated capacity.
- G. Submit product data of filter media, filter performance data, filter assembly, and filter frames.
- H. Submit electrical requirements for power supply wiring including wiring diagrams for interlock and control wiring, clearly indicating factory-installed and field-installed wiring.
- I. Submit manufacturer's installation instructions under provisions of Division 01.

1.6 Delivery, Storage, and Handling

- A. Deliver products to site under provisions of Division 01 in factory-fabricated protective containers, with factory-installed shipping skids and lifting lugs.
- B. Store and protect products under provisions of Division 01.
- C. Store in clean dry place and protect from weather and construction traffic. Handle carefully to avoid damage to components, enclosures, and finish.

1.7 Environmental Requirements

- A. Do not operate units for any purpose, temporary or permanent, until ductwork is clean, filters are in place, bearings lubricated, and fan has been test run under observation.

1.8 Extra Stock

- A. Provide one set of disposable panel filters under provisions of Division 01.

Part 2 PRODUCTS

2.1 Acceptable Manufacturers

- A. Daikin.
- B. MAFNA Air Technologies.
- C. Huntair.
- D. Haakon Industries.
- E. Substitutions: Under provisions of Division 01.

2.2 General

- A. Fabricate draw-through type air handling units suitable for low pressure operation.
- B. Fabricate units with fan and coil section plus accessories, including heating coil, mixing box section, and filter section.
- C. Factory fabricate and test air handling units of sizes, capacities, and configuration as indicated and specified.
- D. Base performance on sea level conditions.
- E. Unit shall be made to disassemble into sections whose dimensions will meet the size requirements for installation: equipment shall be capable of fitting through a 5-feet by 5-feet opening with room available to allow for the lifting and/or carrying equipment.

2.3 Casing

- A. The unit shall be constructed out of 2" thick wall and roof panels. The panel outer skin shall be made out of painted 18gauge solid satin coat steel sheet in accordance with ASTM-653, inner skin to be 20 gauge - G90. Fan Sections to have 20 gauge G-90 perforated liner (if shown in the drawing). The inner skin at coil and drain pan sections shall be 20G solid Hot Dip Galvanized Steel Sheet in accordance with ASTM-653, Commercial quality, G90 coating equivalent to Z275 measured in accordance with Triple Spot Test Method. The inner skin shall be hemmed on all four sides to eliminate any sharp edges, un-hemmed inner skins are not acceptable. The panels are to be internally joined together with self-tapping screws with 100% solid cross linked butyl preformed rubber sealant between each panel and then caulked to prevent water and air leakage. The housing panel deflections are limited to 1/200th of the span dimension while under positive and negative pressure.
- B. The exterior panels shall be fastened to the base through Rain Lip Type Z strip hemmed at the exterior end. (Unhemmed Z-strips are not acceptable) installed around the perimeter. The Z strips will be stitch welded to the base floor with Tremco 440 tape between Z strip and base of panel. This will be continuously caulked with Vulkem 116 gun grade polyurethane sealant conforming to US Federal & ASTM specifications in water and humid areas like drain pan, and with Thermoplastic Elastomeric sealant Tremco 830 sealant in general areas. Z strip to be mitered at time of assembly before

- being clamped into position for assembly. Sections or modules shall be designed to be fastened together in the field with closed cell neoprene gasketing.
- C. Removable panels and access doors shall be provided for easy access to interior of unit as necessary for maintenance and parts replacement. These shall be of the same thickness and construction as the wall panel units.
 - D. Panel Insulation: Panel to consist of 2" thick 3.5 lb/cft density mineral wool insulation. The overall thermal conductance of the assembled structure shall not exceed 0.14 BTU/hr/sqft/F at 50 Deg F Mean temperatures.
 - E. Base Insulation: Base to consist of 4" thick resilient 3/4 lb/cft density flexible blanket insulation made from inorganic glass fibers bonded by a thermosetting resin. All insulation and accessories including adhesives and facing shall have a composite fire and smoke hazard rating tested by ASTM E84, NFPA 225, and UL 723 not exceeding; Flame Spread 25, Smoke Developed 50.
 - F. Access shall be provided through large hinged, tightly sealed doors or removable access panels. Access doors shall be constructed of the same materials as the unit casing. Each door shall be provided with two (2) cam type handles and two (2) heavy-duty hinges to achieve maximum sealing. Handles shall be internal and external for opening from the inside or outside of the unit. All doors shall open against the air pressure.
 - G. Coils shall have bolted removable panels to facilitate easy access and removal of coils. The panel shall be made similar to wall panels. For ease of removal the coil shall be supported on individual racks. The racks shall be made of Structural steel channel. One side of the coil shall have a removable panel for coil pull out and removal and shall be designed to permit the removal of individual coil sections without disturbing remaining coils.
 - H. The exterior of the unit shall be cleaned and primed with high solids two component Aliphatic polyurethane coatings weather resistant topcoat for extra heavy duty service.

2.4 Fans

- A. The fan shall be centrifugal plenum type designed without a scroll housing incorporating a non-overloading type backward inclined airfoil Aluminum blades continuously welded around all edges to a wheel shroud and heavy gauge reinforced steel back plate. The assembly shall have structural steel frame. The fan shall have inlet plate incorporating removable spun inlet cone designed for smooth airflow into the accompanying inlet retaining ring of the fan wheel.
- B. All wheels shall be statically and dynamically balanced on precision electronic balancer to a level of G6.3 (Per ANSI 2-19 or better). All shafts shall be solid steel accurately turned, ground, polished and ring gauged for accuracy. Shaft shall have first critical speed at least 1.35 times the maximum speed of the fan.
- C. All fans shall have heavy duty, grease lubricated, anti-friction ball or roller bearing, self-aligning, pillow block type bearing selected for minimum average life ABMA L50 of 200,000 hrs. and fitted with regreasable fittings with option of extending the lube lines for easy re-lubrication.

- D. Each fan component shall be thoroughly degreased before application of rust-preventive blue primer. After complete assembly, a finished coat shall be applied to the assembly.
- E. Fan performance shall be based on test conducted in accordance with AMCA standard test code for air moving devices and shall be licensed to bear AMCA seal. Drives shall be V-belt and sized for 1.5 times the fan motor horsepower. The fan shall have an OSHA belt guard.

2.5 Coils

- A. Primary surface shall be round seamless 5/8 inch O.D. by .035 inch thick copper tube on 1.5 inch centers, staggered in the direction of airflow. All joints shall be brazed. Secondary surface shall consist of .0075 inch rippled copper plate fins for higher capacity and structural strength. Fins shall have full drawn collars to provide a continuous surface cover over the entire tube for maximum heat transfer. Bare copper tube shall not be visible between fins and the fins shall have no openings punched in them to prevent the accumulation of lint and dirt. Tubes shall be mechanically expanded into the fins to provide a continuous primary to secondary compression bond over the entire finned length for maximum heat transfer rates.
- B. Casings shall be constructed of continuous Galvanized steel. Coil side plates shall be of reinforced flange type. Coils shall have equal pressure drop through all circuits. Coils shall be circuited for counter flow heat transfer to provide the maximum heat transfer rates. Headers on coils shall be seamless copper tubing. The headers shall have intruded tube holes to provide a large brazing surface for maximum Strength and inherent flexibility. Supply and return connections on water coils shall be steel with male pipe threads. The complete coil core shall be tested with 315 psig air pressure under Warm water and be suitable for operation at 250 psig working pressures. Individual tube tests and core tests before installation of headers shall not be considered satisfactory. Water coils shall be circuited for drain ability. Use of internal restrictive devices to obtain turbulent flow shall not be acceptable. Vents and drains shall be furnished on all water coils. Coils shall be rated in accordance with ARI and coated with a corrosion resistant coating.
- C. Coils shall be mounted in galvanized holding racks. Water coil supply and return connections shall be extended to the unit exterior. Water coil drain and vent connections are accessible from the interior of the Unit and are not extended.
- D. Provide coils with air vent at top of coil and drain valve at bottom.

2.6 Filters

- A. Filters shall be Farr type 30/30 or approved equal. Air filters shall be 2" thick, pleated, disposable type. Each filter shall consist of a non-woven cotton and synthetic fabric media, media support grid and enclosing frame. The filter media shall have an average efficiency of 25-30% on ASHRAE Test Standard. The filter shall be listed by UL as Class 2. A bank of galvanized universal holding frames shall be arranged for upstream access. Provisions shall be made on the downstream side of the frames to prevent filter blowout from moisture or overloading.

