Craig City School District

CRAIG HIGH SCHOOL
NEW SHOP BUILDING

PROJECT MANUAL

April 19, 2024

Prepared for:
Craig City School District
PO Box 800/100 School Rd
Craig, Alaska 99921

Prepared By:
R&M Engineering-Ketchikan, Inc.
7180 Revilla Road, Suite 300
Ketchikan, Alaska 99901

TABLE OF CONTENTS

CRAIG CITY SCHOOL DISTRICT
INVITATION FOR BID

CRAIG HIGH SCHOOL
NEW SHOP BUILDING SUPPLY CONTRACT

NOTICE IS HEREBY GIVEN THAT the Craig City School District (CCSD), is soliciting sealed bids for the following project: **CRAIG HIGH SCHOOL NEW SHOP BUILDING**. This project includes the construction of a 2880 SF prefabricated metal building that will serves as a wood shop. The prefabricated metal building, including all man doors, overhead doors, vinyl windows, metal SIP wall and roof panels, liner panels, soffit panels, fascia, gutters, snow guards, and all primary and secondary steel as well as has been procured by the Owner and is at the project site. Scope of work includes the erection of the metal building, construction of the concrete foundation, and all interior walls and finishes as well as all mechanical and electrical scope.

To receive the Invitation for Bid (IFB), please contact: 907-826-3274 office of CCSD Superintendent Chris Reitan. Requests for the IFB documents may be emailed to creitan@craigschools.com. The IFB documents will also be posted on the School District's website and The Plans Room. Even though the IFB documents are provided online, each firm must register with the School District by sending an email to: creitan@craigschools.com. Bids from unregistered bidders will not be accepted. The required email must include the firm name, address, telephone number, and fax number. No faxed or oral bids will be allowed.

Bid Submission Deadline: To be considered, sealed bids must be received in the Office of the CCSD Superintendent at PO Box800/100 School Road Craig, AK 99921 by 2:00 P.M. local time, on **May 10, 2024**.

CRAIG CITY SCHOOL DISTRICT

By: _____
CCSD Superintendent

_____
Release Date:

END OF INVITATION FOR BID

INSTRUCTIONS TO BIDDERS

PREPARATION OF BID FORMS.
The Craig City School District, hereinafter referred to as the **OWNER**, invites bids on the form enclosed as part of the bidding and contract documents to be submitted at such time and place as is stated in the Invitation for Bid.

All bids must be submitted in a sealed envelope or box clearly marked on the outside with the project name, and must be delivered to the address outlined, and in the required format, on or before the deadline outlined in the IFB. Bids may also be submitted via email to Chris Reitan at creitan@craigschools.com. It is the sole responsibility of the Bidder to see that his bid is received in proper time. **Any bids received after the deadline for receipt of bids will be disqualified and returned to the Bidder unopened. Bids submitted by fax will not be accepted.**

To be considered, bidders must complete, sign, and include the Bid Documentation Forms provided in the IFB with submitted bids.

SIGNATURES.
All proposals shall give the price proposed, both in writing and in figures, shall give all other information requested herein, and shall be signed and dated by the Bidder or his authorized representative. Specifically:

A. If the proposal is made by an individual, his name, signature and mailing address must be shown.

B. A bid by a partnership shall be executed in the partnership name and signed by a partner (whose title must appear under the signature), accompanied by evidence of authority to sign. Evidence of authority to sign may be in the form of a copy of the partnership agreement or other reliable evidence.

C. A bid by a limited liability company shall be executed in the name of the firm by a member and accompanied by evidence of authority to sign. Such evidence may be in the form of a copy of the corporate bylaws, articles of incorporation, resolution of the board, corporate certificate, or other reliable evidence.

D. A bid by a corporation shall be executed in the corporate name by the president, vice-president, or other corporate officer. A certified copy of the bylaws or resolution of the board of directors of the corporation shall be furnished showing the authority of the officer signing the proposal to execute contracts on behalf of the corporation.

PRE-BID CONFERENCE
A pre-bid conference for discussions of the Project, the bidding requirements and other important matters will be held **onsite** on **May 1st at 1:00 pm**. The pre-bid conference held in person is not mandatory, but is strong recommended to view the existing site preparation that has been done as well as the prefabricated building that as been procured.

PROJECT SITE VISIT

It is strongly encouraged that prospective Bidders visit the site to view existing conditions. A project site visit is **not** mandatory. To set up a date and time to visit the project site, contact:

Daniel Nelson
Maintenance Director
Craig City School District
360.471.7681
dnelson@craigschools.com

INQUIRY DEADLINE

Questions, objections, or protests relating to defects, errors, omissions regarding the project or this IFB should be submitted in writing no later than seven (7) days prior to the time announced for opening the proposals for an interpretation or correction thereof. The person submitting the request shall be responsible for its prompt delivery. Any interpretation or correction of the Contract Documents will be made only by Addendum issued by the Project Manager, which shall thereupon become part of the Contract Documents and a copy of such Addendum will be sent by email to each person receiving a set of Contract Documents; however, responsibility shall rest solely with each of the intending Bidders to determine that he has, by time of bidding, received all Addenda. The OWNER will not be responsible for any other explanation or interpretation of the Contract Documents. No oral interpretation of provisions in the Contract Documents will be made to the Bidder. Bidders must satisfy themselves of the accuracy of any of the estimated quantities by examination of the site and a review of the Contract Documents, including Addenda. After bids have been submitted, the Bidder shall not assert that there was a misunderstanding concerning the quantities of work, site or other conditions, or of the nature of the work to be done.

Address questions to:

R&M Engineering-Ketchikan
Nycole Gizinski
Architect
Telephone: 907.225.7917 Ext. 103
Email: nycole@rmketchikan.com

DELIVERY INSTRUCTIONS

Bids must be received by the deadline specified in this IFB.

Be aware that Craig is considered a remote location and, as such, mail and special deliveries by couriers to Craig are commonly delayed beyond the advertised guaranteed arrival of carriers and couriers.

Bids must be delivered or emailed to:
Craig City School District (CCSD)
Superintendent
Att: Chris Reitan, creitan@craigschools.com
Po Box 800/100 School Rd
Craig, AK 99921

INSURANCE AND LEGAL REQUIREMENTS

INSURANCE REQUIREMENTS.
Before execution of a contract, and during the entire period of the project, the contractor shall provide the types of insurance listed below. All policies shall have a mandatory 30-day cancellation clause. The Craig City School District shall be named as additional insured on all insurance policies except professional liability policies Insurance certificates will be required to be submitted for review by the Craig City School District's Risk Manager before the Craig City School District will issue a notice to proceed. The following insurances are required:

Workers' compensation as required by law and employer's liability coverage at a minimum of $1,000,000. The Workers' compensation policy shall include a Waiver of Subrogation in favor of the Craig City School District.

Commercial general liability insurance, not excluding explosion, contractual liability or product/completed operation liability insurance - $1,000,000 per occurrence and $2,000,000 aggregate.

Comprehensive automobile liability, bodily injury and property damage, including all owned, hired and non-owned, automobile - $1,000,000 per each accident.
Builder's all risk (course of construction) in the amount of 100% of the total contract amount, including change orders, as well as materials in place and/or stored at the site, whether or not partial payment has been made by the Craig City School District. Deductible to be no more than 10% of the total contract amount.

SURETY REQUIREMENTS
All projects $25,000 and over are subject to surety requirements as outlined below.

BID BOND: Bidder shall submit with their bid or price bid component, a bid bond accompanied by Power of Attorney, or cashier's check payable to Craig City School District as evidence of good faith and as a guarantee that if awarded the Contract the Bidder will execute the required form of agreement, and give the bonds and other instruments as required. Bids or price bids between $25,000 and $100,000 require a surety of 10% of the total bid or price bid. Bids or price bids greater than $100,000 require a surety of 5% of the bid or price bid. The successful Bidder's bid security will be retained until he has furnished a one hundred percent (100%) performance bond and a one hundred percent (100%) payment bond, if such bonds are not expressly waived by the special conditions, on the forms included in the Contract Documents with a qualified corporate Surety, and the required form of Agreement have been executed by the Bidder and the OWNER and required worker's compensation and other insurance certificates have been provided. The OWNER reserves the right to hold the bid security from the three (3) apparent lowest responsive Bidders until the Agreement is executed by the accepted Bidder and by the OWNER.

PERFORMANCE BOND: Performance Bonds are required on any and all contracts over $100,000. All performance bonds will be in the amount of 100% of the contract.

PAYMENT BOND: Payment Bonds are required for all construction contracts involving the use of subcontractors, where the total amount of the contract is $100,000 or more. Payment Bonds shall be in the amount of 100% of the contract amount.

BID, PAYMENT AND PERFORMACE GUARANTEES: The Bidder whose bid is accepted shall execute the Contract and furnish the required satisfactory performance and payment bonds, and required worker's compensation and other required insurance certificates or policies of insurance and execute the required form of Agreement within ten (10) days after delivery of Notice of Award, or within such additional time as is allowed by the OWNER. The Contract shall be considered executed by the successful bidder when two copies of the Contract, signed by an authorized representative of the Contractor, the bond and required insurance are received by the Purchasing Officer. Failure, neglect or refusal by the Bidder to do so shall constitute a breach of agreement to enter into the Contract effected by the Bidder's proposal and the OWNER'**s** Notice of Award and such Bidder shall be deemed to be a defaulting bidder. The damages to the Owner for such a breach of agreement will include monetary loss from, among other things, interference with the OWNER's program and normal operations. The amount of such damages is difficult or impossible to compute. The OWNER has estimated, and each Bidder, by submitting its Bid proposal, agrees that reasonable compensation for damages resulting from such breach of agreement shall be the amount of the Bid proposal guaranty and promises to pay that amount as liquidated damages for such breach, and the OWNER may retain all such bid security or recover the said amount from the Bidder and Surety.

LABOR AND WAGE RATES

The Contractor shall at all times pay not less than the minimum wage per hour for each classification of laborers, workers, or mechanics as set forth in the general prevailing wage rate schedule applicable at the time the work is performed published by the State of Alaska, as amended from time to time, and shall comply with all other provisions of Alaska Statutes AS 36.05.010 and AS 36.10 Each Bidder, by submitting a bid proposal, acknowledges and represents they have familiarized themselves with the prevailing wage rates and agree to pay and comply with said requirements relating to labor and wage rates.

LICENSES AND REGISTRATION

Before execution of a contract, the successful bidder must have a current State of Alaska business license. Any Bidder or Contractor not so licensed is subject to the penalties imposed by such laws and the Bid Proposal of such Bidders may be rejected.

COMPLIANCE WITH LAWS

The Contractor shall observe and abide by all applicable laws, regulations, ordinances and other rules of the State of Alaska and/or any political subdivisions thereof, or any other duly constituted public authority wherein work is done or services performed, and further agrees to indemnify and save the Craig City School District harmless from any and all liability or penalty which may be imposed or asserted by reason of the Contractor's failure or alleged failure to observe and abide thereby.

BIDDER CERTIFIES

The bidder certifies that any and all prices which may be charged under the terms of this bid request do not and will not violate any existing federal, state, or municipal laws or regulations concerning price discrimination and/or price fixing. The bidder agrees to indemnify, exonerate, and hold harmless the Craig City School District from liability for such violation now and throughout the term of the contract.

ADDENDA ACKNOWLEDGEMENTS

Each proposal shall include specific acknowledgment in the space provided of receipt of all addenda issued during the bidding period. Failure to so acknowledge may result in the proposal being rejected as not responsive.

WRITTEN WORDS

In the case of a difference between written words and figures, the amount stated in written words shall govern. In the case of a difference between a unit price and the extended price, he unit price shall govern.

MODIFICATIONS.

Changes in or additions to the bid forms, recapitulations of the work bid upon, alternative proposals or any other modifications of the bid form which are not specifically called for in the Contract Documents may result in the OWNER's rejection of the bid as not being responsive to the Notice to Contractors Inviting Bids. No oral or telephone modification of any bid submitted will be considered. Any Bidder may modify his bid by submitting a written modification signed by the Bidder or by a signed facsimile communication at Fax No. (907) 826 - 3309 at any time prior to the scheduled bid closing time for receipt of bids, provided such communication is received by the OWNER prior to the bid closing time, and, provided further, the OWNER is satisfied that a written confirmation or facsimile modification over the signature of the Bidder was mailed or shipped via overnight service to the Craig City School District prior to the bid closing time. The modification should not reveal the bid price but should provide the addition or subtraction or other modification so that the final prices or terms will not be known by the Owner until the sealed bid is opened. If written confirmation is not received within three (3) days from the closing time, no consideration will be given to the modification.

ERASURES.

The bid submitted must not contain any erasures, interlineations or other corrections unless each such correction is suitably authenticated by affixing in the margin immediately opposite the corrections the surname of the person or persons signing the bid.

EXAMINATION OF THE SITE, DRAWINGS, ETC.

Each Bidder shall visit the site of the proposed work and fully investigate and acquaint himself with the conditions relating to the work and labor, including taking of soils or other tests, so that he may fully understand the facilities, difficulties, soils and other conditions and restrictions attending the execution of the work under this Contract. Bidders shall thoroughly examine and be familiar with the Contract Documents. The failure or omission of any Bidder to receive or examine any forms, instrument or addendum or other document or to visit the site, take and make soils or other tests, and fully acquaint himself with conditions there existing shall in no way relieve the Bidder from obligations with respect to his bid or to full performance of the Contract and for

the price bid. The submission of a bid shall be taken as conclusive evidence of compliance with this section.

BID PRICE.
The bid price shall include everything necessary for the fulfillment of the Contract including, but not limited to, furnishing all materials and equipment, except as may be provided otherwise in the Contract Documents. In the event of a difference between a price quoted in words and a price quoted in figures for the same quotation, the words shall be the amount bid.

QUALIFICATION OF BIDDERS.
Each Bidder shall be duly licensed, qualified, skilled and regularly engaged in the general class or type of work called for under the Contract. A statement setting forth his licensing, qualification, experience and the experience, knowledge and ability of the personnel available for employment in responsible charge of the work shall be submitted by low Bidder when requested by the OWNER.

It is the intention of the OWNER to award a contract to the lowest responsive responsible Bidder who furnishes satisfactory evidence that he has the requisite licenses, qualifications, experience and ability and that he has sufficient capital, facilities, and plant to enable him to prosecute the work successfully and properly, and to complete the work within the time specified in the Contract.

To determine the degree of responsibility to be credited to the Bidder, the OWNER will weigh any evidence that the Bidder, or personnel available for employment in responsible charge off the work, have satisfactorily performed other contracts of like nature, magnitude and comparable difficulty and comparable rates of progress and other factors, including:

a) The ability, capacity and skill of the Bidder to perform the Contract.

b) Whether the Bidder can perform the Contract within the time specified, and without delay

c) The character, integrity, reputation, judgement, experience and efficiency of the Bidder.

d) The quality of the Bidder's performance on previous contracts.

e) The previous and existing compliance by the Bidder with laws and ordinances relating to this and other contracts.

f) The sufficiency of the financial resources and the ability of the Bidder to perform the Contract.

POSTPONEMENT OF OPENING
The OWNER reserves the right to postpone the date and time for opening of proposals at any time prior to the time announced for opening of proposals in the advertisement.

BID CANCELLATION

The Craig City School District reserves the right to cancel the procurement, IFB, or award without liability to the Bidder, except the return of the bid security, at any time before the Agreement has been fully signed by all parties, including the Craig City School District.

DISQUALIFICATION OF BIDDER

If there is reason to believe that collusion exists among the Bidders, none of the bids of the participants in such collusion will be considered.

REJECTION OF BIDS

The OWNER reserves the right to reject any bid which is nonresponsive, incomplete, obscure or irregular; any bid which omits any one or more items on which the bids are required; any bid in which unit prices are unbalanced in the opinion of the OWNER; any bid accompanied by insufficient or irregular bid security; and any bid from Bidders who have previously failed to perform properly or to complete on time contracts of any nature.

RETURN OF BID BOND

Within ten (10) days after the bids are opened, the OWNER will return the bid security accompanying the proposals which are not to be considered in making the award. All other bid security will be held until the Agreement has been fully executed and the performance and payment bonds and insurance certificates, all on the forms provided and required, have been submitted in proper form to the OWNER, after which they will be returned to the respective Bidders whose proposals they accompany. The bonds or other bid security of the three (3) apparent lowest responsive Bidders may be retained by the OWNER until execution of the Agreement and delivery of the required bonds and insurance certificates by the Bidder whose Bid Proposal is accepted.