- B. A differential Pressure Gauge for measuring the pressure drop across each filter bank shall be provided. The gauge shall be diaphragm-actuated dial type series 2000, 3 7/8" dia. white dial with black figures & graduations, 0 to 1" water gauge operating ranges and will have two static pressure taps and vent valves. Static Pressure taps shall be factory piped.

2.7 Dampers

- A. Provide unit with factory mounted outside, relief and return air dampers (where shown in the plan) of galvanized steel blades, with metallic bulb edge seals (vinyl edge seal is not acceptable) in galvanized frame, in opposed blade arrangement with non-slip keyed connecting rods and linkages. Permanently secure damper blades on a single shaft with self-lubricating nylon bearings. Position damper blades across short air opening dimension. Maximum leakage shall not exceed 2 percent at 4 inch water gauge differential pressure when sized for 2000 fpm face velocity
- B. Dampers to be opposed blade, low leakage type and shall be single or multiple blade as required. Dampers are to be furnished and installed by the air handling unit manufacturer. Dampers to be provided with internal motor mounts, suitable for operation with pneumatic operators. Electric operators furnished by the Building Automation System Contractor. Provide internal motor mount for each individual damper section. Damper sections not to exceed 48" x 48".
- C. All damper frames are to be constructed of aluminum sheet metal and shall have flanges for duct mounting. Damper blades shall not exceed 6" in width. All blades are to be of airfoil type construction, fabricated from aluminum sheet metal. Blades are to be suitable for high velocity performance. Replaceable seals are to be provided with the damper. Seals are to be installed along the top, bottom and sides of the frame and along each blade edge. Linkages shall be located on the damper face for accessibility. Seals shall provide a tight closing, low leakage damper. Dampers shall be guaranteed to limit leakage to 6 CFM per square foot when closing against 4" W.G. static pressure. Provide "equal percentage" or "linear" linkage as required. Dampers shall be made up in sections as required so that damper blades shall not exceed 48" length.
- D. Outside air, relief and return air dampers shall be furnished by the unit manufacturer. Damper operators shall be furnished and installed by the Building Automation System (BAS) Contractor.

Part 3 EXECUTION

3.1 Installation

- A. Install in accordance with manufacturer's instructions and in conformance with ARI 435.
- B. Assemble high pressure units by bolting sections together. Isolate fan section with flexible duct connections.
- C. Install unit on vibration isolators. Refer to Section 23 05 00.

End of Section 23 73 00

Section 23 82 16 - Air Coils

Part 1 GENERAL

1.1 Section Includes

- A. Heating glycol coils.

1.2 Related Sections

- A. Section 23 05 19 – Meters and Gauges for HVAC Piping.
- B. Section 23 07 00 – HVAC Insulation.
- C. Section 23 21 16 - Hydronic Specialties.
- D. Section 23 31 00 – HVAC Ducts and Casings: Installation of duct coils.
- E. Section 26 27 26 - Wiring Devices.

1.3 References

- A. ANSI/ARI 410 - Forced-Circulation Air-Cooling and Air- Heating Coils.
- B. ANSI/NFPA 70 - National Electrical Code.
- C. ANSI/UL 1096 - Electric Central Air Heating Equipment.
- D. SMACNA - HVAC Duct Construction Standards, Metal and Flexible.

1.4 Submittals

- A. Submit shop drawings under provisions of Division 01.
- B. Submit shop drawings indicating coil and frame configurations, dimensions, materials, rows, connections, and rough-in dimensions.
- C. Submit product data under provisions of Division 01.
- D. Submit product data indicating coil and frame configurations, dimensions, materials, rows, connections, and rough-in dimensions.
- E. Submit manufacturer's installation instructions under provisions of Division 01.

1.5 Qualifications

- A. Manufacturer: Company specializing in manufacturing the products specified in this Section with minimum three years experience.

1.6 Delivery, Storage, and Handling

- A. Deliver products to site under provisions of Division 01.
- B. Store and protect products under provisions of Division 01.
- C. Protect coil fins from crushing and bending by leaving in shipping cases until installation, and by storing indoors.
- D. Protect coils from entry of dirt and debris with pipe caps or plugs.

Part 2 PRODUCTS

2.1 Manufacturers – Hydronic Coils

- A. Luvata.
- B. Trane.
- C. Pace.
- D. Carrier.
- E. York.
- F. Substitutions: Under provisions of Division 01.

2.2 Fabrication

- A. Tubes: 5/8 inch OD seamless copper arranged in parallel or staggered pattern, expanded into fins, brazed joints.
- B. Fins: Aluminum continuous plate type with full fin collars or individual helical finned tube type wound under tension.
- C. Casing: Die formed channel frame of 18 gauge galvanized steel. Provide tube supports for coils longer than 36 inches.
- D. Capacity: As scheduled.

2.3 Heating Glycol Coils

- A. Headers: Seamless copper tube with silver brazed joints, or prime coated steel pipe with brazed joints.
- B. Configuration: Drainable, with threaded plugs in headers for drain and vent; threaded plugs in return bends and in headers opposite each tube.
- C. Fin Spacing: 9 fins per inch.

Part 3 EXECUTION

3.1 Installation

- A. Install in accordance with manufacturer's instructions.
- B. Install in ducts and casings in accordance with SMACNA HVAC Duct Construction Standards, Metal and Flexible.
- C. Support coil sections independent of piping on steel channel or double angle frames and secure to casings. Provide frames for maximum three coil sections. Arrange supports to avoid piercing drain pans. Provide airtight seal between coil and duct or casing.
- D. Protect coils to prevent damage to fins and flanges. Comb out bent fins.
- E. Install coils level.
- F. Make connections to coils with unions and flanges.

- G. Provide shut-off valve on supply line and lockshield balancing valve on return line. Locate water supply at bottom of supply header and return water connection at top. Provide float operated automatic air vents at high points complete with stop valve. Ensure coils are drainable and provide drain connection at low points.
- H. Connect water supply to leaving air side of coil (counterflow arrangement).
- I. Insulate headers located outside air flow as specified for piping. Refer to Section 23 07 00.

End of Section 23 82 16

Section 26 05 00 – Common Work Results for Electrical

Part 1 GENERAL

1.1 Section Includes

- A. General Requirements specifically applicable to Division 26, in addition to Division 01 provisions.
- B. The electrical system equipment and installation shall comply with all provisions and requirements of this specification, as well as any and all applicable national, state and local codes and standards.

1.2 Work Sequence

- A. Construct Work in sequence under provisions of Division 01.

1.3 Coordination

- A. Coordinate the Work specified in this Division under provisions of Division 01.
- B. Prepare drawings showing proposed rearrangement of Work to meet job conditions, including changes to Work specified under other Sections. Obtain permission of Owner prior to proceeding.

1.4 References

- A. ANSI/NFPA 70 - National Electrical Code, latest adopted edition including all state and local amendments.
- B. NECA - Standard of Installation.
- C. NETA ATS – Acceptance Testing Specifications for Electrical Power Distribution Equipment and Systems.
- D. Electrical Reference Symbols: The Electrical "Legend" on drawings is standardized version for this project. All symbols shown may not be used on drawings. Use legend as reference for symbols used on plans.
- E. Electrical Drawings: Drawings are diagrammatic; complimentary to the Architectural drawings; not intended to show all features of work. Install material not dimensioned on drawings in a manner to provide a symmetrical appearance. Do not scale drawings for exact equipment locations. Review Mechanical Drawings and adjust work to conform to conditions shown thereon. Field verification of dimensions, locations and levels is directed.

1.5 Regulatory Requirements

- A. Conform to ANSI/NFPA 70.
- B. Conform to the latest adopted edition of the International Building Code and the International Fire Code including all state and local amendments thereto.

- C. Obtain electrical permits, plan review, and inspections from authority having jurisdiction.

1.6 Submittals

- A. Submittal review is for general design and arrangement only and does not relieve the Contractor from any requirements of Contract Documents. Submittal not checked for quantity, dimension, fit or proper operation. Where deviations of substitute product or system performance have not been specifically noted in the submittal by the Contractor, provisions of a complete and satisfactory working installation is the sole responsibility of the Contractor.
- B. In addition to requirements referenced in Division 01, the following is required for work provided under this division of the specification.
 - 1. Provide material and equipment submittals containing complete listings of material and equipment shown on Electrical Drawings and specified herein. Separate from work furnished under other divisions.
 - 2. Submittals shall be provided in PDF format with each section indexed in the PDF document. Submittals for Division 26 shall be complete and submitted at one time. Unless given prior approval, partial submittals will be returned unreviewed.
 - 3. Clearly identify all material and equipment by item, name or designation used on drawings and in specifications.
 - 4. Submit only pages which are pertinent; mark catalog sheets to identify pertinent products, referenced to Specification Section and Article number. Show reference standards, performance characteristics, and capacities; wiring diagrams and controls; component parts; finishes; dimensions; and required clearances.
 - 5. Modify manufacturer's standard schematic drawings and diagrams to supplement standard information and to provide information specifically applicable to the work. Delete information not applicable.
 - 6. Review submittals prior to transmittal; determine and verify field measurements, field construction criteria, manufacturer's catalog numbers, and conformance of submittal with requirements of Contract Documents.
 - 7. Coordinate submittals with requirements of work and of Contract Documents.
 - 8. Certify in writing that the submitted shop drawings and product data are in compliance with requirements of Contract Documents. Notify Owner in writing at time of submittal, of any deviations from requirements of Contract Documents.
 - 9. Do not fabricate products or begin work which requires submittals until return of submittal with Owner acceptance.

10. Equipment scheduled by manufacturer's name and catalog designations, manufacturer's published data and/or specification for that item, in effect on bid date, are considered part of this specification. Approval of other manufacturer's item proposed is contingent upon compliance therewith.

1.7 Substitutions

- A. In accordance with the General Conditions and the General Requirements, Substitution and Product Options, all substitute items must fit in the available space, and be of equal or better quality including efficiency performance, size, and weight, and must be compatible with existing equipment.

1.8 Project Record Drawings

- A. Maintain project record drawings in accordance with Division 01.
- B. In addition to the other requirements, mark up a clean set of drawings as the work progresses to show the dimensioned location and routing of all electrical work which will become permanently concealed. Show routing of work in permanently concealed blind spaces within the building. Show complete routing and sizing of any significant revisions to the systems shown.
- C. Record drawing field mark-ups shall be maintained on-site and shall be available for examination of the Owner's Representative at all times.

1.9 Demonstration of Electrical Systems

- A. During substantial completion inspection:
 1. Conduct operating test for approval under provisions of Division 01.
 2. Demonstrate installation to operate satisfactorily in accordance with requirements of Contract Documents.
 3. Should any portion of installation fail to meet requirements of Contract Documents, repair or replace items failing to meet requirements until items can be demonstrated to comply.
 4. Have instruments available for measuring light intensities, voltage and current values, and for demonstration of continuity, grounds, or open circuit conditions.
 5. Provide personnel to assist in taking measurements and making tests.

1.10 Warranty

- A. In addition to the requirements of Division 01, or as specified in other sections. Warrant all materials, installation and workmanship for one (1) year from date of acceptance.
- B. Copies of manufacturer product warranties for all equipment shall be included in the operation and installation manuals.

Part 2 PRODUCTS

2.1 Materials and Equipment

- A. All Materials and Equipment shall be new.
- B. All Materials and Equipment shall be listed by Underwriter's Laboratories or equivalent third party listing agency for the use intended.
- C. Materials and Equipment shall be acceptable to the authority having jurisdiction as suitable for the use intended when installed per listing and labeling instructions.
- D. No materials or equipment containing asbestos in any form shall be used. Where materials or equipment provided by this Contractor are found to contain asbestos such items shall be removed and replaced with non-asbestos containing materials and equipment at no cost to the Owner.
- E. In describing the various items of equipment, in general, each item will be described singularly, even though there may be numerous similar items.

Part 3 EXECUTION

3.1 Workmanship

- A. Install Work using procedures defined in NECA Standard of Installation and/or the manufacturer's installation instructions.

3.2 Penetrations of Fire Barriers

- A. Related information to this section appears in Division 07, Fire Stopping.
- B. All holes or voids created to extend electrical systems through fire rated floors, walls or ceiling shall be sealed with an asbestos-free intumescent fire stopping material capable of expanding 8 to 10 times when exposed to temperatures 250°F or higher.
- C. Materials shall be suitable for the fire stopping of penetrations made by steel, glass, plastic and shall be capable of maintaining an effective barrier against flame, smoke and gases in compliance with the requirements of ASTM E814 and UL 1479.
- D. The rating of the fire stops shall be the same as the time-rated floor, wall or ceiling assembly.
- E. Install fire stopping materials in accordance with the manufacturer's instructions.

End of Section 26 05 00

Section 26 05 05 – Selective Demolition for Electrical

Part 1 GENERAL

1.1 Section Includes

- A. Electrical Demolition.

1.2 Related Sections

- A. Division 01 - Alteration Project Procedures.
- B. Division 02 - Minor Demolition for Remodeling.

Part 2 PRODUCTS

2.1 Materials and Equipment

- A. Materials and equipment for patching and extending work: As specified in individual Sections.

Part 3 EXECUTION

3.1 Examination

- A. Verify field measurements and circuiting arrangements are as shown on Drawings.
- B. Verify that abandoned wiring and equipment serve only abandoned facilities.
- C. Demolition Drawings are based on existing record documents. Report discrepancies to Owner before disturbing existing installation.
- D. Beginning of demolition means installer accepts existing conditions.

3.2 Preparation

- A. Provide temporary wiring and connections to maintain existing systems in service during construction. When work must be performed on energized equipment or circuits, use personnel experienced in such operations.

3.3 Demolition and Extension of Existing Electrical Work

- A. Demolish and extend existing electrical work under provisions of Division 01, Division 02, and this Division.
- B. Remove, relocate, and extend existing installations to accommodate new construction.
- C. Remove abandoned wiring to source of supply.
- D. Remove exposed abandoned conduit, including abandoned conduit above accessible ceiling finishes. Cut conduit flush with walls and floors, and patch surfaces.
- E. Disconnect abandoned outlets and remove devices. Remove abandoned outlets if conduit servicing them is abandoned and removed. Provide blank cover for abandoned outlets which are not removed.
- F. Disconnect and remove electrical devices and equipment serving utilization equipment that has been removed.

- G. Disconnect and remove abandoned luminaires. Remove brackets, stems, hangers, and other accessories.
- H. Repair adjacent construction and finishes damaged during demolition and extension work.
- I. Maintain access to existing electrical installations which remain active.
- J. Extend existing installations using materials and methods as specified.
- K. Where materials or equipment are to be turned over to Owner or reused and installed by the Contractor, it shall be the Contractor's responsibility to maintain condition of materials and equipment equal to the existing condition of the equipment before the work began. Repair or replace damaged materials or equipment at no additional cost to the Owner.
- L. Contractor to field verify conduits and electrical items in walls to be demolished prior to start of work. Demolish conduits, boxes, devices, equipment, etc. In walls that are scheduled for demolition. Where conduits pass through the walls or circuits are shared with equipment that is existing to remain, provide all work necessary (including extending and re-routing conduits) to maintain access and provide electrical continuity to existing systems and circuitry.

3.4 Existing Panelboards

- A. Ring out circuits in existing panel affected by the Work. Where additional circuits are needed, reuse circuits available for reuse. Install new breakers.
- B. Tag unused circuits as spare.
- C. Where existing circuits are indicated to be reused, use sensing measuring devices to verify circuits feeding Project area or are not in use.
- D. Remove existing wire no longer in use from panel to equipment.
- E. Provide new updated directories where more than three circuits have been modified or rewired.

3.5 Cleaning and Repair

- A. Clean and repair existing materials and equipment which remain or are to be reused.
- B. Panelboards: Clean exposed surfaces and check tightness of electrical connections. Replace damaged circuit breakers and provide closure plates for vacant positions.

3.6 Installation

- A. Install relocated materials and equipment under the provisions of Division 01.

3.7 Disposal

- A. Dispose of all hazardous waste in accordance with all local, State and Federal requirements.

End of Section 26 05 05

Section 26 05 19 – Low-Voltage Electrical Power Conductors and Cables

Part 1 GENERAL

1.1 Section Includes

- A. Building Wire.
- B. Cable.
- C. Wiring Connections and Terminations.

1.2 Related Sections

- A. Section 26 01 26 – Maintenance Testing of Electrical Systems.
- B. Section 26 05 53 – Identification for Electrical Systems.

1.3 References

- A. Federal Specification FS-A-A59544 – Cable and Wire, Electrical (Power, Fixed Installation).
- B. Federal Specification FS-J-C-30B – Cable Assembly, Power, Electrical.
- C. ANSI/NEMA WC 70-2009 – Power Cables Rated 2000 Volts or Less for the Distribution of Electrical Energy.
- D. NETA ATS – Acceptance testing specifications for Electrical Power Distribution and Systems.
- E. NFPA 70 – National Electrical Code.
- F. NFPA 262 – Standard Method of test for flame travel and smoke of wires and cables for use in air-handling spaces.
- G. UL 62 – Flexible Cords and Cables.
- H. UL 83 – Thermoplastic Insulated Wire and Cable.
- I. UL 1424 – Standard for Cables for Power-Limited Fire Alarm.
- J. UL 1479 – Standard for Fire Tests of Through Wall Penetration Fire Stops.
- K. UL 1581 – Reference Standard for Electrical Wires, Cables and Flexible Cords.