AGREEMENT AND BONDS

The form of Agreement which the successful Bidder, as Contractor, shall be required to execute, and the form and amounts of surety bonds which he shall be required to furnish at the time of execution of the Agreement, are included in the Contract Documents and should be carefully examined by the Bidder. The Agreement shall be executed in three (3) original counterparts.

BIDDERS INTERESTED IN MORE THAN ONE BID

No person, firm, or corporation shall be allowed to make, or file, or be interested in more than one bid for the same work unless alternate bids are specifically called for. A person, firm, or corporation that has submitted a sub-proposal to a Bidder, or that has quoted prices or materials to a Bidder, is not thereby disqualified from submitting a sub-proposal or quoting prices to other Bidders or making a prime proposal.

AWARD OF CONTRACT

The OWNER reserves the right to reject any or all bids, waive any informalities or irregularity in the bidding and/or not make an award. The award of the Contract, if made by the OWNER, will be made to the qualified and responsible Bidder submitting the lowest responsive bid, but the OWNER shall determine in its own discretion whether a Bidder is responsible and qualified to perform the Contract, and what bid is the lowest or in the best interest of the OWNER, including the OWNER's right to consider the proposed form of manufacturer's warranty to be given by the manufacturer to be used by a Bidder, if such warranty is called for in the Contract Documents, or

any other matters to be submitted pursuant to the Contract Documents, in making its determinations, and determine whether it is to the best interest of the OWNER to accept the bid.

Alternate bids are intended to provide the Owner a range of comparative costs which will allow identification of the combination most responsive to the Owner's needs and available funds. The Bidder must submit bid prices for all alternate bids. Except as otherwise herein stated an apparent low Bidder will be identified and award of the contract will be made on the basis of the base bid plus those alternate bids that the Owner in its sole discretion elects to accept. The order of the alternates listed shall not be construed as binding and/or an indication of the order in which the Owner may select alternatives if any.

NON-COLLUSION AFFIDAVITS

Upon a specific request of the OWNER, the Bidder, before the award of a Contract, shall submit non-collusion affidavits to the OWNER covering the Bidder and all subcontractors.

DEFAULTING BIDDER

If any Bidder whose Bid proposal is accepted fails, neglects or refuses to furnish the required performance and payment bonds, or the required worker's compensation and other insurance certificates or policies, or to execute the Agreement as herein provided, such Bidder shall not be the lowest responsive Bidder. The OWNER may then select the lowest responsive Bidder and deliver a notice of acceptance of Bid proposal to such lowest responsive Bidder.

ERRORS AND OMISSIONS

No consideration will be given by the OWNER to claim of error in a bid unless such claim is made to the OWNER within twenty-four (24) hours after the time stated for receiving bids in the Notice to Contractors Inviting Bids, and unless supporting evidence of such claim, including cost breakdown sheets, is delivered to the OWNER within forty-eight (48) hours after the time stated for receiving bids in the Notice to Contractors Inviting Bids. Relief may be granted only at the OWNER's discretion and in such event only for clerical errors.

SIGNING

Each document signed by an attorney-in-fact shall be accompanied with a copy of the power of attorney authorizing the attorney-in-fact. No agreement shall be binding upon the OWNER until the same has been completely signed by the Contractor and also signed on behalf of the OWNER. Failure to sign and return the required form of Agreement and acceptable bonds and/or insurance certificates or policies as provided herein and the Contract Documents within the time limit above specified may be just and sufficient cause for the cancellation of the award and the forfeiture of the bid security.

WITHDRAWAL OF BIDS.

Bids may be withdrawn only by written or facsimile notice to 907.826.3309 provided such notice is received prior to the date and time set for the receipt of bids, and, provided further, a written confirmation of the withdrawal is mailed or shipped via overnight service to the Craig City School District prior to the bid closing time. No Bidder may withdraw his bid after the time announced for the opening, or before both the award and execution of the agreement, unless the award is delayed for a period in excess of sixty (60) days.

BID PROTESTS.
An aggrieved bidder may file a bid protest within ten (10) calendar days after Notice of Intent to Award the contract is mailed.

PROJECT OVERVIEW

PROJECT:
Craig High School Biomass Project

PROJECT SITE:
1 Panther Way, Craig, AK 99921

PROJECT SCHEDULE:
Craig High School Biomass Project will advertise for bid in the Ketchikan Daily News the weekends of April 20th & 27th.

Note: the project schedule may be modified after the closing date.

- IFB issued: April 19, 2024
- Mandatory Pre-Bid Conference May 1st, 2024
- Deadline for questions, objections, or protests relating to defects, error, omissions regarding the project or this IFB May 3, 2024
- IFB closing date: May 10, 2024
- Notice of Intent to Award: May 10, 2024
- Deadline for Appeal of Proposed Award (10 days): May 20, 2024
- Approval of Contract Award by School May 23, 2024

SCOPE OF WORK

Site work consists of regrading and widening an existing walking path for a new gravel access road along with the installation of a new rock retailing wall.

Mechanical work consists of the installation of a new biomass boiler system at new addition and tying into the existing mechanical boiler system of the adjacent main school building.

Electrical work consists of new lighting, power, and heat at additions and for new boiler system. Some modification of existing electrical will be expected.

The shop building and main school building will not be occupied during the project.

Bids are to include all work described in the Craig High School New Shop Building Project Manual dated April 19, 2024 and the Craig High School New Shop Building drawing bid set dated December 11, 2023.

BID CHECKLIST

This Bid Checklist is a summary of the forms and materials required as part of your firm's bid. Bidders are urged to thoroughly read the entire bid. It may be helpful to use this checklist to help ensure compliance with submission requirements.

PROCEDURAL QUALIFICATIONS

[ ] Bidders must be registered (company name, address, telephone number, and fax number) with the Craig City School District as indicated in this solicitation.

[ ] Bids must be received in the Office of the Superintendent no later than the date and time indicated in the solicitation.

FORM AND CONTENT OF BIDS

[ ] Bids must be in a sealed envelope or box clearly marked with the name of the project on the outside of the envelope or box in order to be considered responsive.

[ ] Bidders must list and acknowledge receipt of any Addenda issued on the Bid Documentation form by signing in the space provided.

[ ] Bidders must fill out the Subcontractors List included in the Bid Documentation indicating the name(s) of any anticipated subcontractors for the proposed project. Use multiple pages if necessary. For portions of the work where a subcontractor will be selected by competitive bids at a later date, enter the type of Work to be subcontracted followed by "To be Determined". For example: "Mechanical – To Be Determined". If the use of subcontractors is not anticipated, N/A or NONE is to be written on the form.

[ ] The Bid Documentation Forms must be signed by an individual authorized to bind the bidder. All bidders, other than individuals, must include evidence of authorization to sign on behalf of the corporation, partnership, limited liability company, or other organization.

[ ] Bidders must attend the pre-bid conference.

Completion of this checklist does not guarantee that a bid will be considered to be responsive. The checklist is provided strictly as a courtesy to bidders.

BID PROPOSAL

TO: Craig City School District:

Pursuant to and in compliance with your Notice to Contractors Inviting Bids, Information For Bidders, Agreement and the other Contract Documents relating thereto, the undersigned Bidder, being fully familiarized with all the terms of all the Contract Documents and with the project site and local conditions and costs affecting the performance as called for in the Contract Documents, hereby proposes and agrees to perform, within the time and in the manner stipulated, the Contract, including all of its component parts, and everything required to be performed, and to provide and furnish any and all of the work, labor, materials, tools, supplies, and all transportation and other services necessary to perform the Contract in a skillful and timely manner, all in strict conformity with the Contract Documents, including addenda(s) for the following project:

CRAIG HIGH SCHOOL NEW SHOP BUILDING

Award of Contract. The Craig City School District shall have the right to reject this bid proposal and such bid proposal shall remain open and may not be withdrawn for a period of sixty (60) days after the date prescribed for its closing.

Execution of Contract and Performance Security. It is understood and agreed that if written notice of the acceptance of this proposal and award of the Contract is mailed, telefaxed or delivered to the undersigned Bidder within sixty (60) days after the opening of the proposal, or at any time thereafter before it is withdrawn in writing, the undersigned Bidder will execute and deliver the Agreement in the form set forth in the Contract Documents to the Craig City School District in accordance with the proposal as accepted, and will also furnish and deliver to the Craig City School District the performance and payment bonds on the forms provided in the Contract Documents, the Certificate of Insurance and policies of insurance and any other documents or bonds called for in the Contract Documents, all within ten (10) days after notice of acceptance and award of the Contract is given.

Notice of acceptance and award of the Contract or requests or additional information may be addressed to the undersigned Bidder at the business address set forth at the end of this bid.

Wherever in this proposal an amount is stated in both words and figures, in case of discrepancy between words and figures, the words shall prevail; if all or any portion of the proposal is required to be given in unit prices and totals and a discrepancy exists between any such unit prices and totals so given, the unit prices shall prevail.

Receipt of Addenda. Receipt of the following Addenda to the Contract Documents is hereby acknowledged.

ADDENDUM NO	DATE OF RECEIPT OF ADDENDUM	SIGNED ACKNOWLEDGMENT
1	_____	_____
2	_____	_____
3	_____	_____
4	_____	_____

(**Note**: Failure to acknowledge receipt of any addenda may be considered an irregularity in the proposal and grounds for rejection of the bid.)

BIDDER:

By:_____

Title:_____

Alaska Contractor License No. _____

Company/Firm Name: _____

Telephone: _____

Fax No: _____

Mobile No:_____

Business Address:_____

Email: _____

NOTE: If Bidder is a corporation, the legal name of the corporation shall be set forth above together with the signatures of the officer or officers authorized to sign contracts on behalf of the corporation; if Bidder is a copartnership, the true name of the firm shall be set forth above together with the signature of the partner or partners authorized to sign contracts in behalf of the copartnership, and if Bidder is an individual, the appropriate signature shall be placed above.

_____

Signature of Individual Authorized to Bind the Bidder

_____

Printed Name and Title of Individual Authorized to Bind the Bidder

_____

Date

PRICE PROPOSAL FORM

CRAIG HIGH SCHOOL BIOMASS BIOLER PROJECT

Basis of Award shall be based upon the lowest base bid price. The OWNER reserves the right to award any or all portions of this contract as determined to be in the best interest of the Craig City School District.

- **BASE BID:**

_____ $_____

Total in Written Words Total in Dollars

_____ _____

Company Date

_____ _____

Signature and Title Printed Name

SUBCONTRACTOR LIST

SUBCONTRACTORS: The bidder may not subcontract greater than fifty percent of this project without prior written approval of the Craig City School District. List all subcontractors who will be providing greater than 5 percent of the project work and an approximate percentage of their individual participation by discipline. Use additional copies of this form as needed.

SUBCONTRACTORS:

Company/Firm Name:_____

Estimated percentage of subcontractor's participation by discipline:_____

Telephone: _____

Fax No.:_____

Business Address: _____

Company/Firm Name:_____

Estimated percentage of subcontractor's participation by discipline:_____

Telephone: _____

Fax No.:_____

Business Address: _____

Company/Firm Name:_____

Estimated percentage of subcontractor's participation by discipline:_____

Telephone: _____

Fax No.:_____

Business Address: _____

CORPORATE CERTIFICATE

(if applicable)

1. _____, certify that I am the Secretary of the Corporation named as Bidder in the foregoing instrument; that_____, who signed this bid on behalf of the corporation, was then_____ of said Corporation; that the bid was duly signed for and on behalf of said Corporation by authority of its governing body or other authority and is written the scope of its corporate powers.

_____
Signature

CORPORATE ACKNOWLEDGMENT

STATE OF_____)
) ss.
FIRST JUDICIAL DISTRICT)

THIS IS TO CERTIFY that on this_____day of_____, 2024, before me, the undersigned, a Notary Public in and for the State of_____, duly commissioned and sworn, personally appeared_____ and_____known to be the_____ and_____of_____, the corporation which executed the above and foregoing instrument, and who on oath stated they were duly authorized to execute said instrument and acknowledged that they signed the same freely and voluntarily on behalf of said corporation for the purposed therein mentioned.

WITNESS my hand and official seal the day and year in this certificate above written.

_____
NOTARY PUBLIC FOR_____
My Commission Expires:_____

(Seal)

PARTNERSHIP ACKNOWLEDGMENT

(if applicable)

STATE OF_____)
) ss.
FIRST JUDICIAL DISTRICT)

THIS IS TO CERTIFY that on this_____day of_____, 2024, before me, the undersigned, a Notary Public in and for the State of_____, duly commissioned and sworn, personally appeared_____ and_____known to be the_____ and_____of_____, the corporation which executed the above and foregoing instrument, and who on oath stated they were duly authorized to execute said instrument and acknowledged that they signed the same freely and voluntarily on behalf of said corporation for the purposed therein mentioned.

WITNESS my hand and official seal the day and year in this certificate above written.

_____
NOTARY PUBLIC FOR_____
My Commission Expires:_____

(Seal)

LIMITED LIABILITY COMPANY (LLC) ACKNOWLEDGMENT

(if applicable)

STATE OF_____)
) ss.
FIRST JUDICIAL DISTRICT)

THIS IS TO CERTIFY that on this_____day of_____, 2024, before me, the undersigned, a Notary Public in and for the State of_____, duly commissioned and sworn, personally appeared_____ and_____known to be the_____ and_____of_____, the corporation which executed the above and foregoing instrument, and who on oath stated they were duly authorized to execute said instrument and acknowledged that they signed the same freely and voluntarily on behalf of said corporation for the purposed therein mentioned.

WITNESS my hand and official seal the day and year in this certificate above written.

_____
NOTARY PUBLIC FOR_____
My Commission Expires:_____

(Seal)

INDIVIDUAL ACKNOWLEDGMENT

(if applicable)

STATE OF_____)
) ss.
FIRST JUDICIAL DISTRICT)

THIS IS TO CERTIFY that on this_____day of_____, 2024, before me, the undersigned, a Notary Public in and for the State of_____, duly commissioned and sworn, personally appeared_____ and_____known to be the_____ and_____of_____, the corporation which executed the above and foregoing instrument, and who on oath stated they were duly authorized to execute said instrument and acknowledged that they signed the same freely and voluntarily on behalf of said corporation for the purposed therein mentioned.

WITNESS my hand and official seal the day and year in this certificate above written.

_____
NOTARY PUBLIC FOR_____
My Commission Expires:_____

(Seal)

BID BOND

KNOW ALL MEN BY THESE PRESENTS,

That we_____

_____

_____(Bidder) as **PRINCIPAL**, and _____

_____

_____

_____(Bonding Company) as **SURETY**, a corporation incorporated in the State of _____ and authorized to do business in the State of Alaska, are held and firmly bound unto the Craig City School District, a municipal corporation, hereinafter called the **OWNER**, as Obligee, in the penal sum of_____ _____ Dollars ($_____), for the payment of which sum in lawful money of the United States, well and truly to be made, we bind ourselves, our heirs, executors, administrators, and successors, jointly and severally, firmly by these presents.

WHEREAS the **PRINCIPAL** has, by written proposal, submitted a bid to the said **OWNER** on that certain contract for the performance of the work, services, and materials for which bids are to be opened on _____, 2023, at _____p.m. for:

CRAIG HIGH SCHOOL NEW SHOP BUILDING

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION IS SUCH THAT if the aforesaid **PRINCIPAL** shall not withdraw said bid within the period specified therein after the opening of the same, or, if no period be specified, within sixty (60) days after said opening, and, if awarded the Contract, shall within the period specified therefore, or such additional time as is allowed by the **OWNER**, or, if no period be specified, within ten (10) days after the prescribed forms are presented to said **PRINCIPAL** for signature, enter into a written contract with the **OWNER** in the prescribed form, in accordance with the bid as accepted, and delivers to the **OWNER** good and sufficient performance and payment bonds on the forms and as required to guarantee the faithful performance of the terms and conditions of the Contract, and the required certificates or policies of insurance, and other instruments as called for by the Contract Documents, then this obligation shall be null and void; otherwise, it shall be and remain in full force and effect.

IN WITNESS WHEREOF, we have hereunto set our hands and seals on this _____ day of _____, 2024.