1.4 Submittals

- A. Submittals are not requested for this section.

1.5 Quality Assurance

- A. Provide wiring materials located in plenums with peak optical density not greater than 0.5, average optical density not greater than 0.15, and flame spread not greater than 5 feet (1.5m) when tested in accordance with NFPA 262.

Part 2 PRODUCTS

2.1 Building Wire

- A. Thermoplastic-insulated Building Wire: NEMA WC 70.
- B. Feeders and Branch Circuits 6 AWG and Smaller: Copper conductor, 600 volt insulation, THHN/THWN or XHHW-2. 6 and 8 AWG, stranded conductor; smaller than 8 AWG, solid or stranded conductor.
- C. Branch Circuit Wire Color Code:
 - 1. Color code wires by line or phase as follows:
 - a. Black, red, blue and white for 120/208V systems.
 - 2. For conductors 6 AWG and smaller, insulation shall be colored.
 - 3. Grounding conductors 6 AWG and smaller shall have green colored insulation.
- D. Control Circuits: Copper, stranded conductor 600 volt insulation, THHN/THNN or XHHW-2.

2.2 Remote Control and Signal Cable

- A. Control Cable for Class 1 Remote Control and Signal Circuits: Copper conductor, 600 volt insulation, rated 90° C, individual conductors twisted together, shielded, and covered with an overall PVC jacket; UL listed.
- B. Control Cable for Class 2 or Class 3 Remote Control and Signal Circuits: Copper conductor, 300 volt insulation, rated 90° C, individual conductors twisted together, [shielded or unshielded (as required),] and covered with a PVC jacket; UL listed.
- C. Plenum Cable for Class 2 or Class 3 Remote Control and Signal Circuits: Copper conductor, 300 volt insulation, rated 90° C, individual conductors twisted together, shielded or unshielded (as required), and covered with a nonmetallic jacket; UL listed for use in air handling ducts, hollow spaces used as ducts, and plenums.

2.3 Wiring Connections and Terminations

- A. For conductors 8 AWG and smaller:
 - 1. Dry interior areas: Spring wire connectors, pre-insulated "twist-on" rated 105 degrees C per UL 468C. Where stranded conductors are terminated on screw type terminals, install crimp insulated fork or ring terminals. Thomas & Betts Sta-Kon or equal.
 - 2. Motor connections: Spring wire connectors, pre-insulated "twist-on" rated 105 degrees C per UL 468C. Provide a minimum of 8 wraps of Scotch 33+ electrical tape around conductors and connector to eliminate connector back off.

Part 3 EXECUTION

3.1 General Wiring Methods

- A. Use no wire smaller than 12 AWG for power and lighting circuits, and no smaller than 18 AWG for control wiring.
- B. Use 10 AWG conductor for 20 ampere, 120 volt branch circuit home runs longer than 75 feet.
- C. Splice only in junction or outlet boxes.
- D. Neatly train and lace wiring inside boxes, equipment, and panelboards.
- E. Make Conductor lengths for parallel circuits equal.
- F. Wiring in lighting fixture channels shall be rated for 90° C minimum.
- G. Do not share neutral conductors. Provide a dedicated neutral conductor for each branch circuit that requires a neutral.

3.2 Wiring Installation in Raceways

- A. Pull all conductors into a raceway at the same time. Verify that raceway is complete and properly supported prior to pulling conductors.
- B. Install wire in raceway after interior of building has been physically protected from the weather and all mechanical work likely to injure conductors has been completed.
- C. Do not install XHHW-2 conductors when ambient temperatures are below -5 degrees C and THHN/THWN conductors when ambient temperatures are below 0 degrees C.
- D. Conductors shall be carefully inspected for insulation defects and protected from damage as they are installed in the raceway. Where the insulation is defective or damaged, the cable section shall be repaired or replaced at the discretion of the Owner and at no additional cost to the Owner.
- E. Place an equal number of conductors for each phase of a circuit in same raceway or cable.
- F. Route conductors from each system in independent raceway system and not intermix in the same raceway, enclosure, junction box, wireway, or gutter as another system unless otherwise shown on the plans.
- G. No more than six current carrying conductors shall be installed in any homerun unless otherwise indicated on the drawings or without prior approval from the Engineer.
- H. Completely and thoroughly swab raceway system before installing conductors.
- I. When two or more neutrals are installed in one conduit, identify each with the proper circuit number in accordance with Section 26 05 53.

3.3 Cable Installation

- A. Provide protection for exposed cables where subject to damage.

- B. Support cables above accessible ceilings; do not rest on ceiling tiles. Use spring metal clips or cable ties to support cables from structure. Do not support cables from ceiling suspension system. Include bridle rings or drive rings.
- C. Use suitable cable fittings and connectors.

3.4 Wiring Connections and Terminations

- A. Stranded wire shall not be wrapped around screw terminals.
- B. Splice only in accessible junction boxes.
- C. Thoroughly clean wires before installing lugs and connectors.
- D. Make splices, taps and terminations to carry full ampacity of conductors without perceptible temperature rise.
- E. Terminate spare conductors with twist on connectors or heat shrink insulation to proper voltage rating.
- F. Control systems wiring in conjunction with mechanical, electrical or miscellaneous equipment to be identified in accordance with wiring diagrams furnished with equipment.
- G. Code sound and signal systems wiring and any special equipment in accordance with manufacturer's diagrams or recommendations.
- H. Do not exceed manufacturer's recommended pull tensions.

3.5 Field Quality Control

- A. Field inspection and testing will be performed under provisions of Division 01 and Section 26 01 26.
- B. Inspect wire and cable for physical damage and proper connection.
- C. Torque conductor connections and terminations to manufacturer's recommended values.

3.6 Wire and Cable Installation Schedule

- A. All Locations: Building wire and/or remote control and signal cable in conduit.

End of Section 26 05 19

Section 26 05 29 – Hangers and Supports for Electrical Systems

Part 1 GENERAL

1.1 Section Includes

- A. Section included hangers and supports for Power Systems.
- B. Conduit Supports.
- C. Formed Steel Channel.
- D. Spring Steel Clips.

1.2 Related Sections

- A. The Work under this section is subject to requirements of the Contract Documents including the General Conditions, Supplementary Conditions, and sections under Division 01 General Requirements, and Section 26 05 00 – Common Work Results for Electrical.

1.3 References

- A. International Building Code (IBC), Chapter 16 – Structural Design.

1.4 Submittals

- A. Submittals are not requested for this section.

1.5 Coordination

- A. Coordinate size, shape and location of concrete pads with Division 03.

1.6 Quality Assurance

- A. Support systems shall be adequate for weight of equipment and conduit, including wiring, which they carry.

Part 2 PRODUCTS

2.1 Conduit Supports

- A. Manufacturers:
 - 1. Allied Tube & Conduit Corp.
 - 2. Minerallac Fastening Systems.
 - 3. O-Z Gedney Co.
 - 4. Substitutions: per Division 01
- B. Hanger Rods: Threaded high tensile strength galvanized carbon steel with free running threads.
- C. Beam Clamps: Malleable Iron, with tapered hole in base and back to accept either bolt or hanger rod. Set screw: hardened steel.

- D. Conduit clamps for trapeze hangers: Galvanized steel, notched to fit trapeze with single bolt to tighten.
- E. Conduit clamps - general purpose: One-hole malleable iron for surface mounted conduits.
- F. Cable Ties: High strength nylon temperature rated to 185 degrees F. self-locking.

2.2 Formed Steel Channel

- A. Manufacturers:
 - 1. B-Line Systems.
 - 2. Allied Tube & Conduit Corp.
 - 3. Unistrut Corp.
 - 4. Substitutions: per Division 01.
- B. Product Description: Galvanized 12 gage thick steel. With holes 1-1/2 inches on center.

Part 3 EXECUTION

3.1 Examination

- A. Division 01: Verification of existing conditions before starting work.

3.2 Preparation

- A. Obtain permission from Owner's Representative before using powder-actuated anchors.
- B. Obtain permission from Owner's Representative before drilling or cutting structural members.

3.3 Installation – General

- A. Fasten hanger rods, conduit clamps, and outlet and junction boxes to building structure using precast insert system, expansion anchors, preset inserts, beam clamps, or spring steel clips.
- B. Use toggle bolts or hollow wall fasteners in hollow masonry partitions and walls; expansion anchors or preset inserts in solid masonry walls; self-drilling anchors or expansion anchor on concrete surfaces; sheet metal screws in sheet metal studs; and wood screws in wood construction.
- C. Do not fasten supports to piping, ductwork, mechanical equipment, conduit, or ceiling suspension system.
- D. Fabricate supports from structural steel or steel channel, rigidly welded or bolted to present a neat appearance. Use hexagon head bolts with spring lock washers under all nuts.
- E. Install surface-mounted cabinets and panelboards with minimum of four anchors.
- F. Bridge studs top and bottom with channels to support flush-mounted cabinets and panelboards in stud walls.

- G. Securely fasten fixtures and equipment to building structure in accordance with manufacturer's recommendations and to provide necessary earthquake anchorage.
- H. Provide wall attached fixtures and equipment weighing less than 50 pounds with backing plates of at least 1/8" x 10" sheet steel or 2" x 10" fire retardant treated wood securely built into the structural walls. Submit attachment details of heavier equipment for approval.
- I. Earthquake Anchorages:
 - 1. Equipment weighing more than 50 pounds shall be adequately anchored to the building structure to resist lateral earthquake forces.
 - 2. Total lateral (earthquake) forces shall be 1.5 times the equipment weight acting laterally in any direction through the equipment center of gravity. Provide adequate backing at structural attachment points to accept the forces involved.
- J. Power-driven fasteners are prohibited for tension load applications (such as supporting luminaries or conduit racks from ceiling above). Use drilled-in expansion anchors, or drilled and screw-in anchors such as Kwik-Con II or Tapcon.

End of Section 26 05 29

Section 26 05 33 – Raceway and Boxes for Electrical Systems

Part 1 GENERAL

1.1 Section Includes

- A. Metal Conduit.
- B. Flexible Metal Conduit.
- C. Liquidtight Metal Conduit.
- D. Electrical Metallic Tubing.
- E. Fittings and Conduit Bodies.
- F. Wall and Ceiling Outlet Boxes.
- G. Pull and Junction Boxes.

1.2 Related Sections

- A. The Work under this section is subject to requirements of the Contract Documents including the General Conditions, Supplementary Conditions, and sections under Division 01 - General Requirements and Section 26 05 00 – Common Work Results for Electrical.
- B. Section 26 05 19 – Low-Voltage Electrical Power Conductors and Cables.
- C. Section 26 05 29 – Hangers and Supports for Electrical Systems.
- D. Section 26 05 53 – Identification for Electrical Systems.
- E. Section 26 27 26 – Wiring Devices.

1.3 References

- A. American National Standards Institute (ANSI):
 - 1. ANSI C80.1 - Rigid Steel Conduit, Zinc Coated.
 - 2. ANSI C80.3 - Electrical Metallic Tubing, Zinc Coated.
- B. American Society for Testing and Materials (ASTM):
 - 1. ASTM A 123 – Specification for Zinc Coatings on Products Fabricated from Rolled, Pressed, and Forged Steel Shapes, Plates, Bars and Strip.
- C. National Electrical Manufacturers Association (NEMA):
 - 1. NEMA FB 1 - Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit and Cable Assemblies.
 - 2. NEMA OS 1 - Sheet-Steel Outlet Boxes, Device Boxes, Covers, and Box Supports.
 - 3. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum).
- D. Underwriters Laboratory (UL):
 - 1. UL 6 - Rigid Steel Conduit, Zinc Coated.

- 2. UL 514B – Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit and Cable Assemblies.
- E. National Fire Protection Association (NFPA):
 - 1. NFPA 70 - National Electrical Code.
- F. International Building Code (IBC):
 - 1. IBC chapters 16 and 17 seismic requirements.

1.4 Raceway and Boxes installation Schedule

- A. In or through CMU walls:
 - 1. Raceway: Provide rigid steel conduit or intermediate metal conduit. EMT conduit may penetrate through CMU walls where the EMT is installed in a sleeve and does not come in direct contact with the CMU.
 - 2. Boxes and Enclosures: Provide concrete tight cast and sheet metal steel metal boxes.
- B. Outdoor Above Grade, Damp or Wet Interior Locations:
 - 1. Raceway: Provide rigid steel conduit or intermediate metal conduit.
 - 2. Boxes and Enclosures: Provide weatherproof malleable iron for branch circuit junction and outlet boxes. Provide weatherproof NEMA 3R sheet metal enclosures for safety and disconnect switches and NEMA 4 sheet metal enclosures with gaskets for motor controllers and control panels.
 - 3. Fittings: Provide galvanized malleable iron with gaskets. Provide Myers threaded hubs for all conduit entries into top and side of sheet metal enclosures.
- C. Concealed Dry Locations:
 - 1. Raceway: Provide rigid steel conduit, intermediate metal conduit, or electrical metallic tubing.
 - 2. Boxes and Enclosures: Provide sheet-metal boxes. Provide vapor barrier boxes in exterior walls and the ceiling.
 - 3. Fittings: Provide galvanized malleable iron and steel.
- D. Exposed Dry Locations:
 - 1. Raceway: Provide rigid steel conduit or intermediate metal conduit. EMT conduit may be used where exposed conduit is allowed, where it is not subject to physical damage, or where installed on the ceiling or a minimum of ten feet above the floor.
 - 2. Boxes and Enclosures: Provide sheet-metal boxes with raised steel covers.
 - 3. Fittings: Provide galvanized malleable iron and steel.
- E. Equipment Connections: Provide short extensions (three feet maximum) of flexible metal conduit for connections to light fixtures, motors, transformers, vibrating equipment or equipment that requires removal for maintenance or replacement. Use Liquidtight flexible conduit and fittings for motors and equipment in damp or wet

locations or subject to spilling of liquids as at pumps, kitchen equipment, in mechanical rooms, boiler rooms, pump rooms, etc.

1.5 Design Requirements

- A. Raceway Minimum Size:
 - 1. Provide 1/2 inch minimum, unless otherwise noted. Raceway may be reduced to 1/2 inch for final connection of raceway up to 6 feet for connection to fixture or device where maximum conduit entry size is 1/2 inch.
 - 2. Line Voltage Circuits: Raceway is sized on the drawings for copper conductors with 600-Volt type XHHW insulation, unless otherwise noted. Where a raceway size is not shown on the drawings, it shall be calculated to not exceed the percentage fill specified in the NEC Table 1, Chapter 9 using the conduit dimensions of the NEC Table 4, Chapter 9 and conductor properties of the NEC Table 5, Chapter 9.
 - 3. Fire Alarm and other Low-Voltage Circuits: Where installed in raceways, the raceway size shall be calculated to not exceed the percentage fill specified in the NEC Table 1, Chapter 9, using the conduit dimensions of the NEC Table 4, Chapter 9, and cable diameter provided by the manufacturer.
- B. Box Minimum Size: Provide all boxes sized and configured per NEC Article 370 and as specified in this section.
- C. Seismic Support: Provide support in accordance with section 26 05 29 – Hangers and Supports for Electrical Systems.

1.6 Submittals

- A. Submittals are not requested for this section.

1.7 Delivery, Storage, and Handling

- A. Protect conduit from corrosion and entrance of debris by storing above grade. Provide appropriate covering.

Part 2 PRODUCTS

2.1 Rigid Metal Conduit (RMC)

- A. Rigid Steel Conduit: ANSI C80.1, UL 6.
- B. Fittings and Conduit Bodies: NEMA FB 1, UL 514B; Galvanized malleable iron with threaded hubs for all conduit entries. Provide threaded connections and couplings only. Set Screw and running thread fittings are not permitted.
- C. Provide insulated throat bushings at all conduit terminations.

2.2 Intermediate Metal Conduit (IMC)

- A. Product Description: ANSI C80.6, UL 1242; Galvanized Steel Conduit.
- B. Fittings and Conduit Bodies: NEMA FB 1, UL 514B; use fittings and conduit bodies specified above for rigid steel conduit.

- C. Provide insulated throat bushings at all conduit terminations.

2.3 Flexible Metal Conduit (FMC)

- A. Product Description: UL 1, FS WW-C-566; galvanized or zinc-coated flexible steel, full or reduced-wall thickness.
- B. Fittings and Conduit Bodies: ANSI/NEMA FB 1; steel or malleable iron with insulated throat bushings. Die cast zinc or threaded inside throat fittings are not acceptable.

2.4 Liquidtight Flexible Metal Conduit (LFMC)

- A. Product Description: UL 360, flexible metal conduit with interlocked steel construction and PVC jacket.
- B. Fittings and Conduit Bodies: ANSI/NEMA FB 1; liquid tight steel or malleable iron with insulated throat bushings. Die cast fittings are not acceptable.