_____

PRINCIPAL

By: _____

Title: _____

ATTEST: (If Corporation)

By: _____

Title: _____

Corporate Seal

_____

SURETY

By: _____

Title: _____

_____

(Address)

Corporate Seal

ATTORNEY-IN-FACT ACKNOWLEDGMENT OF SURETY

STATE OF ALASKA)
) ss.
FIRST JUDICIAL DISTRICT))

On this _____ day of _____, 2024, before me, the undersigned, a Notary Public in and for said district and State personally appeared _____ known to me to be the person whose name is subscribed to the within instrument as the attorney-in-fact of, _____, the corporation named as Surety in said instrument, and acknowledged to me that he subscribed the name of said corporation thereto as Surety, and his own name as attorney-in-fact.

_____
NOTARY PUBLIC FOR ALASKA
My Commission Expires: _____

NOTE: (a) Signatures of those executing for Surety must be properly acknowledged.

(b) The Attorney-in-Fact must attach a certified copy of the Power of Attorney.

INSTRUCTIONS

1. This form shall be used whenever a bid bond is required.

2. The surety on the bond may be any corporation or partnership authorized to do business in Alaska as an insurer under AS 21.09. In lieu of furnishing a bid bond, the bidder may submit a certified check, cashier's check or money order payable to the **OWNER** in the amount of the bid bond required.

3. The name, including full Christian name, and business or residence address of each individual party to the bond shall be inserted in the space provided therefor, and each party shall sign the bond with his usual signature on the line opposite the scroll seal.

4. If the principals are partners, their individual names shall appear in the space provided therefor, with the recital that they are partners composing a firm, naming it, and all members of the firm shall execute the bond as individuals.

5. If the principal or surety is a corporation, the name of the State in which incorporated

shall be inserted in the space provided therefor, and said instrument shall be executed and attested under the corporate seal as indicated in the form. If the corporation has no corporate seal the fact shall be stated, in which case a scroll or adhesive seal shall appear following the corporate name.

6. The official character and authority of the person or persons executing the bond for the principal, if a corporation, shall be certified by the secretary or assistant secretary, according to the form herein provided. In lieu of such certificate there may be attached to the bond copies of so much of the records of the corporation as will show the official character and authority of the officer signing, duly certified by the secretary or assistant secretary, under the corporate seal, to be true copies.

7. The date of this bond must not be prior to the date of the instrument in connection with which it is given.

8. Individual Surety will not be accepted as bid security.

AGREEMENT FOR

CRAIG HIGH SCHOOL NEW SHOP BUILDING

THIS AGREEMENT made and entered into this ___ day of _____, 2024, by and between the **Craig City School District**, PO Box 800/100 School Rd, Craig, Alaska 99921, hereinafter called "**OWNER**," and_____ licensed and qualified to do business within the State of Alaska, hereinafter called "**CONTRACTOR**."

NOW, THEREFORE, for and in consideration of the terms, covenants, conditions, and provisions contained herein, and attached and incorporated herein and made a part hereof, the parties hereto agree as follows:

Section 1: Scope of Work. The **CONTRACTOR** shall perform and provide, within the time stipulated, the Contract as herein defined, of which this Agreement is a component part, and everything required to be performed including the providing of all work, labor, services, materials, utility, transportation and other acts necessary to perform the Contract in a workmanlike manner (hereinafter referred to as "Construction"), in connection with:

CRAIG HIGH SCHOOL NEW SHOP BUILDING

and in strict conformity with the Contract Drawings and Engineering Specifications, including any and all Addenda issued by the **OWNER**, and with all of the other Contract Documents enumerated in Section 4 hereof, hereinafter collectively referred to as the "Contract."

Section 2: Construction Time.

(a) The **CONTRACTOR** agrees to complete all work and construction called for and as defined in the Contract Documents, to the satisfaction of the **OWNER** within the time for completion as specified in these Contract Documents.

Section 3: Contract Amount. As and for full payment, and in consideration of the timely and proper performance of all construction and work called for by the Contract, as defined herein, and performance of all the terms and conditions thereof, the **OWNER** shall pay the **CONTRACTOR** in currency of the United States, as follows:

(a) If the Bid Proposal calls for single lump sum price(s), the **OWNER** shall pay to the **CONTRACTOR** a Total Contract Amount of_____ _____Dollars($_____) to be paid monthly upon **CONTRACTOR'S** progress; the total contract amount shall not exceed $XX. Any increases beyond this amount must be approved through a written change order signed by the authorized representatives of both parties.

(b) If the Bid Proposal calls for unit prices, the **OWNER** shall pay to the **CONTRACTOR** a Total Contract Amount computed from the unit prices set forth in the

CONTRACTOR'S Bid Proposal and the actual quantities of units furnished. It is understood that the quantities stated are approximate only and are subject to either increase or decrease, and should the quantities of any of the units of work and construction be increased, the **CONTRACTOR** shall perform the additional work at the unit prices set forth in the Bid Proposal, and should the quantities be decreased, payment will be made based on the actual quantities installed at the unit prices set forth in the Bid Proposal and the **CONTRACTOR** will make no claim for anticipated profits, or cost recovery for any increase or decrease in the quantities except as specifically provided in the General Conditions. Based upon the unit prices set forth in the **CONTRACTOR'S** Bid Proposal and upon the quantities estimated from the Contract Drawings for bidding purposes, the estimated Total Contract Amount is _____($_____).

It is further agreed that the **CONTRACTOR** shall start all work and construction within ten (10) days after delivery of the **OWNER'S** Notice to Proceed, unless otherwise specified in such Notice to Proceed, and shall complete all work and construction in accordance with the construction schedule and time for completion as provided in the Contract Documents.

Section 4: **Contract Documents**. The Contract, and the component parts of this Contract, entered into by the acceptance of the **CONTRACTOR'S** Bid Proposal and the signing of this Agreement, consist of the following documents, all of which are component parts of said Contract and are as fully a part thereof as if herein set forth in full, and if not attached, as if attached hereto:

This Agreement with the following Exhibits:

EXHIBIT A	Invitation to Bid;
EXHIBIT B	Information for Bidders;
EXHIBIT C	Notice of Award;
EXHIBIT D	Bid Proposal as accepted;
EXHIBIT E	Contract Forms: Change Orders; Request for Payment; Release; Waiver, and Discharge of all Claims and Liens;
EXHIBIT F	Performance and Payment Bond (will be added after execution)
EXHIBIT G	Addendum No(s). _____;
EXHIBIT H	Notice to Proceed
EXHIBIT I	Certificate of Insurance (will be added after execution);
EXHIBIT J	State of Alaska, Department of Labor, Schedule of Laborer's and Mechanic's Minimum Rates of Pay, dated _____ as hereafter amended from time to time, and available at http://labor.state.ak.us/1ss/forms/pamp600-040118.pdf ;
EXHIBIT K	General Conditions;
EXHIBIT L	Special Conditions;
EXHIBIT M	Specifications bearing the title Craig High School New Shop Building consisting of _____ (____) pages.
EXHIBIT N	Contract Drawings, consisting of _____ (____) pages with each sheet bearing the title **Craig High School New Shop Building**.

IN WITNESS WHEREOF, the parties hereto have executed this agreement the day and year first above written.

OWNER:

Craig City School District

Date: _____

By:_____
Chris Reitan
Superintendent

Attest:

By:_____
Name
Title

Certified Funds Available:

By:_____
Name
Business Manager
Account No. XXX-XX-XXX-XXXX

CONTRACTOR NAME:

_____
Name of Contractor

Date:_____

By: _____
(Signature of authorized officer)

_____
(Title of person signing)

SCHOOL DISTRICT ACKNOWLEDGMENT

STATE OF ALASKA)
) ss.
FIRST JUDICIAL DISTRICT)

THIS IS TO CERTIFY that on this _____ day of _____, 2024, before me, the undersigned, a Notary Public in and for the State of Alaska, duly commissioned and sworn, personally appeared _____ and _____ to me known to be the **Superintendent** and the **CCSD Clerk** of the **Craig City School District**, the entity which executed the above and foregoing instrument; who on oath stated that they were duly authorized to execute said instrument and affix the corporate seal thereto on behalf of said entity; who acknowledged to me that they signed and sealed the same freely and voluntarily on behalf of said entity for the uses and purposes therein mentioned.

WITNESS my hand and official seal the day and year in the certificate first above written.

_____
NOTARY PUBLIC FOR ALASKA
My Commission Expires:_____

(Seal)

CORPORATE CERTIFICATE

I, _____certify that I am the Secretary of the Corporation named as _____ in the foregoing instrument; that _____, who signed said instrument on behalf of said Corporation, was then President of said corporation; that said instrument was duly signed for in behalf of said Corporation by authority of its governing body and is within the scope of its corporate powers.

_____
(Corporate Seal) (Signature)

CORPORATE ACKNOWLEDGEMENT (if applicable)

STATE OF ALASKA)
) ss.
FIRST JUDICIAL DISTRICT)

THIS IS TO CERTIFY that on this ____ day of _____, 2024, before me, the undersigned, a Notary Public in and for the State of _____, duly commissioned and sworn, personally appeared _____ and _____
(Name) (Name)
known to be the President and Secretary of_____, a corporation formed under the laws of the State of _____, the corporation which executed the above and foregoing instrument, and who on oath stated he(she)(they) were duly authorized to execute said instrument and affix the corporate seal thereto on behalf of said corporation, and that the seal affixed thereto is the corporate seal thereof, and acknowledged that he(she)(they) signed the same freely and voluntarily on behalf of said corporation for the purposes therein mentioned.

WITNESS my hand and official seal the day and year in this certificate above written.

_____
NOTARY PUBLIC FOR ALASKA
My Commission Expires:_____

(Seal)

INDIVIDUAL ACKNOWLEDGMENT (if applicable)

STATE OF ALASKA)
) ss.
FIRST JUDICIAL DISTRICT)

THIS IS TO CERTIFY that on this ____ day of _____, 2024, before me, the undersigned, a Notary Public in and for the State of Alaska, duly commissioned and sworn, personally appeared * to me known to be the person(s) described in and who executed the foregoing instrument, and acknowledged to me that he/she/they signed and sealed the same freely and voluntarily for the uses and purposes therein mentioned.

WITNESS my hand and official seal the day and year in this certificate above written.

_____
NOTARY PUBLIC FOR ALASKA
My Commission Expires: _____

PARTNERSHIP ACKNOWLEDGMENT (if applicable)

STATE OF ALASKA)
) ss.
FIRST JUDICIAL DISTRICT)

THIS IS TO CERTIFY that on this _____ day of _____, 2024, before me, a Notary Public, personally appeared _____ known to me to be (one of) the partner(s) of the partnership that executed the within instrument, and acknowledged to me that such partnership executed the same.

DATED: _____

_____
NOTARY PUBLIC FOR ALASKA
My Commission Expires: _____

(Seal)

PAYMENT BOND

KNOW ALL MEN BY THESE PRESENTS:

WHEREAS, the School Board of the Craig City School District, Alaska, by motion passed _____, has awarded to _____, (hereinafter designated as the **PRINCIPAL**), a contract for the work described as follows:

CRAIG HIGH SCHOOL NEW SHOP BUILDING

WHEREAS, under the terms of said contract, **PRINCIPAL** is required before entering upon the performance of the work, to file a good and sufficient payment bond with the **Craig City School District** (hereinafter referred to as "**OWNER**") to secure the payment of the claims to which reference is made in Title 36, Chapter 25, commencing at Section 36.25.0l0, Statutes of the State of Alaska.

NOW THEREFORE, we, the **PRINCIPAL** and _____, as **SURETY**, are held and firmly bound unto the **OWNER** and any and all persons, companies or corporations furnishing materials, provisions, provender, or other supplies, used in, upon, or about the performance of the work contracted to be executed or performed under the hereinabove mentioned contract, and all persons, companies, or corporations renting or hiring implements or machinery, for or contributing to said work to be done, and all persons performing work or labor done upon the same, and all persons supplying both work and labor as aforesaid, and as referred to in said Chapter 25, Title 36, Statutes of the State of Alaska, in the penal sum of _____ Dollars ($_____) lawful money of the United States, for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH THAT if said **PRINCIPAL**, hers/his/its subcontractors, heirs, executors, administrators, successors and assigns, shall pay any and all persons, companies or corporations furnishing materials, provisions, provender, or other supplies, used in, upon, or about the performance of the work contracted to be executed or performed under the hereinabove mentioned contract, and all persons, companies, or corporations renting or hiring implements or machinery, for or contributing to said work to be done, and all persons performing work or labor done upon the same, and all persons supplying both work and labor as aforesaid, and as referred to in said Chapter 25, Title 36, Statutes of the State of Alaska, and shall indemnify and save the **OWNER** harmless from all cost, expense, and damage by reason of **PRINCIPAL'S** default or failure to do so, and shall pay any local sales or use taxes, then this obligation shall be void; otherwise said bond shall remain in full force and effect and **SURETY** on this bond shall pay the same.

It is expressly agreed and understood that in addition to **OWNER**, this bond shall inure to the benefit of any and all of the persons named in Alaska Statutes, Title 36, Chapter 25, Sections 36.25.0l0, 36.25.020, and AS 23.20.265, et seq., so as to give a right of action to such persons or

their assigns in any suit brought upon this bond.

It is further stipulated and agreed that the **SURETY** on this bond shall not be exonerated or released from the obligation of this bond by any change, extension of time for performance, addition, alteration or modification in, to, or of any contract, plans, specifications, or agreement pertaining or relating to any scheme or work of improvement hereinabove described or pertaining or relating to the furnishings of labor, materials, or equipment therefor, nor by any change or modification of any terms of payment or extension of the time for any payment pertaining or relating to any scheme or work of improvement hereinabove described, nor by any rescission or attempted rescission of the contract, agreement or bond, nor by any conditions precedent or subsequent in the bond attempting to limit the right of recovery of claimants otherwise entitled to recover under any such contract or agreement or under the bond, nor by any fraud practiced by any person other than the claimant seeking to recover on the bond and that this bond be construed most strongly against the **SURETY** and in favor of all persons for whose benefit such bond is given, and under no circumstances shall **SURETY** be released from liability to those for whose benefit such bond has been given by reason of any breach of contract between the **OWNER** and the **PRINCIPAL** or on the part of any obligee named in such bond, but the sole conditions of recovery shall be that claimant is a person described herein and/or in Alaska Statutes Title 36, Chapter 25, Section 36.25.0l0, 36.25.020, et seq., and has not been paid the full amount of his claim and that **SURETY** does hereby waive notice of any such change, extension of time, addition, alteration or modification herein mentioned.

As a part of the obligation secured hereby and in addition to the face amount specified therefor, there shall be included costs and reasonable expenses and fees, including reasonable attorney's fees, incurred by **OWNER** or other person entitled to bring suit thereon in enforcing such obligation, all to be taxed as costs and included in any judgment rendered.

IN WITNESS WHEREOF this instrument has been duly executed by the Principal and Surety above named, on the _____ day of _____,2024.

_____

PRINCIPAL

By: _____

Title: _____

TWO WITNESSES:

ATTEST: (If Corporation)

_____

By: _____

_____ Title: _____

Corporate Seal:

_____

SURETY

By: _____

Title: _____

_____

ADDRESS

ATTORNEY-IN-FACT ACKNOWLEDGMENT OF SURETY

STATE OF ALASKA)
) ss.
FIRST JUDICIAL DISTRICT)

On this _____ day of _____, 2024, before me, _____, a notary public in and for said district and State, personally appeared _____ known to me to be the person whose name is subscribed to the within instrument as the attorney-in-fact of the _____, the corporation named as Surety in said instrument, and acknowledged to me that he subscribed the name of said corporation thereto as Surety, and his own name as attorney-in-fact.

_____
NOTARY PUBLIC FOR ALASKA
My Commission Expires: _____

NOTE: (a) Signature of those executing for Surety must be properly acknowledged.

(b) The Attorney-in-fact must attach a certified copy of the Power of Attorney

PERFORMANCE BOND

KNOW ALL MEN BY THESE PRESENTS:

WHEREAS, the School Board of the Craig City School District, Alaska, by motion passed _____ has awarded to _____ hereinafter designated as the **PRINCIPAL**, a contract for:

CRAIG HIGH SCHOOL BIOMASS PROJECT

WHEREAS, said **PRINCIPAL** is required under the terms of said contract to furnish a bond for the faithful performance of said contract,

NOW, THEREFORE, we, the **PRINCIPAL** and _____, as **SURETY**, are held and firmly bound unto Craig City School District hereinafter called the **OWNER**, in the penal sum of _____ Dollars ($) lawful money of the United States, for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators and successors, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH THAT if the above bounden **PRINCIPAL**, his or its heirs, executors, administrators, successors or assigns, shall deliver, provide and perform all work, services, and materials, and in all things stand to and abide by, and well and truly keep and perform the covenants, conditions and agreements in the said contract, and any alteration thereof made as therein provided, on his or its part, to be kept and performed at the time and in the manner therein specified, including any warranty, or guarantee, and during the period thereof, as provided for therein, and in all respects according to their intent and meaning, and shall indemnify and save harmless the **OWNER**, its officers and agents, as therein stipulated, then this obligation shall become null and void; otherwise it shall be and remain in full force and effect.

And the said **SURETY**, for value received, hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of the contract or contract documents, or the work to be performed thereunder, or the specifications accompanying the same, shall in any way affect its obligations on this bond, and said **SURETY** does hereby waive notice of any such change, extension of time, alteration, modifications, or additions to the terms of the contract or contract documents, or to the work or to the specifications.

As a part of the obligation secured hereby and in addition to the face amount specified therefor, there shall be included costs, expenses and fees, including attorney's fees, incurred by **OWNER** in enforcing such obligation, all to be taxed as costs and included in any judgment rendered.

IN WITNESS WHEREOF _____ identical counterparts of this instrument, each of which shall for all purposes be deemed an original thereof, have been duly executed by the **PRINCIPAL** and **SURETY** above named, on the _____ day of _____, 2024.

_____

PRINCIPAL

TWO WITNESSES:

_____ By: _____

_____ Title: _____

Corporate Seal

_____

SURETY

By: _____

Title: _____

_____

ADDRESS

Corporate Seal

ATTORNEY-IN-FACT ACKNOWLEDGMENT OF SURETY

STATE OF ALASKA)
) ss.
_____ JUDICIAL DISTRICT)

On this _____day of _____, 2024, before me, _____, a notary public in and for said district and State personally appeared _____ known to me to be the person whose name is subscribed to the within instrument as the attorney-in-fact of, _____, the corporation named as Surety in said instrument, and acknowledged to me that he subscribed the name of said corporation thereto as Surety, and his own name as attorney-in-fact.

_____
NOTARY PUBLIC FOR ALASKA
My Commission Expires: _____

(Seal)

GENERAL CONDITIONS

TABLE OF CONTENTS

GENERAL CONDITIONS

Section 1: DEFINITIONS.

(a) **ACT OF GOD** shall mean an earthquake, flood, cyclone or other cataclysmic phenomenon of nature. A rain, windstorm, high water or other natural phenomenon of unusual intensity for a specific locality, but which might reasonably have been anticipated from historical records of the general locality, shall not be construed as an Act of God.

(b) **ADDENDA** shall mean written modifications of the Contract Documents which may be issued by the Owner to holders of Contract Documents prior to opening Proposals.

(c) **BIDDER** shall mean any person, partnership, firm or corporation that submits a Bid Proposal and Bid Bond, if required, to the Owner.

(d) **CHANGE ORDER** shall mean a written supplemental agreement executed by the Owner and the Contractor to modify the Contract at the time of or after its execution.

(e) **CONSTRUCTION** shall mean:

1. All management, superintendence, labor, materials, use of equipment and tools, transportation and other facilities or services necessary to complete the Contract.

2. If the Contract includes the furnishing of manufactured equipment, "Construction" shall also include all management, superintendence, labor, materials, equipment components, tools, inspection, testing transportation and other facilities and services necessary to design, manufacture, fabricate, assemble, deliver and install equipment and complete the Contract.

3. Without limiting the generality of the foregoing, "Construction" shall also include delivery to the location of the job site all management, superintendence, labor, materials, equipment, tools, transportation and other facilities and services necessary to complete the Contract.

(f) **CONTRACT** shall mean the whole understanding between the Owner and the Contractor covering the furnishing of the construction and payment therefor and described or encompassed in the Contract Documents, including any addenda or change orders.

(g) **CONTRACT DOCUMENTS** shall mean the documents enumerated in the agreement which form the Contract.

(h) **CONTRACT DRAWING** shall mean a diagrammatic or pictorial description of the construction to be furnished, or copies thereof, which is included as a part of the Contract Documents as modified by Addenda and Change Orders to the Contract. Contract Drawings shall include Proposal Drawings issued to Bidders to delineate the scope of the construction and Construction Drawings issued to the Contractor during construction to further describe the details of the Project design.

(i) **CONTRACTOR** shall mean the person, partnership or corporation whose Bid Proposal has been accepted by the Owner and who has furnished suitable Performance Bond and Payment Bond, Insurance Certificate or Insurance Policies, Lump Sum Bid Breakdown and executed the Agreement.

(j) **ENGINEER** shall mean the duly authorized employee of the Owner or an engineer, architect or other consultant contracted to the Owner and authorized to perform the engineering or contract administration functions contemplated herein.

(k) **ENGINEERING SPECIFICATIONS** shall mean written descriptions, including performance, of the construction to be furnished which are part of the Contract Documents.

(l) **ENGINEER'S INSTRUCTION** shall mean a written interpretation of the Contract issued by the Engineer for the guidance of the Contractor.

(m) **OR EQUAL** shall mean construction items or materials substantially equal to that specified in the Contract Documents. The Engineer shall be the sole judge of the quality and suitability of proposed substitutions.

(n) **OWNER** shall mean the CRAIG CITY SCHOOL DISTRICT whose address is PO BOX 800/100 School Rd., Craig, Alaska 99921.

(o) **PERFORMANCE AND PAYMENT BONDS** shall mean the form of Performance Bond and the form of Payment Bond included in the Contract Documents which shall be furnished by the Contractor and its Surety as assurance to the Owner that the Contractor will furnish, pay for, and warrant the construction and perform all the requirements of the Contract.

(p) **PROJECT** shall mean the improvements and/or facility to be completed in whole or in part through the performance of the Contract.

(q) **BID PROPOSAL** shall mean a Bidder's offer to the Owner to contract for and undertake furnishing the construction for one (l) or more Bid Schedules.

(r) **SHOP DRAWING** shall mean a diagrammatic, pictorial or written description of the details of proposed materials, equipment components, construction, adjustment or operation, except drawings containing proprietary information, prepared by the Contractor or a Subcontractor and submitted for the review of the Engineer to demonstrate that the construction when completed will meet the requirements of the Contract.

(s) **SUBCONTRACTOR** shall mean an independent person, partnership or corporation, other than an employee of the Contractor, supplying to and under agreement with the Contractor or any Subcontractor of the Contractor, any construction or equipment in connection with the Contract.

(t) **SUBSTANTIAL COMPLETION** shall mean that degree of completion of the

construction necessary for the Project to function and operate at its intended location and for its intended use. Written approval of administrative authorities having jurisdiction approving occupancy by Owner for intended use must be submitted by Contractor as a condition of any determination of Substantial Completion.

(u) **SURETY** shall mean a corporation executing a Bid Bond, Performance Bond, Payment Bond or other bond payable to the Owner.

(v) **UNITS OF CONSTRUCTION.**

1. "Basic Unit of Construction" shall mean an elementary part of the total construction which includes like materials and labor, is repetitive in nature, and is readily and economically measurable, i.e., "cu. yd. of concrete in place," "lin. ft. of pipe installed," or "lb. of reinforcing steel furnished."

2. "Integrated Unit of Construction" shall mean a part of the total construction which combines various quantities of unlike materials, equipment and labor into a separate piece of construction where the component materials, equipment and labor are not in themselves readily and economically measurable, i.e., "road bridge complete" includes excavation, concrete, bridge work, backfill, etc.

(w) **UNIT PRICE** shall mean the amount bid by the Contractor for furnishing one (1) unit of construction, the quantities being subject to adjustment within the limits specified in the Contract Documents.

(x) **WRITTEN NOTICE** shall mean a handwritten or typewritten communication delivered in person, or sent to the individual, or to a partner of the partnership, or to an officer of the corporation, which is the Contractor, at the address set forth in the Contractor's Bid Proposal or, if to the Owner, addressed to the CCSD Superintendent, PO Box 800/100 School Rd, Craig, Alaska 99921, or such other address as may be specified for such purpose in writing by the Contractor or Owner.

Section 2: REFERENCED SPECIFICATIONS AND ABBREVIATIONS.

(a) Any material specified by reference to number, symbol or title of a specific standard such as a code, commercial standard, Federal Specification, trade association standard, or other similar standard, shall comply with the requirements of the issue in effect on the date of the Notice to Contractors Inviting Bids unless a specific issue is indicated in the special conditions or Engineering Specifications.

(b) Those applicable provisions of and such specifications which are referred to as provided in (a) above, except as modified in the Engineering Specifications, shall have full force and effect as though included in the Engineering Specifications.

(c) The following is a general list of abbreviations which may appear on the Contract Drawings or in the Engineering Specifications.

AAMA	Architectural Aluminum Manufacturers' Association
AAN	American Association of Nurserymen
AAR	Association of American Railroads
AASHTO	American Association of State Highway and Transportation Officials
ACI	American Concrete Institute
AEIC	Associated Edison Illuminating Companies
AGC	Associated General Contractors of America
AFBMA	Anti-Friction Bearing Manufacturers' Association
AGA	American Gas Association
AGMA	American Gear Manufacturers' Association
AIA	American Institute of Architects
AIEE	American Institute of Electrical Engineers
AISC	American Institute of Steel Construction
AISI	American Iron and Steel Construction
AMCA	Air Moving and Conditioning Association
ANSI	American National Standards Institute
APA	American Plywood Association
API	American Petroleum Institute
APWA	American Public Works Association
ARA	American Railway Association
AREA	American Railway Engineering Association
ASCE	American Society of Civil Engineers
ASE Code	American Standard Safety Code for Elevators, Dumbwaiters and Escalators
ASHRAE	American Society of Heating, Refrigerating and Air Conditioning Engineers
ASLA	American Society of Landscape Architects
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials
AWPA	American Wood Preservers' Association
AWS	American Welding Society
AWWA	American Water Works Association
CSI	Construction Specification Institute
DCDMA	Diamond Core Drill Manufacturers' Association
DEMA	Diesel Engine Manufacturers' Association
EEI	Edison Electric Institute
EIA	Electronic Industries Association
EJMA	Expansion Joint Manufacturers' Association
FHWA	Federal Highway Administration
Fed.Spec.	Federal Specifications
FSS	Federal Specifications and Standards General Services Administration
F.S. Std.Specs.	Forest Service Standard Specifications for Construction of Roads and Bridges, E,-7720-100, 1979, Forest Service U.S. Department of Agriculture, Washington, D.C. 20013
ICC	Interstate Commerce Commission
IEEE	Institute of Electrical and Electronics Engineers

IES	Illuminating Engineering Society
ICEA	Insulated Cable Engineers' Association
JIC	Joint Industrial Council
NBS	National Bureau of Standards
NEC	National Electrical Code
NEMA	National Electrical Manufacturers' Association
NESC	National Electrical Safety Code
NFPA	National Fire Protection Association
PCI	Prestressed Concrete Institute
SAE	Society of Automotive Engineers
SMACNA	Sheet Metal and Air Conditioning Contractors' National Association, Inc.
SPR	Simplified Practice Recommendation
SSPC	Steel Structures Painting Council
TCA	Tile Council of America
TEMA	Tubular Exchanger Manufacturers' Association
UBC	Uniform Building Code
UL	Underwriters' Laboratories, Inc.
USASI	United States of America Standards Institute
WCLA	West Coast Lumbermen's Association
WWPA	Western Wood Products Association

Section 3: SUBCONTRACTS.

(a) The Contractor shall perform with its own organization not less than one-third (1/3) of the total monetary amount of the Contract and shall not sublet to any one (1) Subcontractor more than one-half (1/2) of the total monetary amount of the Contract without the previous written consent of the Owner. After execution of the Contract and prior to the beginning of operations on a subcontract, the Contractor may, if approved by the Owner through execution of a Change Order, employ a different Subcontractor than was offered in the Contractor's Bid Proposal. In this event the Total Contract Amount shall be reduced by an amount equal to the reduction, if any, in the cost to the Contractor as a result of the change of Subcontractor. The Contractor shall furnish to the Owner the detailed bids of both Subcontractors before execution of the Change Order.

(b) The Contractor shall be fully responsible to the Owner for the acts, errors and omissions of Subcontractors and of persons either directly or indirectly employed by them. The Contractor shall include all applicable provisions of these Contract Documents in all subcontracts for construction to be performed under this Contract.

(c) Nothing contained in the Contract Documents shall create any contractual relationship between any Subcontractor and the Owner. The Owner's consent to or approval of any Subcontractor under the Contract shall not relieve the Contractor of its obligations under the Contract and no such consent or approval shall be deemed to waive or modify any provisions of the Contract.

Section 4: PERFORMANCE AND PAYMENT BONDS.

(a) Within ten (10) days after the Contractor receives the Notice of Award, and prior to the execution of the Contract by the Owner, the Contractor shall furnish a Performance Bond and also a Labor and Materials Payment Bond, on the forms included in the Contract Documents, with a corporate Surety satisfactory to the Owner, which bonds shall insure the full and faithful performance of the Contract, including payment of all obligations arising thereunder, and each bond shall be in an amount equal to one hundred percent (100%) of the total contract amount unless otherwise provided in the Special Conditions.

(b) The Surety on such Performance Bond and Labor and Material Payment Bond shall be a duly licensed surety corporation authorized to do business in the State of Alaska and shall be named in the current list of "Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies" as published in Circular 570 (amended) by the Audit Staff Bureau of Accounts, U.S. Treasury Department. All bonds signed by an agent must be accompanied by a certified copy of the authority to act.

(c) Failure to timely provide the bonds on the required bond forms and as required herein shall be grounds for the Owner rescinding the award and awarding to another bidder or rejecting all bids. The Contractor in such event forfeits the Contractor's bid security.

Section 5: EMERGENCY CONSTRUCTION.

If, in the opinion of the Owner, and the Contractor is so advised, certain emergency construction must be done immediately to safeguard life or property or to protect completed construction, or the building or site where work is to be performed, the Contractor shall proceed at once with such emergency construction. The omission or failure of the Owner to form such an opinion or to advise the Contractor shall not excuse the Contractor from any obligation to safeguard life or property or to protect completed construction, or the buildings or site where work is to be performed. If such emergency construction is within the scope of the Contract, or is to protect completed construction, and is not caused by the negligence or acts or omissions of the Contractor, its employees, agents, representatives or subcontractors, the Contractor shall be paid as provided in the Contract. If such emergency construction is outside the scope of the Contract, the Contractor shall submit a written proposal within ten (10) days after commencement of the emergency construction and the construction shall be paid for as a change in construction; provided, however, the Owner shall have no obligation to compensate the Contractor for emergency construction required because of the Contractor's negligence or acts or omissions of the Contractor, its employees, agents, representatives, subcontractors, or other persons for whose acts the Contractor is liable or responsible. Failure to submit such a proposal within the specified time shall constitute waiver of any claim based upon such emergency construction.

Section 6: CONTRACTOR'S DEFAULT.

(a) If the Contractor becomes insolvent, is adjudged bankrupt or makes an assignment for the benefit of its creditors, or if a receiver, assignee or other liquidating officer is appointed for the Contractor, or if the Contractor fails to prosecute the work according to the Construction Schedule,

or otherwise, or persistently or repeatedly refuses or fails to supply satisfactory superintendence, satisfactory numbers of properly skilled workmen or satisfactory construction or fails to make payment to employees or Subcontractors or payment for materials or equipment when due, or violates any law, ordinance, rule or regulation of any governmental authority having jurisdiction, or otherwise is in violation of any provisions of the Contract, the Contractor shall be in default under the Contract, and if such default continues for a period of ten (10) days after written notice thereof is served by the Owner upon the Contractor, the Owner, without prejudice to any other right or remedy, including termination, may declare the Contractor to be in default under the Contract by written notice thereof served upon the Contractor and its Surety.

(b) In the event of such declaration of default, the Surety shall have the obligation immediately to remedy the default or to undertake performance of the Contractor's obligations under the Contract; provided, however, that if the Surety does not remedy the default or does not undertake such performance within fifteen (15) days from the date of service of such declaration of default, the Owner may, but shall not be required to take possession of the construction and of all the Contractor's equipment, tools and materials used in connection therewith and complete the construction by whatever method the Owner may deem expedient. In such event, the Contractor shall not be entitled to receive any further payment until the construction is completed. If the unpaid balance of the total contract amount exceeds the cost to the Owner of completing the Contract, including reasonable compensation for additional administrative, engineering and legal costs of the Owner, and any damages incurred by the Owner by reason of such default, such excess shall be paid to the Contractor. If the cost to the Owner of completing the Contract, including reasonable compensation for additional administrative, engineering and legal costs of the Owner, exceeds such unpaid balance, the Contractor shall immediately pay the excess to the Owner. The foregoing provisions are in addition to and not in limitation of any other rights or remedies available to the Owner, including termination for default.