2.5 Electrical Metallic Tubing (EMT)

- A. Product Description: ANSI C80.3, UL 797; galvanized steel tubing.
- B. Fittings and Conduit Bodies: ANSI/NEMA FB 1; steel or malleable iron, compression or set screw type with insulated throat bushings. Zinc die cast or indentor fittings are not acceptable.
- C. Maximum size shall be 2". Provide factory elbows on sizes 1-½" and larger.

2.6 Outlet Boxes

- A. Sheet Metal Outlet Boxes: ANSI/NEMA OS 1, UL514A galvanized steel, with plaster ring where applicable.
 - 1. Minimum Size: 4 inches square or octagonal, 1-1/2 inches deep, unless otherwise noted.
 - 2. Luminaire and Equipment Supporting Boxes: Rated for weight of equipment supported; furnish 1/2 inch male fixture studs where required. Minimum Size: 4 inches square or octagonal, 2-1/8 inches deep.
 - 3. Concrete and Masonry: Concrete type with field installed tape cover to prevent concrete entry to raceway system. Minimum Size: 4 inches square, 2-1/8 inches deep.
- B. Vapor Barrier Boxes: Airtight box with vapor barrier flange and integral wire entry seal. Lessco, Nutek, Enviroseal, or approved equal.
- C. Cast Boxes: NEMA FB 1, Type FD, galvanized malleable iron. Furnish gasketed cover by box manufacturer. Furnish threaded hubs. "Bell" boxes are not acceptable.
- D. Wall Plates: As specified in Section 26 27 26.

2.7 Pull and Junction Boxes

- A. Sheet Metal Pull and Junction Boxes: ANSI/NEMA OS 1, UL514A galvanized steel.
 - 1. Minimum Size: 4 inches square or octagonal, 1-1/2 inches deep, unless otherwise noted.
- B. Sheet Metal Boxes Larger Than 12 Inches in Any Dimension: Hinged enclosure, Hoffman or approved equal.

2.8 Expansion Fittings

- A. Galvanized malleable iron, galvanized with grounding bond jumper.

2.9 Bushings

- A. Non-grounding: Threaded impact resistant plastic.
- B. Grounding: Insulated galvanized malleable iron/steel with hardened screw bond to raceway and conductor lug.

2.10 Locknuts

- A. Threaded Electro Zinc Plated Steel designed to cut through protective coatings for ground continuity.

2.11 Wireway

- A. Product Description: General purpose type wireway. Size per NEC minimum fill capacity required.
- B. Knockouts: Field-installed, no factory knockouts acceptable.
- C. Cover: Screw cover.
- D. Fittings and Accessories: Include factory couplings, offsets, elbows, adapters and support straps required for a complete system. Provide internal ground bonding jumper bonded to each section.

Part 3 EXECUTION

3.1 Installation

- A. Ground and bond raceway and boxes in accordance with Section 26 05 26.
- B. Provide seismic support and fasten raceway and box supports to structure and finishes in accordance with Section 26 05 29.
- C. Identify raceway and boxes with origin and destination in accordance with Section 26 05 53.
- D. Unless otherwise noted, do not inter-mix conductors from separate panelboards or any other system in the same raceway system or junction boxes.

3.2 Installation – General Raceway

- A. Install raceway for all systems, unless otherwise noted.

- B. Install an equipment grounding conductor inside of all raceways containing line voltage conductors.
- C. Provide raceways concealed in construction unless specifically noted otherwise, or where installed at surface cabinets, motor and equipment connections and in Mechanical and Electrical Equipment rooms. Do not route conduits on roofs, outside of exterior walls, or along the surface of interior finished walls unless specifically noted on the plans.
- D. Raceway routing and boxes are shown in approximate locations unless dimensioned. Where raceway routing is not denoted, field-coordinate to provide complete wiring system.
- E. Do not route raceways on floor. Arrange raceway and boxes to maintain a minimum of 6 feet 6 inches of headroom and present a neat appearance. Install raceways level and square to a tolerance of 1/8" per 10 feet. Route exposed raceways and raceways above accessible ceilings parallel and perpendicular to walls, ceiling, and adjacent piping.
- F. Maintain minimum 6-inch clearance between raceway and mechanical and piping and ductwork. Maintain 12-inch clearance between raceway and heat sources such as flues, steam pipes, heating pipes, heating appliances, and other surfaces with temperatures exceeding 104 degrees F.
- G. Do not install raceway imbedded in spray applied fire proofing. Seal raceway penetrations of fire-rated walls, ceilings, floors in accordance with the requirements of Section 26 05 00.
- H. Where raceway penetrates fire-rated walls and floors, seal opening around conduit with UL listed firestop sealant or intumescent firestop, preserving the fire time rating of the construction.
- I. Raceways and boxes penetrating vapor barriers or penetrating areas from cold to warm shall be taped and sealed with a non-hardening duct sealing compound to prevent the accumulation of moisture, and shall include a vapor barrier on the outside.
- J. Arrange raceway supports to prevent misalignment during wiring installation. Support raceway using coated steel or malleable iron straps, lay-in adjustable hangers, clevis hangers, and split hangers.
- K. Do not attach raceway to ceiling support wires or other piping systems and do not fasten raceway with wire or perforated pipe straps. Remove all wire used for temporary raceway support during construction, before conductors are pulled. Raceway shall be installed to permit ready removal of equipment, piping, ductwork, or ceiling tiles.
- L. Group raceway in parallel runs where practical and use conduit rack constructed of steel channel with conduit straps or clamps, as specified in Section 26 05 29. Provide space on each rack for 25 percent additional raceway.
- M. Cut conduit square; de-burr cut ends. Bring conduit to the shoulder of fittings and couplings and fasten securely. Where locknuts are used, install with one inside box and one outside with dished part against box.
- N. Use threaded raintight conduit hubs for fastening conduit to cast boxes, and for fastening conduit to sheet metal boxes in damp or wet locations. Sealing locknuts are not acceptable.

- O. Install no more than the equivalent of three 90-degree bends between boxes.
- P. Install conduit bodies to make sharp changes in direction, such as around beams. "Goosenecks" in conduits are not acceptable.
- Q. Provide protective plastic bushings or insulated throat bushings at each raceway termination not installed to an enclosure. Bushings shall be threaded to the raceway end or connector.
- R. Avoid moisture traps; install junction box with drain fitting at low points in raceway system.
- S. Install fittings designed and listed to accommodate expansion and contraction where raceway crosses control and expansion joints.
- T. Use cable sealing fittings forming a watertight non-slip connection to pass cords and cables into conduit. Size cable sealing fitting for the conductor outside diameter. Use Appleton CG series or equal cable sealing fittings.
- U. Use suitable caps to protect installed raceway against entrance of dirt and moisture.
- V. Provide nylon "jet-line" or approved equal pull string in empty raceway, except sleeves and nipples.

3.3 Installation – General Boxes

- A. Provide electrical boxes as shown on Drawings, and as required for splices, taps, wire pulling, equipment connections, and code compliance. All electrical box locations shown on Drawings are approximate unless dimensioned.
- B. Install pull boxes and junction boxes above accessible ceilings and in unfinished areas only. Where installation is inaccessible, install outlet and junction boxes no more than 6 inches from ceiling access panel or from removable recessed luminaries.
- C. Coordinate layout and installation of boxes to provide adequate headroom and working clearance. Coordinate mounting heights and locations of outlets mounted above counters, benches, and backsplashes.
- D. Align wall-mounted outlet boxes for switches, thermostats, and similar devices.
- E. Use multiple-gang boxes where more than one device are mounted together; do not use sectional boxes. Provide barriers to separate wiring of different voltage systems and where normal and emergency power circuits occur in the same box.
- F. Adjust box location up to 6 feet prior to rough-in to accommodate intended purpose.
- G. Locate and install boxes to maintain headroom and to present a neat appearance.
- H. Provide knockout closures for unused openings.
- I. Install boxes in walls without damaging wall insulation or reducing its effectiveness.
- J. Do not fasten boxes to ceiling support wires or other piping systems.
- K. Support boxes independently of conduit.
- L. Clean interior of boxes to remove dust, debris, and other material and clean exposed surfaces and restore finish.

M. Provide blank covers or plates for all boxes that do not contain devices.

End of Section 26 05 33

Section 26 05 53 – Identification for Electrical Systems

Part 1 GENERAL

1.1 Section Includes

- A. Nameplates and Tape Labels.
- B. Wire and Cable Markers.