Section 7: LIQUIDATED DAMAGES.

(a) For each and every calendar day that any portion of the work and construction is not completed after the Construction Time fixed for completion in the Contract Documents, the Contractor shall pay the Owner, not as a penalty but as liquidated damages, such amount per calendar day as is specified in the Special Conditions.

(b) Because the difficulty in computing the actual damages which will result from failure to complete the construction on time, the said amount of liquidated damages is hereby estimated, agreed upon and determined in advance by the parties hereto as a reasonable evaluation of the actual damages which the Owner will suffer for each and every day during which the completion of the construction is delayed beyond the Construction Time herein fixed.

(c) Such monies due the Contractor, or to become due the Contractor at or after the Construction Time fixed in the Contract Documents, for all or any part of the construction, as may be necessary to pay said liquidated damages, may be retained by the Owner, and if such amounts are not sufficient to pay such liquidated damages, the Contractor shall immediately pay the deficiency to the Owner. Such deductions or amounts retained by the Owner shall not in any degree release the Contractor from further obligation and liability with respect to fulfilling the entire Contract.

(d) Nothing herein shall be construed to preclude claims by the Owner for damages caused by Contractor errors, omissions, or negligence unrelated to time delay in completing the construction on time.

Section 8: CONTRACTOR'S CLAIMS PRIOR TO SUBSTANTIAL COMPLETION.

(a) Written notice of any condition or event for which a claim is subsequently to be made by the Contractor shall be made to the Owner in writing within two (2) days after the first observance of such condition or event. A written claim for damages or additional compensation setting forth in full detail the labor, material and other costs and the total amount of the claim and the reasons therefor, shall be given to the Owner by the Contractor, with a copy to the Engineer, within fifteen (15) days after the first notice of such condition or event and if such condition or event continues, a similar written claim shall be presented every thirty (30) days thereafter. The Contractor expressly agrees that failure to give such notice of such condition or event and to present such detailed claims within the times specified shall constitute a binding waiver of any claim based upon such condition or event. Knowledge of the condition or event on the part of the Owner shall not affect the requirements for such written notice and written claims within the specified times.

(b) The Contractor shall not cause a delay of construction during any dispute. If the Owner orders a modification of the Contract by issuing a Change Order which becomes a subject of dispute or if any interpretation of the Contract Documents, or Engineer's Instructions, becomes a subject of dispute, the Contractor, upon written notice from the Owner, shall proceed with the construction as modified by the disputed Change Order during the period required to resolve the dispute.

(c) Claims for additional payment for delay in the construction caused by any act or omission of the Owner shall be limited to damages, if any, sustained during the time reasonably required for the Contractor to discharge its employees and to move equipment to another construction project location which, in the opinion of the Engineer, is suitable for operations by such equipment. In no event shall such time exceed two (2) weeks for each such occurrence.

Section 9: CONTRACTOR'S CLAIMS AFTER TERMINATION, SUBSTANTIAL COMPLETION OR DECLARATION OF CONTRACTOR'S DEFAULT.

(a) When in the opinion of the Engineer the Contract is substantially completed, the Owner will send to the Contractor, by registered or certified United States mail, a written Opinion of Substantial Completion. Within thirty (30) days after delivery of such Opinion of Substantial Completion, and also in the event of a declared default of the Contractor or termination of the Contract before substantial completion, the Contractor shall give the Owner written notice of any claim it intends to make against the Owner arising out of or in relation to the Contract; provided, that written notice of a claim based upon an event which occurs after receipt by the Contractor of the Opinion of Substantial Completion may be so given within thirty (30) days after the occurrence of the event upon which the claim is based but in no event later than thirty (30) days after Owner has given Notice of Acceptance of the Construction. The notice of claim shall state the amount

claimed and shall specify in detail the nature, grounds and manner of computation of the amount of the claim. The fact that the Contractor has given any notice or presented any claim required by any other provision of the Contract shall not relieve it from giving the notice required by this section of the Contract nor shall giving the notice required by this section relieve the Contractor from the effect of failure to give any notice or present any claim as required by any other paragraph or section of the Contract.

(b) Within sixty (60) days after receipt of such notice of claim, the Owner will give the Contractor written notice that the claim is allowed or rejected or allowed in part and rejected in part. Any claim or part thereof so allowed shall constitute an acknowledged obligation of the Owner under the Contract payable in due course. Failure to give such written notice of allowance or rejection within sixty (60) days after the Owner receives the notice of claim shall constitute rejection thereof in full. The Contractor shall not start suit on any claim until the Owner has rejected the claim in whole or in part or has been accorded sixty (60) days in which to allow or reject the claim as above provided.

(c) The parties hereto expressly agree that the Contractor shall have thirty (30) days after receipt of written notice that the claim has been rejected in whole or in part, or ninety (90) days after the notice of claim is received by the Owner in case no notice of rejection is given, to bring suit against the Owner in the appropriate court sitting in the City of Ketchikan, First Judicial District, State of Alaska, and that otherwise, the claim, except the portion thereof allowed by the Owner, shall be forever barred. No suit shall be brought against the Owner on any claim arising out of or in connection with the Contract unless the requirements of this section applicable to the Contractor have been strictly complied with.

Section 10: ASSIGNMENT OF CONTRACT.

The Contractor shall not assign, transfer, convey, pledge, hypothecate, or otherwise dispose of or encumber this Contract, or any rights thereunder, without the prior written consent of the Owner. Any such attempted assignment, transfer, conveyance, pledge, hypothecation, or other disposition shall be null and void and of no force or effect. No assignment of the Contract or funds due under the Contract by the Contractor with the consent of the Owner shall be valid unless it contains a provision that the funds to be paid to the assignee under the assignment are subject to all the Contractor's obligations under the Contract.

Section 11: WAIVER OR MODIFICATION.

The failure of either party to the Contract to insist upon strict performance of any of the terms or provisions of the Contract Documents shall not constitute a waiver or relinquishment of any such terms or provisions, but the same shall be and remain in full force and effect. The making of any payment by the Owner to the Contractor, with or without knowledge of any default or breach of the Contract, shall not be deemed to be a waiver as to any default or breach of any term or provision of the Contract Documents. No waiver or modification of any term or provision of the Contract Documents shall be claimed by the Contractor unless the same be made by Change Order, and no such waiver or modification shall constitute a waiver or modification of any other term or provision.

Section 12: SEVERABILITY AND HEADINGS.

(a) If any part of the Contract Documents, including, but not limited to, any provision, paragraph, clause, phrase or words, is found to be in conflict with applicable law, such part shall be inoperative, null and void insofar as it is in conflict with said law, but the remainder shall be given full force and effect.

(b) The descriptive headings of the various parts, sections, paragraphs, and other portions of the Contract Documents have been inserted for convenience of reference only and shall in no way modify or restrict any of the terms and provisions of the Contract Documents.

Section 13: INTENT OF CONTRACT DOCUMENTS.

(a) Except as otherwise provided in the Special Conditions, the intent of the Contract Documents is to include all plant, materials, equipment, tools, supplies, management, superintendence, Contractor's design and detailing, work, labor, transportation, fuel, power, water and all other utilities and services necessary for furnishing all of the construction required for the proper performance of the Contract.

(b) Except as may be otherwise provided in the Special Conditions, the intent of the Contract Documents is to specify and set forth a complete and operating unit or system ready for use regardless of whether or not every detail has been set forth in the Contract Documents. Any omission of details from the Contract Documents shall not be construed to mean that they are to be omitted by the Contractor or to affect in any way the completeness of the construction. The cost of such details shall be included in the prices in the Bid Proposal.

Section 14: DISCREPANCIES IN CONTRACT DOCUMENTS.

(a) If at any time the Contractor discovers that there is possible error, omission or discrepancy in any of the Contract Documents, the Contractor shall immediately notify the Engineer in writing. The Engineer shall promptly review the alleged error, omission or discrepancy and issue an Engineer's Instruction or the Owner may issue a Change Order. Any work done after such discovery and until receipt of an Engineer's Instruction or execution of a Change Order shall be at the Contractor's expense.

(b) To avoid any disputes which might arise as to the meaning of any engineering requirements in the Contract Documents or to any alleged error, omission or discrepancy therein, the Engineer's opinion as to the true intent and meaning, and the Engineer's interpretation thereof, shall be first obtained before any legal action is taken. All dimensions shall be taken from numerical figures on the Contract Drawings and no dimensions scaled from such drawings are valid. If dimensions are apparently missing from the Contract Drawings, work shall be suspended on that portion of the construction until the Owner has been notified and has made the necessary dimensions available via an Engineer's Instruction or on a Contract Drawing.

(c) Should any discrepancies or conflicting provisions among the various Contract Documents be discovered, precedence is hereby established in the following order:

1. Change Orders
2. Agreement
3. Addenda
4. Special Conditions
5. General Conditions
6. Engineering Specifications
7. Contract Drawings
8. Construction Schedule
9. Notice to Contractors Inviting Bids
10. Information for Bidders
11. Performance and Payment Bonds
12. Bid Proposal as Accepted.

Section 15: DRAWINGS, SPECIFICATIONS AND INSTRUCTIONS.

(a) The Owner has prepared designs and Contract Documents and may from time to time issue additional information during the term of the Contract, by means of Engineer's Instructions, Construction Drawings or otherwise, to add detail to the Contract Documents. All such Instructions, Drawings and additional information shall be consistent with the Contract Documents and shall be developments thereof.

(b) All construction shall be furnished in accordance with the Contract Documents and to the dimensions fixed thereby. The Owner reserves the right to make reasonable revisions in dimensions and relocations of construction; provided, however, that such revisions or relocations are made prior to construction of any item to be revised or relocated. If such revisions and relocations result in no additional cost to the Contractor, such revisions or relocations shall be made at no additional cost to the Owner.

Section 16: SHOP DRAWINGS.

(a) The Contractor shall prepare or secure, and submit to the Owner for review, not as a check of details but for the purpose of determining whether or not the general method of fabrication, quality of materials and equipment and detailing are in accordance with the Contract Documents, are suitable for instruction of operating personnel and for maintenance, such nonproprietary Shop Drawings as are necessary in the opinion of the Engineer for such purposes. Such Shop Drawings shall include, but not be limited to, general arrangement, outline, connection and external detail drawings and instruction, operation and maintenance booklets. Two reproducible prints and one contact print of each Shop Drawing shall be submitted to the Owner. Four (4) copies of all catalog cuts serving as Shop Drawings shall be submitted to the Owner over and above the number of copies the Contractor wants returned following Owner's review.

(b) The review of Shop Drawings shall not relieve the Contractor of the responsibility which it has under the Contract Documents, including but not limited to quality, quantity, performance characteristics, dimensions, adequate details, schedules and satisfactory coordination of

all materials and equipment components. The Contractor shall submit such Shop Drawings with such promptness as to cause no delay in its own operations or that of its Subcontractors. Shop Drawings shall be checked by the Contractor to determine that they do not deviate from the Contract Documents, and if they do, such Shop Drawings shall be accompanied by a written notice to the Engineer stating in detail the nature of and the reasons for any proposed deviations. Shop Drawings shall be submitted in such sequence as is necessary in the opinion of the Engineer to give them adequate review.

(c) The Engineer's review will be completed within a reasonable time after receipt by the Engineer of each Shop Drawing in proper sequence with markings as follows:

(1) **Reviewed**. Indicates Shop Drawing has been reviewed and appears to conform with the intent of the design concept. The Contractor shall make further distribution of the Shop Drawing and may proceed with fabrication shown on the Shop Drawing.

(2) **Resubmit**. Indicates Shop Drawing or part thereof does not appear to conform with the design concept. The Owner's comments will be noted on the Shop Drawing or in a separate letter. The Contractor shall recheck, make necessary revisions and resubmit for Owner's review.

(3) **Reference**. Indicates Shop Drawing gives information that is incidental to construction described in the Contract Documents and is for general information only.

(d) All Shop Drawings and data shall be concise and legible. Detailed information about the various components involved shall be clearly identified with the component designation. Shop Drawings shall include, as applicable, equipment outlines and dimensions, foundation requirements and wiring diagrams giving complete information for the installation and erection, maintenance and repair, or for identification of parts for ordering replacements on each item to be furnished under the Contract.

(e) The Contractor shall submit to the Owner three (3) sets of final Shop Drawings, showing all changes and revisions and shall furnish one (1) full-size black-on-white positive mylar transparency to the Owner.

Section 17: CONTRACTOR'S COPIES OF DRAWINGS.

The Contractor will be supplied by the Owner without charge, not more than ten (10) sets of Contract Drawings. Additional copies of Contract Drawings, if desired by the Contractor, will be furnished by the Owner at cost. The Contractor shall keep at least one (1) record copy of all Contract Documents, including Plans, Shop Drawings, Modifications, etc., at the construction site in good condition in a weathertight enclosure to show all changes, revisions, and "as-built" notations made during the construction process. These are to be available to the Engineer and shall be delivered to him for the Owner upon completion of the project.

Section 18: MATERIALS AND EQUIPMENT.

(a) Unless otherwise provided in the Special Conditions, the Contractor shall furnish and fully pay for all construction prior to acceptance by the Owner. All materials and equipment incorporated in the completed construction shall be new and not previously used. If requested by the Owner, the Contractor shall provide satisfactory evidence of the kind and quality of materials and equipment to be furnished and that such have been paid for.

(b) If materials or equipment are specified in the Special Conditions to be furnished by the Owner, they shall be conclusively deemed acceptable for the purpose designed if received in satisfactory condition. The Contractor may continue to use such materials or equipment until otherwise directed; provided, however, that if the Contractor discovers any defect in materials or equipment furnished by the Owner, it shall immediately notify the Owner and the Engineer in writing and shall cease to use such defective items pending receipt of written instructions from the Owner or the Engineer.

(c) If materials or equipment are specified in the Special Conditions to be furnished by the Owner, they shall be received by the Contractor f.o.b. the point of delivery specified in the Special Conditions, and in the absence of such specification, receipt by the Contractor shall be f.o.b. the plant of the supplier of the materials or equipment to be so furnished. The Contractor shall receive, load and unload, transport, store and properly protect from damage or loss all such materials or equipment and the Contractor shall be responsible for loss or damage after receipt of materials or equipment and until final acceptance of the construction by the Owner. The Contractor shall immediately report to the Owner and the Engineer in writing in the form and manner prescribed by the Engineer the receipt of Owner-furnished materials and equipment.

Section 19: WORKMANSHIP.

All construction shall be such that its several component parts function as a workable system, with all accessories necessary for its proper operation, and the construction shall be furnished with all components tested, properly adjusted, and in operation. The construction shall be furnished in conformance with the normally accepted standard practice of the trade so as to contribute to maximum efficiency of operation, accessibility and appearance and minimum cost of operation, maintenance and construction of future alterations and additions. It shall also be so furnished that the completed construction will conform and adjust to and operate in a coordinated manner with the existing installation, if any.

Section 20: COMPLIANCE WITH CONTRACT DOCUMENTS.

(a) Unless otherwise provided in the Special Conditions, whenever in the Contract Documents any material, equipment, method or process is indicated or specified without reservation, by patent or proprietary name, by name of the manufacturer or by catalog number, such specification shall be deemed to be used for the purpose of establishing a standard of quality and for facilitating the description of the material, equipment, method or process desired, and shall be deemed to be followed by the words "or equal." In such event the Contractor may offer to furnish another material, equipment, method or process which shall be substantially equal in every

respect to that so indicated or specified. The Engineer shall be the sole judge of the equality of such material, equipment, method or process offered in substitution.

(b) Offers of substitution for items described in the Contract Documents will be considered only upon the written request of the Contractor, and no requests for such substitutions will be acknowledged or considered from suppliers, distributors, manufacturers or subcontractors or any other source. Requests for approval of a substitution shall be by submitting Shop Drawings, where applicable, and shall be accompanied by documentary evidence of equality in the form of descriptive literature, samples, records of performance, certified copies of tests by independent recognized laboratories, and differences in prices and delivery, if any, in the form of certified quotations from suppliers of both the specified material, equipment, method or process and the proposed substitute.

(c) Such offers of substitution of materials or equipment shall include data to substantiate that the "or equal" product meets the following criteria applicable to the item submitted:

(1) The change is adaptable to the design, (2) the functional performance will be equal to or better than the item specified, (3) where the appearance affects the end product, the appearance of the item will be as good as or better than the item specified, (4) the maintenance cost for the product or item will be equal to or less than the item specified, (5) the quality of materials used and the level of construction of the item will be as good or better than the item specified, (6) the net price of the item will be within the same price range as the item specified and (7) installation cost of the item specified will be equal to or less than that of the item specified.

Section 21: VALUE ENGINEERING.

(a) The Contractor may submit alternate construction details for consideration where these will result in reduced project cost without loss of essential function. Such alternates shall be in the form of written value engineering proposals indicating the nature of recommended revisions and the Contractor's proposed credit to the Owner.

(b) A value engineering proposal shall constitute a binding offer by and on the Contractor and may not be withdrawn. However, if not accepted within the time limits described in (c) below, the proposal shall become void. The terms and credits of the proposal may be changed by mutual agreement between the Owner and Contractor, or may be accepted without further modification by the Owner.

(c) The value engineering proposal shall be in sufficient detail to permit a reasonably complete evaluation of the costs and technical changes involved. Proposals shall be addressed to the Owner's Engineer, who shall respond within fourteen (14) calendar days after receipt regarding functional acceptability or completeness of the proposal. In the event no response is made within this time period, the proposal shall be considered rejected. The judgment of the Owner's engineer shall be final regarding acceptability of Contractor's proposal.

(d) If a proposal is accepted, the Contract shall be amended by Change Order to reflect

the modifications and the Contract amount shall be decreased by negotiated or offered credit amount.

Section 22: SOIL AND/OR SUBSURFACE CONDITIONS.

Any data regarding soil and/or subsurface conditions which may be shown in the Construction Drawings, Engineering Specifications, or elsewhere in the Contract Documents, is not to be taken as a representation, but is based on limited information and is at best only an opinion; consequently, such data cannot and shall not be considered precise or complete and there is no guarantee or representation as to its completeness, accuracy, or precision and the Owner shall not be liable therefor. All Bidders and/or Contractors shall thoroughly familiarize themselves with the site and subsurface conditions at all locations on this project by their own independent investigation, including soils or other tests, and the nature of such condition shall be determined and ascertained by Bidders and Contractors on their own by independent investigations and to their own satisfaction.

Section 23: STORAGE OF MATERIALS AND EQUIPMENT.

If any materials or equipment are stored, they shall be stored so as to ensure the preservation of their quality and fitness. Materials and equipment shall be placed on platforms or other hard, clean surfaces, and not on the ground, and shall be placed under cover and heated adequately to prevent condensation or freezing. Stored materials and equipment shall be located so as to facilitate observation. The Contractor shall be responsible for all damage to or loss of the materials or equipment that occurs until written acceptance by the Owner.

Section 24: MANUFACTURER'S INSTRUCTIONS.

All instructions and directions of the manufacturer of material and equipment furnished to the Contractor shall be followed unless specified to the contrary. The Contractor shall obtain and furnish to the Engineer prior to use of materials or installation of equipment five (5) copies of all instructions and directions of the manufacturer of such materials and equipment.

Section 25: DEFECTIVE MATERIALS AND WORKMANSHIP.

(a) The Contractor shall promptly remove from the premises all materials and equipment and correct all construction which in the opinion of the Engineer is defective in workmanship or materials or fails to conform to the Contract, or the manufacturer's specifications or technical data, whether incorporated in the work or not, and the Contractor shall promptly replace and re-execute its own construction in accordance with the Contract and without cost or expense to the Owner, and shall bear the expense of making good all construction of other contractors or the Owner's building or site, destroyed or damaged by such removal and replacement.

(b) If the Contractor does not remove construction which in the opinion of the Engineer is defective or fails to conform to the Contract, within a reasonable time, which shall be fixed by written notice from the Owner, the Owner may remove and store the materials and cause the

correction of such construction at the expense of the Contractor. If the Contractor does not pay the expense of such removal and storage within ten (10) days after delivery of a notice of the cost of such removal and storage, the Owner may give written notice to the Contractor and ten (10) days after such notice the Owner may dispose of the material. Costs arising from such removal, storage or disposal of materials and correction of the construction shall be paid by the Contractor and may be deducted from any payment due the Contractor. The provisions of this section shall not impose any duty or responsibility on the Owner or Engineer to advise or inform Contractor of any materials or work considered to be defective and failure to do so shall not be deemed to be an acceptance of defective materials or work by the Engineer or by the Owner.

(c) All work such as pipes, wires, conduits, insulation and any other items designated by the Engineer shall be inspected prior to the work being covered.

All work requiring inspection that is covered prior to inspection by the Engineer shall be uncovered for inspection as requested by the Engineer and recovered at no cost to the Owner.

Section 26: WARRANTIES.

(a) The Contractor warrants to the Owner that the construction to be provided under the Contract shall be fit for the purpose specified when operated in accordance with generally accepted operating practices; shall be new and free from any defects in material, workmanship, and title; shall meet all specifications, including those relating to performance, contained or incorporated by reference in the Contract; and that the technical direction of installation will be performed in a competent, diligent manner in accordance with generally accepted professional standards.

(b) The foregoing warranties (except as to title) shall apply to defects or deficiencies occurring within a period of one (1) year from final acceptance of the Project by the Owner. If, however, during the above one (1) year warranty period the construction is not available for operation due to a failure to meet such warranties, such time of unavailability shall not be counted as part of the warranty period. The conditions of any field tests shall be mutually agreed upon, and the Contractor shall be notified of and may be represented at all tests that may be made.

(c) If the construction furnished does not meet the warranties specified above, assuming normal and proper use and maintenance, the Owner shall promptly notify the Contractor and make the construction available for correction. The Contractor shall thereupon correct all defects, including nonconformance with the Engineering Specifications, at its expense, either by repairing or replacing any defective or damaged parts of the construction furnished under the Contract. All of the costs of labor, materials and equipment associated with such repair or replacement of the construction, including removal, loading and unloading, transportation to and from the repair site and reinstallation, shall be borne by the Contractor.

(d) Any repaired or replacement construction furnished under the aforesaid warranty shall also carry warranties for one (1) year on the same terms as set forth above from the date of its repair or replacement.

(e) The Contractor shall obtain written warranties from its Subcontractors and suppliers of material and equipment where such warranties are specifically required by the Special

Conditions and shall deliver the original warranties to the Owner.

(f) Neither the final payment, nor any other provision of the Contract, nor partial or entire use of the construction by the Owner shall relieve the Contractor of liability with respect to the warranties referred to in the Contract or any other warranties express or implied.

(g) In the event the Contractor fails to accomplish the warranty work as required herein, the Owner may proceed to accomplish the same and the Contractor, and its Surety, shall be jointly and severally liable to the Owner for all costs and expenses in relation thereto.

Section 27: PATENTS AND ROYALTIES.

(a) The Contractor shall pay the costs of all royalties, permits, licenses or other fees necessary for the performance of the Contract.

(b) The Contractor warrants that the construction furnished hereunder, and any part thereof, shall be delivered free of any rightful claim of any third party for infringement of any patent. If notified promptly in writing and given authority and information, the Contractor shall appear and defend or may settle, at its expense, any suit or proceeding against the Owner so far as it is based on a claimed patent infringement which would result in a breach of this warranty and the Contractor shall pay all damages and costs awarded therein against the Owner due to such breach. In the event the construction or any part thereof is held to constitute such an infringement and the use of said construction or part is enjoined, the Contractor shall, at its expense and option, either procure for the Owner the right to continue using said construction or part, or replace same with non-infringing construction, or part, or modify same so it becomes non-infringing.

(c) The preceding subparagraph shall not apply to any construction or part manufactured to the Owner's design, or to the use of any construction furnished hereunder in conjunction with any other product in a combination not furnished by the Contractor pursuant to the Contract. As to any such construction, part, or use of such combination, the Contractor shall have no liability for patent infringement.

Section 28: LAWS AND REGULATIONS.

(a) The Contractor shall give all notices required by law and comply with all laws, ordinances, rules and regulations relating to the conduct of the construction. The Contractor shall be liable for all violations of the law in connection with construction furnished by the Contractor.

(b) If the Contractor observes that the Contract Documents are at a variance with any law, ordinance, rule or regulation the Contractor shall promptly notify the Owner in writing and all necessary changes shall be made by Engineer's Instructions or Change Order. If the Contractor performs any work knowing or that the Contractor should have known to be contrary to such laws, ordinances, rules and regulations, and without giving such notice to the Owner, the Contractor shall bear all costs of required changes and be liable to the Owner for all damages arising therefrom.

Section 29: PERMITS.

(a) Permits, licenses and easements of a temporary nature which are necessary only for and during the construction, shall be secured and paid for by the Contractor, except those permits, licenses or easements of a temporary nature which are stated in the Special Conditions to be provided by the Owner.

(b) Permits, licenses, and easements of a permanent nature, which are necessary to be maintained after acceptance of construction, shall be secured and paid for by the Owner unless otherwise specified in the Special Conditions.

Section 30: HOLD HARMLESS AND INDEMNITY.

The Contractor specifically obligates itself to the Owner in the following respects, to-wit:

(a) To indemnify and appear and defend and hold harmless the Owner, its elected and appointed officials and employees, from and against any and all claims, damages, losses, costs and expenses, including attorneys' fees and expenses incurred, whether or not suit is filed, and for injuries to or theft of property, including loss of use, injuries to persons, including death, and from any and all other claims, suits or liability, caused in whole or in part by any act or omission of the Contractor, or any of its officers, agents, employees, representatives, servants or subcontractors, or anyone employed by them, or for whose acts Contractor may be liable, in the performance or nonperformance of the work or construction, or of any of the terms and/or conditions of the Contract, or caused by or resulting from any act or omission of Contractor, or any of Contractor's employees, agents, representatives, licensees, contractors or representatives.

(b) To appear, defend, indemnify and hold harmless the Owner and its officers, agents, and employees from and against any and all claims, judgments, liens, loss, damage, cost, charge or expense, including defense costs, court costs and attorneys' fees, whether direct or indirect, by reason of casualties to the construction whether completed or not, including loss of use thereof.

Section 31: INSURANCE.

(a) Contractor shall not commence work under this Contract until all of the insurance required under this section has been obtained and Contractor has filed the certificates of insurance and copies of insurance policies with the Owner as required by the Contract Documents, and the Owner has approved the same, nor shall Contractor allow any subcontractor to commence work on his subcontract until the insurance required has been so obtained.

(b) **General Liability Insurance.**

(1) **Coverage**. The Contractor shall purchase and maintain General Liability Insurance covering bodily injuries, including death at any time resulting therefrom, sustained by any person or persons, and covering damages to property, including loss of use thereof, arising out of or in consequence of the performance of the Contract or the work or construction, whether such

injuries to persons or damages to property are due or are claimed to be due to operations of the Contractor, its subcontractors, or any of their officers, employees, servants, partners, agents or representatives. The Owner shall be named as an additional insured on all such policies.

(2) **Insurance Amounts**. Such General Liability Insurance shall be in the amounts set forth on the form of Certificate of Insurance included in the Contract Documents and required herein to be filed with the Owner.

(3) **Insurance Period**. Such General Liability Insurance shall be maintained in effect at all times until final acceptance by the Owner of all of the completed construction, and products liability and completed operations liability for at least two (2) years thereafter.

(4) **Insurance Form**. Such General Liability Insurance shall indemnify and defend the Contractor, its subcontractors and the Owner, as an additional named insured, and all of their officers, employees, servants, partners, agents and representatives from and against any and all claims, judgments, liens, loss, damage, cost, charge or expense, including defense costs, court costs and attorneys' fees, whether direct or indirect, by reason of liability imposed by law or by contract upon said parties, including Operations/Premises Liability, Independent Contractor's Protective Liability/Owner's Protective Liability, Completed Operations and Products Liability, Broad Form Blanket Contractual Liability, Owner, Non-owned, and Hired Vehicles and Equipment, and Broad Form Property Damage, including explosion, collapse and underground damage and loss of use. Such General Liability Insurance shall be provided on a comprehensive bodily injury and property damage liability form satisfactory to the Owner and shall name the Owner as an additional insured and shall cover and include Contractor's contractual indemnity of Owner. The coverage shall not include an unfunded self-insured retention. A Certificate of Insurance certifying such insurance policies have been issued to the Contractor shall be filed with the Owner in the amount and form and as required herein.

(c) **Worker's Compensation.**

(1) **Insurance Requirements**. The Contractor and its subcontractors shall purchase and maintain industrial accident or worker's compensation insurance issued by an insurance company authorized to write such insurance in the State of Alaska covering bodily injuries, including death at any time resulting therefrom, suffered or alleged to have been suffered by any employee of the Contractor or its subcontractors by reason of or in the course of operations under the Contract.

(2) **Insurance Amount**. The amount and type of such industrial accident or worker's compensation insurance shall be that required by law for all employees employed under the Contract who may come within the protection of such laws, and as required by the Certificate of Insurance required under (e) below.

(3) **Insurance Period**. Such industrial accident and worker's compensation insurance shall be maintained in effect until final acceptance of the completed work and construction.

(4) **Failure to Maintain Worker's Compensation Insurance.** The Contractor acknowledges and agrees that in the event it fails to maintain proper worker's compensation insurance coverage, the State and the Owner may pursue any remedies provided by AS 23.30.045, terminate the Contract without liability, and/or take or pursue any other remedies otherwise provided by law.

(d) **Builder's All Risk.**

(1) **Insurance Requirement**. Contractor shall purchase and maintain All Risk Builder's Risk (course of construction) insurance covering any and all loss, casualty or otherwise, of all or any part of the work or construction, and all work and materials in place and materials stored at the building site and at remote storage sites, which insurance shall include, but not be limited to, loss by fire, earthquake, landslide or flood damage. The Contractor and the Owner shall each be named as insured as their interests may appear and each shall be named in the policy or policies as insureds and the deductible shall not exceed ten percent (10%) of the total amount of insurance that is required in (2) below without prior approval of the Owner. Contractor shall furnish coverage at all times for the full replacement value of all completed work and construction, including approved Change Orders, as well as materials in place and/or stored at the site, whether or not partial payment has been paid by the Owner. The Contractor shall maintain this insurance until all of the work and construction under the Contract has been fully completed and finally accepted by the Owner. Contractor shall submit to the Owner a complete copy of the All Risk Builder's Risk (course of construction) insurance policy hereinabove required.

(2) **Insurance Amount**. Such All Risk Builder's Risk insurance shall be equal to the Total Contract Amount.

(3) **Insurance Period**. Such Builder's All Risk insurance shall be maintained in effect until final acceptance of all of the completed work, construction and the Project.

(e) **Certificates of Insurance**. Contractor shall deposit with the Owner not later than submittal of the signed Agreement and required bonds, Certificates of Insurance from its insurance companies certifying to the coverage of all of the insurance required in this section in the form, and in the amounts set forth on the form of Certificate of Insurance set forth in the Contract Documents, and as required herein, and shall furnish copies of all insurance policies at any time upon request of the Owner.

(f) **Cancellation of Insurance.**

(1) The Contractor shall not cause any insurance policy to be canceled or permit any policy to lapse or reduce the amount of such insurance during the period of the Contract. All insurance policies shall include a provision to the effect that the insurance policy shall not be subject to cancellation, lapse, or to a reduction in the amount of insurance until written notice has been first delivered to the Owner by the insuring company stating the date that such cancellation, lapse, or reduction shall be effective, which date shall not be less than thirty (30) days after the delivery of such notice to the Owner.

(2) When a renewal of the policy is approaching, Contractor shall deposit evidence of renewal not less than twenty (20) days before expiration of the term of the policy.

(3) The Owner shall have the right to require Contractor provide verification, including the right to inspect Contractor's records at reasonable times, to confirm the insurance called for herein is in force. If the Contractor fails to provide verification of full coverage of all the insurance required by the Contract Documents, at all times, Owner may, without liability, direct the Contractor cease any further operations, and remove all personnel and equipment from the project site until all such insurance is verified as being in full force and effect, or may, without liability, deem such failure to verify full coverage as a material breach and default and terminate the Contract without liability.

(g) **Waiver of Subrogation**. Each of the policies of insurance required herein shall contain a clause or endorsement pursuant to which the insurance companies waive subrogation or consent to a waiver of right to recovery against the Owner.

(h) **Insurance Companies**. Unless such requirement is waived by the Owner in writing, all insurance companies issuing any insurance required in this section shall be member insurers included and covered under the Alaska Insurance Guarantee Association Act (Alaska Statutes, Section 21.80.010, et seq.).