1.2 Related Sections

- A. The Work under this section is subject to requirements of the Contract Documents including the General Conditions, Supplementary Conditions, and sections under Division 01 General Requirements, and Section 26 05 00 – Common Work Results for Electrical.
- B. Section 26 05 19 – Low-Voltage Electrical Power Conductors and Cables.
- C. Section 26 05 33 – Raceway and Boxes for Electrical Systems.
- D. Section 26 27 26 – Wiring Devices.

1.3 Submittals

- 1. Submittals are not requested for this section.

1.4 Environmental Requirements

- A. Install labels and nameplates only when ambient temperature and humidity conditions for adhesive are within range recommended by manufacturer.

Part 2 PRODUCTS

2.1 Nameplates

- A. Product Description: Laminated three-layer plastic with engraved white letters on black background. Nameplate for service disconnect shall be engraved white letters on red background.
- B. Letter Size:
 - 1. 1/4-inch high letters for identifying individual panel or equipment.
 - 2. 1/8-inch high letters for remaining lines with 1/8 inch spacing between lines.
- C. Minimum nameplate size: 1/8 inch thick with a consistent length and height for each type of nameplate wherever installed on the project.

2.2 Tape Labels

- A. Product Description: Adhesive tape labels, with 3/16 inch Bold Black letters on clear background made using Dymo Rhino series label printer or approved equal.
- B. Embossed adhesive tape will not be permitted for any application.

2.3 Wire Markers

- A. Power and Lighting Description: Machine printed heat-shrink tubing, cloth or wrap-on type, for all neutrals and Phase conductors.
- B. Low Voltage System Description: Self-adhesive machine printed label with unique wire number that is shown on shop drawing for system.

2.4 Fire Alarm Conduit and Box Identification

- A. Product Description: Red spray paint for fire alarm boxes.

Part 3 EXECUTION

3.1 General Installation

- A. Degrease and clean surfaces to receive nameplates and tape labels.
- B. Install nameplates and tape labels parallel to equipment lines.

3.2 Nameplate Installation

- A. Secure nameplates to equipment fronts using machine screws tapped and threaded into panelboard, or using rivets. The use of adhesives is not acceptable. Machine screws to not protrude more than 1/16 inch on back side.
- B. Disconnects, Starters, or Contactors:
 - 1. Provide nameplate for each device with the following information:
 - a. Line 1: Load served.
 - b. Line 2: Panelboard and circuit number from which the device is fed.
 - c. Line 3: Fuse or Circuit amperage and poles. Where fused disconnect is installed, denote the maximum fuse size to be installed.
- C. Control or Low Voltage System Panels:
 - 1. Provide nameplate for each control panel with the following information:
 - a. Line 1: Unique panel name as shown on the shop drawings.
 - b. Line 2: System description such as Fire Alarm, Intercom, BAS, Security, etc.
 - c. Line 3: Panelboard and circuit number from which the panel is fed if applicable.

3.3 Wire Identification

- A. Provide wire markers on each conductor in panelboard gutters, pull boxes, outlet and junction boxes, and at load connection. Identification shall be as follows:
 - 1. Markers shall be located within one inch of each cable end, except at panelboards, where markers for branch circuit conductors shall be visible without removing panel deadfront.
 - 2. Each wire and cable shall carry the same labeled designation over its entire run, regardless of intermediate terminations.

3. Color code phases, neutral, and ground per NEC requirements and Section 26 05 19.
 4. Color-code all low-voltage system wires and cables in accordance with the individual sections in which they are specified.
 5. For power and lighting circuits, identify with branch circuit or feeder number.
 6. Control Circuits: Control wire number as indicated on schematic and shop drawings.
 7. Fire Alarm Circuits: Provide cable markers showing NAC or SLC loop identification number at all fire alarm junction boxes and pullboxes.
- B. Provide pull string markers at each end of all pull strings. Marker shall identify the location of the opposite end of the pull string.

3.4 Junction Box Identification

- A. Label each lighting and power junction box with the panelboard name and circuit number.
- B. For junction boxes above ceilings, mark the box cover with the circuit or system designation using permanent black marker. For junction boxes in finished areas, mark the inside of the cover with the circuit or system designation using permanent black marker.

3.5 Device Plate Identification

- A. Label each receptacle device plate or point of connection denoting the panelboard name and circuit number.
- B. Install adhesive label on the top of each plate.

3.6 Low-Voltage System Identification

- A. Install all labeling in accordance with the requirements of this section and of each section where the individual systems are specified.

End of Section 26 05 53

Section 26 27 26 – Wiring Devices

Part 1 GENERAL

1.1 Section Includes

- A. Receptacles.
- B. Device Plates and Box Covers.

1.2 Related Sections

- A. The Work under this section is subject to requirements of the Contract Documents including the General Conditions, Supplementary Conditions, and sections under Division 01 - General Requirements and Section 26 05 00 – Common Work Results for Electrical.
- B. Section 26 05 33 – Raceway and Boxes for Electrical Systems.
- C. Section 26 05 53 – Identification for Electrical Systems.

1.3 Reference Standards

- A. FS W-C-596 – Federal Specification for Electrical Power Connector, Plug, Receptacle, and Cable Outlet.
- B. FS W-S-896 – Federal Specification for Switches, Toggle (Toggle and Lock), Flush Mounted.
- C. NEMA WD 1 - General Color Requirements for Wiring Devices.
- D. ANSI/NEMA WD 6 – Wiring Devices – Dimensional Requirement.
- E. UL 498 - Attachment Plugs and Receptacles.
- F. UL 943 – Ground-Fault-Circuit-Interrupters.

1.4 Submittals

- A. Submittals are not requested for this section.

Part 2 PRODUCTS

2.1 Acceptable Manufacturers – Receptacles

- A. Hubbell.
- B. Leviton.
- C. Pass & Seymour.
- D. Arrow Hart
- E. Substitutions: Under provisions of Division 01.

2.2 Receptacles

- A. Convenience and Straight-blade Receptacles: UL 498, ANSI/NEMA WD-6 and Federal Specification FS W-C-596 industrial grade receptacle.

- B. Locking-Blade Receptacles: NEMA WD 5.
- C. Convenience Receptacle Configuration: ANSI/NEMA WD-6; Type 5-20R, white [ivory] nylon face.
- D. GFCI Receptacles: ANSI/NEMA WD-6; 20A, duplex convenience receptacle with integral class 'A' ground fault current interrupter, LED indicator lamp and integral lockout.

2.3 Device Plates

- A. Decorative Cover Plate: Smooth 430 or 302 stainless steel with metal, counter sunk screws to match device plate.
- B. Exposed Work Cover Plate: ½ inch raised, square, pressed, galvanized or cadmium plated steel cover plate supporting devices independent of the outlet box.

Part 3 EXECUTION

3.1 Installation

- A. Install convenience receptacles 18 inches above floor, grounding pole on bottom unless noted otherwise.
- B. Install galvanized steel plates on outlet boxes and junction boxes in unfinished areas, above accessible ceilings, and on surface-mounted outlets.
- C. Install devices and wall plates flush and level.
- D. Ground receptacles to boxes with a grounding wire. Grounding through the yoke or screw contact is not an acceptable alternate to the ground wire.
- E. Install circuit label on each receptacle and light switch in accordance with Section 26 05 53.

End of Section 26 27 26

Section 26 28 16 – Enclosed Switches and Circuit Breakers

Part 1 GENERAL

1.1 Section Includes

- A. Enclosed Switches.

1.2 Related Sections

- A. The Work under this section is subject to requirements of the Contract Documents including the General Conditions, Supplementary Conditions, and sections under Division 01 General Requirements and Section 26 05 00 – Common Work Results for Electrical.
- B. Section 01 40 00 – Quality Requirements.
- C. Section 26 05 53 – Identification for Electrical Systems.

1.3 Reference Standards

- A. ANSI/UL 98 Enclosed and Dead Front Switches.
- B. NEMA KS 1 - Enclosed and Miscellaneous Distribution Equipment Switches (600 Volts Maximum).
- C. NEMA 250 – Enclosures for Electrical Equipment (1000 Volts Maximum).
- D. NETA ATS – Acceptance Testing Specifications for Electrical Power Distribution Equipment and Systems.

1.4 Submittals

- A. Product Data: Submit product data for all components provided, showing electrical characteristics, material, and dimensions. Each catalog sheet should be clearly marked to indicate exact part number provided, including all options and accessories.
- B. Shop Drawings: Submit shop drawings include outline drawings with dimensions, and equipment ratings for voltage, capacity, horsepower, and short circuit current interrupting rating.

1.5 Closeout Submittals

- A. Project Record Drawings: Accurately indicate actual location of enclosed switches.