Section 32: WAGE RATES.

(a) Contractor shall pay not less than the minimum wage per hour for each classification of laborers, workers, or mechanics as set forth in the State of Alaska, Department of Labor, Wage and Hour Division, pamphlet entitled "Laborers' and Mechanics' Minimum Rates of Pay," a copy of which is included as part of these Contract Documents, and in the event the rates are amended at any time during the period of this Contract, Contractor shall adjust the rates paid in such manner as to at all times be not less than the then current prevailing wage rate schedule issued by the State of Alaska. Contractor shall in addition thereto comply with all other applicable provisions of Alaska Statutes, Title 36, Chapter 5 [Wages and Hours of Labor]. Contractor further expressly acknowledges and agrees that prior to bidding on this Contract and the Project, and at the time of submitting its bid and entering into the Contract, it has obtained and fully informed itself of the current wage rate schedule and Contractor by entering into this Contract, assumes full and sole responsibility to keep itself fully informed as to any changes made in the current wage scale required to be paid and will adjust and pay the prevailing wage rates, as such are modified from time to time, at all times during the performance of the Contract.

(b) The Contractor shall submit to the State of Alaska, Department of Labor, a certified payroll on a form suitable to the Department of Labor each week as required by law, with copies thereof to the Owner if requested, and submit to the Owner an executed Minimum Wage Affidavit with each pay request and at the end of the project. The affidavit shall be in the form included in the Contract documents.

(c) Contractor agrees:

(1) that the Contractor, and his subcontractors, shall pay all employees unconditionally and not less than once a week;

(2) that wages shall not be less than those stated in the most current Minimum Wage Schedule published by the State Department of Labor regardless of the contractual relationship between the Contractor or subcontractors and laborers, mechanics, or field surveyors;

(3) that the scale of wages to be paid shall be posted by the Contractor in a prominent and easily accessible place at the site of the work;

(4) that the Owner is authorized to 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:

(a) the rates of wages required by the Contract to be paid laborers, mechanics, or field surveyors on the work, and

(b) the rates of wages in fact received by laborers, mechanics or field surveyors.

(d) If it is found that a laborer, mechanic, or field surveyor employed by the Contractor or Subcontractor has been or is being paid a rate of wages less than the rate of wages required by the Contract to be paid, the Owner may, by written notice to the Contractor, terminate the Contractor's right to proceed with the work or the part of the work for which there is a failure to pay the required wages and to prosecute the work to completion by contract or otherwise, and the Contractor and his sureties shall be liable to the Owner for all costs and expense incurred thereby and for any excess costs in completing the work. (AS 36.05.070).

Section 33: AFFIRMATIVE ACTION.

(a) Contractor will not discriminate against any employee or applicant for employment because of race, color, religion, sex or national origin. Contractor will take affirmative action to ensure the applicants are employed, and that employees are treated during employment, without regard to their race, color, religion, sex or national origin. Such action shall include, but not be limited to, the following: employment, upgrading, demotion or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. Contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices setting forth the provisions of this subsection.

(b) Contractor will, in all solicitations or advertisements for employees placed by or on behalf of Contractor, state that all qualified applicants will receive consideration for employment without regard to race, color, religion, sex or national origin.

(c) Contractor will send to each labor union or representative of workers and with which it has a collective-bargaining agreement or other contract or understanding, a notice advising the said labor union or worker's representative of Contractor commitments under this section, and shall post copies of the notice in conspicuous places available to employees and applicants for employment.

(d) Contractor will comply with all provisions of Executive Order No. 11246 of September 24, 1965, as amended by Executive Order No. 11375 of October 13, 1967, and the rules, regulations and relevant orders of the Secretary of Labor.

e) Contractor will furnish all information and reports required by Executive Order No. 11246 of September 24, 1965, as amended, and by the rules, regulations and orders of the Secretary of Labor, or pursuant thereto, and will permit access to its books, records and accounts by the Secretary of Labor for purposes of investigation to ascertain compliance with such rules, regulations and orders.

(f) The Contractor will include the provisions paragraphs (a) through (e) of this section in every contract, and will require the inclusion of these provisions in every subcontract entered into by any of its subcontractors, so that such provisions will be binding upon each Subcontractor, as the case may be. For the purpose of including such provisions in any construction, maintenance, or service contract or subcontract, as required hereby, the term "Contractor" and the term "Subcontractor" may be changed to reflect appropriately the name or designation of the parties of such contract or subcontract.

(g) The Contractor agrees that he will fully cooperate with the office or agency of the State of Alaska which seeks to deal with the problem of unlawful or invidious discrimination, and with all other State efforts to guarantee fair employment practices under this Contract, and said Contractor will comply promptly with all requests and directions from the State Commission of Human Rights or any of its officers or against relating to prevention of discriminatory employment practice.

(h) Full cooperation as expressed in the foregoing clause (g) shall include, but not be limited to, being a witness in any proceeding involving questions of unlawful or invidious discrimination if such is deemed necessary by any official or agency of the State of Alaska, permitting employees of said Contractor to be witnesses or complainants in any proceeding involving questions of unlawful or invidious discrimination, if such is deemed necessary by any official or agency of the State of Alaska, or the Owner, participating in meetings, submitting periodic reports on the equal employment aspects of present and future employment, assisting in inspection of relevant facilities, and promptly complying with all State directives deemed essential by any office or agency of the State of Alaska, or the Owner, to insure compliance with all Federal and State laws, regulations, and policies pertaining to the prevention of discriminatory employment practices.

(i) Failure to perform any of the above agreements pertaining to equal employment opportunities shall be deemed a material breach of the Contract and sufficient grounds for termination thereof for cause.

Section 34: EMPLOYMENT OF LOCAL RESIDENTS.

Contractor shall, to the extent required by law, comply with the employment preference provisions of Alaska Statutes 36.10.010 et seq.

Section 35: NOTICE TO PROCEED.

Within ten (10) days after submittal by the Contractor of all required documents, and the execution of the Contract by the Owner, written Notice to Proceed will be given by the Owner to the Contractor. Unless otherwise specified in the Notice to Proceed, the Contractor shall begin construction immediately upon receipt of the Notice to Proceed and shall continue regularly thereafter, unless otherwise directed in writing by the Owner, with such work force, materials and equipment as to assure construction progress in accordance with the construction schedule, if any, and that construction is complete within the construction time stated in the Contract Documents.

Section 36: TIME.

All times and time limits stated in the Contract Documents shall be of the essence of the Contract. All references to days shall mean calendar days and the time within which acts are to be done shall be computed by excluding the first and including the last day, and if the last day is a Sunday or legal holiday where the act is to be performed, the act shall be completed on the next business day.

Section 37: CONSTRUCTION TIME.

The Contractor agrees to achieve Substantial Completion as called for in the Contract within the number of days, or by the date specified, for completion of Construction set forth in the Agreement, or in the event that the time for completion is extended by Change Order as provided herein, then within the additional days by which the time is so extended. All changes in Construction Time shall be made only by Change Orders to the Contract. Contractor further agrees to complete the work so that it is ready for final payment in accordance with Section 48.

Section 38: CONSTRUCTION SCHEDULE.

(a) A Construction Schedule, if required, shall be as required by the Special Conditions or Division 1 in the form of either a time bar diagram showing certain of the various operations necessary to complete the construction, including the starting and completion date of each operation shown, or the Construction Schedule shall be prepared by the critical path method and shall set forth a network analysis, which shall consist of an arrow diagram, tabulation of activities, estimated time and starting and completion date of each activity and an indication of the critical path.

(b) In the event progress payments are provided for and authorized in the Special Conditions, the Contractor's Requests for Payment will be considered and payments will be approved by the Owner on the basis of the Contractor's actual progress in relation to the dates shown in the Construction Schedule for completion of various parts of the operations. If the

actual progress fails to meet the Construction Schedule, the Contractor shall increase its work force and equipment at its own expense as required to bring the actual progress of the operations into conformance with the Construction Schedule.

(c) During the course of construction the Contractor shall enter on the Construction Schedule its estimate of progress at the end of each calendar month, or at such more frequent intervals as directed by the Engineer, and shall deliver to the Owner two (2) copies thereof with each submittal of the Contractor's Request for Payment.

Section 39: CHANGES IN CONSTRUCTION.

(a) If the Contractor claims that the Engineer's Instructions or additional requirements of the Owner, by drawings or otherwise, entitle the Contractor to additional payment or extension of time under the Contract, or both, the Contractor shall deliver to the Owner a written proposal of changes in Total Contract Amount and Construction Time within ten (10) days after the receipt of such instructions or requirements and before proceeding to execute the changes. Failure of the Contractor to deliver such a proposal shall constitute a waiver by the Contractor of any claim for additional payment or extension of time. If the Owner and the Contractor are in agreement as to changes in Total Contract Amount and Construction Time, a Change Order to the Contract will be issued for approval and execution by the Owner and Contractor.

(b) By proper action of its governing body and without invalidating the Contract, the Owner may order changes in the Contract Documents requiring changes in the construction, order changes in the quantities of the unit price items or make other changes in the Contract provided such changes are within the general scope of the Contract. No official, employee, agent or representative of the Owner, with the exception of the governing body empowered to accept and authorize execution of the Contract, shall have power to authorize any change in the Contract. It shall be the responsibility of the Contractor, before proceeding with any change, except a change which is an emergency in the opinion of the Owner, to determine that the execution of a Change Order has been properly authorized on behalf of the Owner by its governing body.

(c) When a change in construction is ordered by the Owner, a Change Order shall be executed by the Owner and the Contractor; except that the Contractor hereby agrees that changes in the construction for which the Special Conditions or other provisions of the Contract provides that the Contractor is to be reimbursed on the basis of cost plus certain allowances may be made by the Owner, and the Contractor hereby accepts such Change Orders.

(d) When a change in quantities is ordered by the Owner, a Change Order shall be executed by the Owner and the Contractor; except that the Contractor hereby agrees to (1) increases of quantities of unit price items of basic units of construction not exceeding twenty-five percent (25%) of the bid quantities unless otherwise specified in the Special Conditions, (2) increases in quantities of unit price items of integrated units of construction in the aggregate not exceeding twenty-five percent (25%) of the Total Contract Amount, (3) changes in work or quantities for which the Contract provides that the Contractor is to be reimbursed on the basis of cost plus certain allowances, and (4) reductions of quantities of unit price items of basic or

integrated units of construction of any amount may be made by the Owner, and the Contractor hereby accepts such Change Orders.

(e) The Contractor shall notify the Engineer in advance of the exact time of commencing any change in the construction or change in quantities where payment is on the basis of cost plus certain allowances and shall keep the Engineer fully informed at all times of the progress of said change and the materials, equipment, and labor involved. The Contractor shall submit to the Engineer a written report of the progress and costs incident to such change on the day following the day during which said change was being carried on. Failure to do so shall constitute a waiver of any and all claims for additional compensation for such changes by the Contractor.

Section 40: EXTENSION OF TIME.

(a) Should the completion of the construction required under the Contract be delayed beyond the time herein specified for completion, the Owner may grant the Contractor additional time for completion by executing a Change Order modifying the Construction Time and Construction Schedule. If the failure of the Contractor to complete the construction within said specified time results from unavoidable delay as hereinafter defined, the Construction Time shall be extended by the number of days lost as a result of the unavoidable delay, provided, however, that the Constructor shall make a claim to the Owner in writing for such extension of time as herein provided. In considering applications for extension of time, the Engineer will classify delays according to the following definitions:

(l) Unavoidable delays in the prosecution or completion of the construction shall include all delays which result from causes beyond the control of the Contractor and which could not have been avoided by the exercise of reasonable care, prudence, foresight and diligence on the part of the Contractor or its Subcontractors. Delay in completion due to contract modifications ordered by the Owner, unforeseeable delays in the completion of the construction of other contractors employed by the Owner, floods, fire, labor strikes, war, the public enemy and Acts of God will be considered unavoidable delays, insofar as they necessarily interfere with the Contractor's completion of the construction. DELAY DUE TO ADVERSE WEATHER CONDITIONS, WILL NOT BE REGARDED AS UNAVOIDABLE DELAYS AS THE CONTRACTOR MUST PLAN ITS CONSTRUCTION WITH PRUDENT ALLOWANCE FOR SUCH CONDITIONS AND IN PARTICULAR, AS SUCH CONDITIONS EXIST IN KETCHIKAN, ALASKA, AND ENVIRONS.

(2) Avoidable delays in the prosecution or completion of the construction shall include all delays which in the opinion of the Engineer could have been avoided by the exercise of care, prudence, foresight and diligence on the part of the Contractor or its Subcontractors. Delays in the prosecution of parts of the construction which may in themselves be unavoidable but do not necessarily prevent or delay the prosecution of other parts of the construction nor the completion of the whole construction within the time herein specified; reasonable loss of time resulting from the necessity of submitting Shop Drawings to the Owner for review and from the making of surveys, measurements, and observations; and such interruptions as may occur in the prosecution of the work on account of the reasonable interference of other contractors employed by the Owner which do not necessarily prevent the completion of the whole construction within

the time agreed upon and delays due to adverse weather conditions, shall constitute avoidable delays within the meaning of the Contract.

(b) Claims for extension of time shall be made in writing to the Owner no later than five (5) days after occurrence of the event causing the delay. In the event of continuing cause of delay, only one (l) claim shall be necessary. Contractor agrees that failure to make such claim within the time specified shall constitute a binding waiver of such claim.

(c) No claim for delay shall be allowed on account of failure to furnish Construction Drawings until ten (10) days after written request for such drawings has been made by the Contractor to the Owner. There may be some Construction Drawings which cannot be made until certain work has been done by the Contractor. Request for such Construction Drawings shall not be effective, so as to start the running of the ten (10) day period, until the Contractor's work has advanced to the point which will enable and require such Construction Drawings to be made.

Section 41: OWNER'S USE OF CONSTRUCTION.

(a) The Owner shall have the right to take possession of, use and collect revenues from any completed, partially completed, satisfactory or unsatisfactory portions of the construction after the time for completion of the entire construction has expired, but such taking possession and use shall not be deemed an acceptance of any construction not completed in accordance with the Contract Documents.

(b) The Contractor shall not be entitled to any extra compensation for or extension of time due to costs to the Contractor arising from the use of any portion of the construction by the Owner.

Section 42: PAYMENT OF THE CONTRACT AMOUNT.

(a) The Owner hereby agrees to pay to the Contractor as full compensation for the timely, proper and complete performance of the Contract a sum of money as follows:

(1) **Total of Lump Sum Prices**. If the Total Contract Amount is a lump sum price, or the total of lump sum prices, such amounts; or

(2) **Total of Unit Prices**. If the Total Contract Amount is computed from the actual measured quantities in the completed construction at the unit prices for construction listed in the Bid Schedule of the Contractor's Bid Proposal, such amounts; or

(3) **Total of Lump Sum Plus Unit Prices**. If the Total Contract Amount is a combination of (1) and (2) above, the total of such amounts;

provided, said sum of money is further properly adjusted in accordance with the applicable provisions of the Contract.

(b) The making of any payment to the Contractor under the Contract shall not relieve the Contractor of any obligations thereunder. The Contractor is obligated to complete the Contract

in its entirety and to deliver to the Owner such completed construction as is specified in the Contract. The Contractor shall be obligated to repair, replace, restore, or rebuild any fully or partially completed construction required to be provided under the Contract until the Contract is fully performed and the Owner gives final acceptance in writing of the work, except that the Contractor's warranty and bonds shall remain in force for the period provided herein and the Contract Documents.

Section 43: PAYMENT FOR CHANGES.

(a) Payment for increases of quantities of unit price items of integrated units of construction which in the aggregate do not exceed twenty-five (25%) percent of the Total Contract Amount, and for increases of quantities of unit price items of basic units of construction which do not exceed twenty-five (25%) percent of the bid quantities, and for all quantities of basic and integrated units of construction less that the bid quantities, unless otherwise specified in the Special Conditions, shall be made at the unit prices in the Bid Schedule in the Contractor's Bid Proposal.