1.6 Quality Assurance

- A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years experience.

Part 2 PRODUCTS

2.1 Acceptable Manufacturers – Enclosed Switches

- A. Square D.
- B. Siemens.

- C. Cutler Hammer.
- D. General Electric.
- E. Substitutions: Under provisions of Division 01.

2.2 Enclosed Switches

- A. Nonfusible Switch Assemblies: NEMA KS 1; Heavy Duty type; quick-make, quick-break, load interrupter enclosed knife switch with externally operable handle interlocked to prevent opening front cover with switch in ON position. Handle lockable in OFF position.
- B. Enclosures: NEMA KS 1; Type 1, 3R or 4 as indicated on Drawings.

2.3 Enclosures

- A. Enclosed circuit breaker shall have NEMA 1 general-purpose ratings unless otherwise noted. Provide enclosure suitable for locations as indicated on drawings.

Part 3 EXECUTION

3.1 Installation

- A. Install enclosed switches where indicated on Drawings, and where required for NEC required disconnect of equipment specified under other divisions, but installed under Division 26.
- B. All enclosed switches shall have signage for arc hazard installed. The marking shall be located to be clearly visible to qualified personnel before examination, adjustment, servicing or maintenance of the equipment. At a minimum the signage shall state the following:

Warning
Arc Flash and Shock Hazard
Appropriate PPE Required

3.2 Field Quality Control

- A. Field inspecting, testing, adjusting and balancing.
- B. Inspect and test in accordance with NETA ATS, exception Section 4.
- C. Perform inspections and tests listed in NETA ATS, Section 7.5.

3.3 Adjustments

- A. The Contractor shall perform necessary field adjustments of the circuit breakers to place the equipment in final operating condition. The settings shall be in accordance with the approved protective device coordination study or as directed by the Engineer.

End of Section 26 28 16

Section 26 50 00 – Lighting

Part 1 GENERAL

1.1 Section Includes

- A. Interior Luminaires and Accessories.
- B. Emergency Lighting Units.

1.2 Related Sections

- A. The Work under this section is subject to requirements of the Contract Documents including the General Conditions, Supplementary Conditions, and sections under General Conditions of the Contract General Requirements, and Section 26 05 00 – Common Work Results for Electrical.
- B. Section 26 05 19 – Low Voltage Electrical Power Conductors and Cables.
- C. Section 26 05 29 - Hangers and Supports for Electrical Systems: General Supports for Luminaires.
- D. Section 26 05 33 – Raceway and Boxes for Electrical Systems.
- E. Section 26 05 53 – Identification for Electrical Systems.

1.3 Definitions

- A. CCT: Correlated Color Temperature.
- B. CRI: Color Rendering Index.
- C. Driver: LED Power Supply.
- D. Fixture: See "Luminaire."
- E. IES: Illuminating Engineering Society of North America
- F. IP: International Protection or Ingress Protection Rating.
- G. Lamp Module: Replaceable LED board array/light engine including a plug-in connector.
- H. LED: Light-emitting diode.
- I. Lumen: Measured output of lamp and luminaire, or both.
- J. Luminaire: Complete lighting unit, including lamp or lamp module, driver, reflector, and housing.
- K. THD: Total Harmonic Distortion.

1.4 Reference Standards

- A. NECA/IESNA 500 – Recommended Practice for Installation Indoor Commercial Lighting System.
- B. IES TM-21-11 Projecting Long Term Lumen Maintenance of LED Light Sources.
- C. IES LM-80 IES Approved Method: Measuring Luminous Flux and Color Maintenance of LED Packages, Arrays and Modules.
- D. UL 924 - Emergency Lighting and Power Equipment.

1.5 Submittals

- A. Product Data: Submit the following:
 - 1. Luminaires: Include manufacturer's product data sheets and/or shop drawings including outline drawings showing support points, weights, and accessory information for each luminaire type. Clearly indicate all options being provided. Arrange data for luminaires in the order of fixture designation.
 - 2. Prior to preparing submittals, coordinate with the reflected ceiling plan for ceiling finishes and provide all necessary kits, brackets, stems, trim, etc. to install the specified fixtures in the ceilings provided. Clearly note these configurations on the product data sheets.
- B. Warranty: Provide copies of manufacturer's warranty information for each luminaire. If warranty information is the same for a group of manufacturer's luminaires, provide a letter or schedule clearly indicating what warranty applies to each fixture.

1.6 Delivery, Storage, and Handling

- A. Deliver products to site, store and protect in a clean, dry environment under provisions of General Conditions of the Contract.

Part 2 PRODUCTS

2.1 Interior and Exterior Luminaires and Accessories

- A. Luminaires: Provide UL listed luminaires as scheduled on the drawings or as approved equal.
- B. Listing: Luminaires shall be listed for use in the environment in which they are installed. For example, luminaires installed in return air plenums, direct contact with insulation, or in hazardous, wet, damp, or corrosive locations shall be UL listed for such application.
- C. Accessories: Provide all mounting kits, supports, interconnecting wiring, power supplies, trim kits, gaskets, etc. for a complete installation.
- D. Housing:
 - 1. Metal parts shall be free of burrs and sharp corners and edges. Form and support to prevent warping and sagging.
 - 2. Doors, Frames and Other Internal Access: Smooth operating, free of light leakage under operating conditions. Designed to prevent doors, frames, lenses, diffusers, and other components from falling accidentally during relamping and when secured in operating position.
 - 3. Luminaires shall be factory painted and free of discoloration. Color as scheduled.

2.2 Drivers - LED

- A. LED Driver: Provide UL listed power supply as recommended by the LED fixture manufacturer for operation of the specified LED lamps. Power supply shall be integral to the luminaire unless otherwise noted on the Plans. Power supply shall be dual

voltage (120/277V) where available or operate at the supply voltage indicated on the Plans.

2.3 Emergency Lighting Units

- A. Luminaires: Provide UL listed emergency lighting units as scheduled on the drawings or as approved equal.

Part 3 EXECUTION

3.1 Installation

- A. Coordinate layout and installation of ceiling-mounted devices with other construction items that penetrate ceilings or are supported by them, including luminaires, occupancy sensors, HVAC equipment, smoke detectors, fire-suppression system, IP video cameras, and partition assemblies. Adjust locations as required.
- B. Unless otherwise noted on Plans, provide drivers integral to luminaires, pre-wired and installed at the factory, suitable for use with the selected LED lamps.
- C. Support surface-mounted luminaires directly from building structure. Install level and parallel/perpendicular with ceiling or wall surfaces.
- D. Provide luminaire disconnecting means in the wiring compartment of each luminaire. Where the luminaire is fed from a multi-wire branch circuit, provide multi-pole disconnect to simultaneously break all supply conductors to the ballast, including the grounded conductor.
- E. Mechanical Rooms: Lighting fixture locations shown on Plans in mechanical and electrical equipment rooms are approximate. Coordinate mounting height and location of lighting fixtures to clear mechanical, electrical and plumbing equipment and to adequately illuminate meters, gauges and equipment. Support all lighting fixtures independently of duct work or piping.
- F. Aim directional lampheads of emergency lighting units to illuminate the path of egress.
- G. installed in.
- H. Coordinate location of wall mounted emergency lighting units with mechanical equipment, ductwork, piping, or any other obstruction that would impact the lighting output.

3.2 Relamping

- A. Re-lamp or replace luminaires that have failed lamps at completion of work.

3.3 Adjusting and Cleaning

- A. Align luminaires and clean lenses and diffusers at completion of work. Clean paint splatters, dirt, and debris from installed luminaires.
- B. Touch up luminaire finish at completion of work.

3.4 Field Quality Control

- A. Tests: Perform tests listed below according to manufacturer's written instructions. Test unit functions, operations, and protective features. Adjust to ensure operation complies

with Specifications. Perform tests required by NFPA 70, Articles 700 and 701. Perform tests on completion of unit installation and after building circuits have been energized. Provide instruments to permit accurate observation of tests. Include the following tests:

1. Simulate power outage: Verify proper operation of each individual emergency power supply.
 2. Verify emergency supply duration.
- B. Retest: Correct deficiencies identified by tests and observations and retest until specified requirements are met.

3.5 Adjusting

- A. Aim lamps on wall-mounted emergency lighting units to obtain the following illumination of egress pathway:
1. An average of 1 foot-candle.
 2. A minimum at any point of 0.1 foot-candle measured along the path of egress at floor level.
 3. Maximum-to-minimum illumination uniformity ratio of 40 to 1 shall not be exceeded.
- B. Test emergency lighting equipment in accordance with the manufacturer's instructions and NECA/IESNA 500.

End of Section 26 50 00