(b) Payment for all changes in lump sum items and for that part of the changes in quantities which are increases of quantities of unit price items in excess of twenty-five percent (25%) of the bid quantities for basic units of construction or in excess of twenty-five percent (25%) of the Total Contract Amount for integrated units of construction shall, at the option of the Owner, be determined in one of the following ways:

(1) by Contractor's proposal and Owner's acceptance of reasonable unit prices, or

(2) by Contractor's proposal and Owner's acceptance of reasonable lump sum prices, or

(3) by payment to the Contractor on a cost basis plus certain allowances as follows:

Items for which payment will be made on a cost plus basis	Percentage Allowance for Overhead and profit in addition to net costs
Labor	20%
Materials and equipment	10%
Use of Equipment	15%

The net costs of items for which payment shall be made on a cost plus basis shall be computed as follows:

(a) **Labor**. For all labor, including such foreman supervision as may be necessary, the Contractor shall be paid the payroll cost of such labor and supervision, but not exceeding the current prevailing rates of wages in the locality where the work is performed, applicable health and welfare benefits, social security, unemployment compensation, and other occupational taxes, for each hour that labor and foreman supervision are actually engaged upon such construction, plus that portion of the cost prorated on the basis of time worked, of travel time, subsistence, and

other labor benefits which are an obligation of the Contractor under the contractor-union labor agreement, if any, applicable to the Project.

(b) **Materials and Equipment**. For all materials and equipment incorporated in the completed construction, the Contractor shall be paid its actual invoice cost, including actual freight and express charges, less all offered or available discounts, regardless of whether or not they may have been taken.

The Contractor shall furnish as evidence of all charges for materials and equipment, valid copies of vendor's invoices, including freight and express bills. For such materials as may be furnished from the Contractor's stocks for which an invoice is not available, the Contractor shall furnish an affidavit certifying to its actual cost of such materials.

In the event that the Contractor's cost of such materials and equipment furnished is excessive in the opinion of the Engineer, or if the Contractor does not furnish satisfactory evidence of its costs, the Owner reserves the right to establish the cost of all or a part of such materials delivered to the location of the Project at the lowest current wholesale prices less all applicable discounts at which said materials and equipment are available to the Contractor in the quantities required.

The Owner reserves the right to furnish such materials and equipment as it deems advisable, and the Contractor shall receive no payment for costs or allowances on such materials.

(c) **Use of Equipment.**

(1) **Contractor-Owned Equipment**. For Contractor-owned equipment, including machine-power tools, which is necessary or desirable for the construction in the opinion of the Engineer, 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., 1980 Ridder Park Drive, San Jose, California 95131, (hereinafter referred to as "Blue Book") and as modified by the Special Conditions, for the time that said equipment is in use on such construction, excluding therefrom all time that such equipment is inoperative because of malfunction or breakdown. Such rates shall be the monthly, weekly, daily or hourly rates applicable to the total period the equipment is in use on the project, whichever is lowest and results in the least total amount.

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 Craig City School District reserves the right to establish a rate based on similar equipment in the Blue Book on prevailing commercial rates in the area.

When Contractor-owned equipment is ordered by the Owner to be held at standby, the equipment rental will be paid at one-half (1/2) of the said rate; except, no percentage allowance shall be paid for equipment on ordered standby.

The said equipment rental rates are the maximum rates allowable for equipment of

modern design in good working condition and shall include and be full compensation for depreciation, investment costs, and furnishing all fuel, oil, lubrication, repairs, maintenance, insurance and incidental expenses, and all other costs except labor for operation thereof. Individual pieces of equipment having a purchase price of Six Hundred Dollars ($600.00) or less will be considered to be tools or small equipment, and no rental will be allowed on such tools or small equipment.

In the event the equipment is not at the Project site and the Engineer determines that such equipment would not have been required other than for the changed construction, and it is necessary to obtain such equipment exclusively for such changed construction, the actual costs of moving such equipment to and from the Project site will be paid to the Contractor from the nearest point such equipment is available, plus rental time during movement of the equipment at fifty percent (50%) of said rental rates.

(2) **Equipment Furnished by Others**. If Contractor-owned equipment is not available and equipment is rented from outside sources, payment will be made on the basis of actual invoice cost, except that when the equipment is ordered standby no percentage allowances will be made. Use of non-owned equipment at rates higher than those established by the "Rental Rate Blue Book for Construction Equipment," and as modified by the Special Conditions will not be allowed, except upon prior written approval of the Owner.

(d) **Payment in Full**. The compensation as herein provided, including the percentage allowance, shall be payment in full for all construction furnished hereunder and all expenses of every nature, kind and description, including, but not limited to, social security, unemployment compensation, occupational taxes and any other federal, state or local taxes, premiums on public liability and property damage insurance, use of small tools and equipment for which no separate payment is allowed, overhead expense and profit.

When construction is furnished by a Subcontractor to the Contractor, the percentage allowances shall be allowed only on the costs to the Subcontractors of labor, material and use of equipment.

The Contractor's cost records pertaining to work paid for hereunder shall be open to inspection and audit by representatives of the Owner during the period of the Contract and for not less than one (1) year after the acceptance of all construction. Where payment for labor, materials or use of equipment is based on the cost thereof to a Subcontractor or material supplier to the Contractor, the Contractor expressly warrants that the cost records of such Subcontractor or material supplier shall be open to inspection and audit by representatives of the Owner on the same terms and conditions as the cost records of the Contractor. If an audit is to be started more than sixty (60) days after the acceptance of all construction under the Contract, the Contractor will be given reasonable notice of the time when such audit is to begin.

(e) **List of Construction Equipment**. Within fifteen (15) days after Notice to Proceed, the Contractor shall furnish to the Engineer a list of construction equipment to be used in the Construction together with applicable Blue Book rental rates. For construction equipment for which Blue Book rental rates are not available, the Contractor shall provide its fully documented and

established rental rates for such equipment under similar usage. Such rental rates shall become effective when approved by the Engineer. The Contractor shall furnish copies of fuel, oil, lubrication and normal maintenance of construction equipment applicable to the project location.

Section 44: PAYMENT FOR UNCORRECTED CONSTRUCTION.

If, in the opinion of the Engineer, it is inexpedient, impractical or otherwise not in the best interests of the Owner, to correct construction which has been damaged, which is faulty, or which has not been furnished in accordance with the Contract, the Owner shall have the right in its sole discretion, to accept such work and an equitable reduction in the Total Contract Amount shall be made.

Section 45: PROGRESS PAYMENTS.

(a) Partial payments of the Total Contract Amount, if such progress payments are to be allowed or made, will be made as specified in the Special Conditions. No progress payment will be allowed unless provided for in the Special Conditions.

(b) In the event progress payments are provided for in the Special Conditions, the Contractor may, unless otherwise provided in the Special Conditions, submit to the Engineer, not later than the tenth (10th) day of each calendar month, two (2) copies of a Contractor's Request for Payment for construction completed during the previous calendar month. Such Contractor's Request for Payment shall be in the form provided in the Special Conditions. With each Contractor's Request for Payment, the Contractor shall, if required, submit satisfactory evidence of payment for materials and labor, including payments to Subcontractors, made during the previous month. Each Contractor's Request for Payment shall be computed from construction completed on all items listed in the Bid Proposal less the amounts retained as provided in the Special Conditions or elsewhere in the Contract Documents, including any claims or offsets asserted against the Contractor, including any asserted by the Owner, and less all previously approved Contractor's Requests for Payment. Partial payment may be made for partially completed construction to the extent completed in the opinion of the Engineer.

(c) Partial payments on account of changes in construction may be made periodically in the same manner as partial payments on the Total Contract Amount.

(d) Within fifteen (15) days after proper submission of Contractor's Request for Payment by the Contractor, the Engineer will:

(1) recommend approval of the Contractor's Request for Payment submitted, or

(2) recommend approval of such other amount, if any, as is due the Contractor, in the opinion of the Engineer, informing the Contractor of the amount recommended, if any.

(e) The recommended Contractor's Request for Payment will be submitted to the Owner by the Engineer, and the Owner may authorize a partial payment to the Contractor, on the basis of the recommended Contractor's Request for Payment, but the Owner will withhold a retained

amount as specified in the Special Conditions and such other amounts as are recommended by the Engineer or allowed to be retained by the Owner, including any claims or offsets asserted against the Contractor.

Section 46: PAYMENTS WITHHELD.

(a) In addition to the amount retained as otherwise provided in the Contract Documents, the Owner may withhold such amounts from any payment as may be necessary in the opinion of the Engineer or Owner for protection from loss on account of

(1) defective work not remedied;

(2) claims filed or reasonable evidence indicating probable filing of claims;

(3) failure of the Contractor to make proper and full payments promptly to its own employees or to the Subcontractors for materials or labor within a reasonable time after the Contractor has received the material or labor for incorporation into the construction;

(4) a reasonable doubt that the Contract can be completed by another contractor for the balance then unpaid;

(5) damage to the Owner, its buildings, structures, or property, to another contractor or subcontractor, or any other person, caused or contributed to by the Contractor, its officers, employees, agents, representatives, subcontractors, or persons for whom Contractor is responsible;

(6) bankruptcy, receivership or insolvency of, or the pendency of such proceedings against the Contractor;

(7) costs of the Owner for engineering tests, inspection costs, or other work, costs or expenses, to be reimbursed to the Owner by the Contractor as provided in the Contract Documents;

(8) unsatisfactory prosecution of the work, or failure of the Contractor to complete any part of the construction in accordance with the Construction Schedule or the Contract;

(9) credits refused by the Contractor for construction deleted; or

(10) errors in previous partial payments, or claims by the Owner against the Contractor.

Section 47: TERMINATION FOR CONVENIENCE.

(a) The performance of work under this Contract may be terminated by the Owner in accordance with this clause in whole, or from time to time in part, whenever the Owner shall determine that such termination is in the best interest of the Owner. Any such termination shall

be effected by delivery to the Contractor of a Notice of Termination specifying the extent to which performance of work under the Contract is terminated, and the date upon which such termination becomes effective.

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

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

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

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

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

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

(6) Transfer title to the Owner, and deliver in the manner, at the times, and to the extent, if any, directed by the Owner, (i) the fabricated or unfabricated parts, work in process, completed work, supplies, and other material produced as a part of, or acquired in connection with the performance of, the work terminated by the Notice of Termination, and (ii) the completed or partially completed plans, drawings, information, and other property which, if the Contract had been completed, would have been required to be furnished to the Owner;

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

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

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

(c) After receipt of a Notice of Termination, the Contractor shall submit to the Owner his termination claim, in the form and with the certification prescribed by the Owner. Such claim shall be submitted promptly but in no event later than sixty (60) days from the effective date of termination, unless one or more extensions in writing are granted by the Owner upon request of the Contractor made in writing within such sixty (60) day period or authorized extension thereof. However, if the Owner determines that the facts justify such action, he may receive and act upon any such termination claim at any time after such one-year period or extension thereof. Upon failure of the Contractor to submit his termination claim within the time allowed, the Owner may determine, on the basis of information available to the Owner, the amount, if any, due to the Contractor by reason of the termination and shall thereupon pay to the Contractor the amount so determined.

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

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

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

(i) The cost of such work;

(ii) The cost of settling and paying claims arising out of the termination of work under subcontracts or orders as provided in paragraph (b)(5) above, exclusive of the amounts paid or payable on account of supplies or materials delivered or services furnished by the Subcontractor prior to the effective date of the Notice of

Termination of work under this Contract, which amounts shall be included in the cost on account of which payment is made under (i) above; and

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

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

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

(f) The Contractor shall have the right to dispute under Section 71 [Remedies] from any determination made by the Owner under paragraphs (c) or (e) above, except that, if the Contractor has failed to submit his claim within the time provided in paragraph (c) above and has failed to request extension of such time, he shall have no such right of appeal. In any case where the Owner has made a determination of the amount due under paragraphs (c) or (e) above, the Owner shall pay to the Contractor the following: (1) if there is no right of appeal hereunder or if no timely appeal has been taken, the amount so determined by the Owner or (2) if a proceeding is initiated under Section 71 [Remedies], the amount finally determined in such proceeding.

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

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

paid to the Contractor for the completion of the continued portion of the Contract when said Contract does not contain an established contract price for such continued portion.

Section 48: ACCEPTANCE AND FINAL PAYMENT.

(a) When the Contractor has completed the construction in accordance with the terms of the Contract Documents and all construction has operated satisfactorily for not less than fifteen (15) days after completion, the Contractor shall submit to the Engineer a Contractor's Final Request for Payment; Statement Concerning Claims; Release, Waiver and Discharge of Claims and Liens on the forms included in the Contract Documents; and such other completed documents as may be required by the Owner for the release of any monies held.

(b) The Contractor's Final Request for Payment shall be prepared on the basis of the Contract, including all authorized Change Orders, but not inclusive of proposals or claims of the Contractor which have not been accepted by executed Change Order. The Contractor's Final Request for Payment shall constitute a complete waiver and release of any and all claims by the Contractor except for unsettled claims that have been properly and timely filed as provided in the Contract and as are expressly and specifically stated and set forth in the Contractor's Statement Concerning Claims on the form for such included in the Special Conditions.

(c) The Statement Concerning Claims shall warrant that the Contractor has fully completed the performance of the Contract and the construction included in the Contract and has fully paid for all labor, materials, equipment, services, taxes and all other costs and expenses of every nature and kind whatsoever resulting from the Contract, except for any itemized payments due but not yet made as set forth in the statement of claims. If any dispute exists between the Contractor and any person, firm or corporation to which the Contractor might be obligated in connection with the Contract, the Contractor shall state the name of claimant and amount and general nature of the claim against the Contractor. Such Statement Concerning Claims shall also state the amount and nature of all present and future claims that the Contractor may have against the Owner relative to the Contract in addition to the Contractor's Final Request for Payment.

(d) After receipt of a properly completed Statement Concerning Claims and Contractor's Final Request for Payment, the Engineer will, within a reasonable time, make a recommendation to the Owner relative to acceptance of the construction. Such a recommendation shall not constitute a recommendation of acceptance of construction not furnished in accordance with the Contract. The Contractor's Final Request for Payment will be reviewed in the same manner as any other Contractor's Request for Payment.

(e) Upon receipt of the Statement Concerning Claims, and a Release and Waiver of Claims and Liens, in the form included in the Contract Documents, recommended Contractor's Final Request for Payment, any other documents necessary for the release of monies held, and the Engineer's recommendation relative to acceptance of the construction, the Owner will, within a reasonable time, take action on the Contractor's Final Request for Payment and on acceptance of the construction. Such action shall be subject to the conditions of the Performance Bond and Payment Bond, legal and contractual rights of the Owner, required warranties, and correction of

faulty construction after final payment. The Owner shall have the right to retain from any payment then due the Contractor, so long as any bills or claims remain unsettled and outstanding, including any asserted by the Owner, a sum sufficient, in the opinion of the Owner to provide for the payment of the same. It is also understood and agreed that, in case of any breach by the Contractor of the provisions hereof, the Owner may retain from any payment or payments, which may become due hereunder, a sum sufficient, in the opinion of the Owner, to compensate for all damages occasioned by such breach, including in such damages any damages arising out of delay on the part of the Contractor.

(f) The acceptance of construction will be evidenced by a Notice of Acceptance of Construction in writing signed by a duly authorized official of the Owner in the manner provided for written notices. No other act of the Owner shall constitute acceptance of the construction.

(g) Thirty (30) days after the Owner has accepted the construction, as above provided, the Contractor may submit a Request for Payment of the Retained Amount; provided, however, that the Owner may also retain such additional amounts and for such lengths of time as may be required by law or by the Special Conditions. If any liens remain unsatisfied after Payment of the Retained Amount is made, the Contractor shall immediately reimburse the Owner such amounts as the Owner may have been compelled to pay in discharging such liens including all costs and reasonable attorneys' fees.

Section 49: CONSTRUCTION FURNISHED PRIOR TO NOTICE TO PROCEED.

Notwithstanding any other provision of the Contract, the Owner shall not be obligated to accept or to pay for any construction furnished by the Contractor, prior to delivery of a written Notice to Proceed whether or not the Owner has knowledge of the furnishing of such construction.

Section 50: SALES AND SIMILAR TAXES.

The Contractor shall timely pay all federal, state, and local sales, excise or other taxes or assessments incurred or required to be collected or paid by the Contractor.

Section 51: CREDIT.

In the event construction is deleted or modified or specified material, equipment, method or process substituted so as to effect a reduction in cost, the Owner shall be entitled to a credit in an equitable amount.

Section 52: OWNER'S OPERATIONS.

The Contractor shall schedule all construction so as not to interfere with the operations of the Owner. Where such interference is essential to prosecution of the construction special arrangements shall be made and the written consent of the Owner as to time and method obtained forty-eight (48) hours in advance of the construction.

Section 53: OVERTIME INSPECTION.

In the event the Contractor elects to work on a Saturday, Sunday, a holiday, or longer than an eight-hour work shift on a regular working day, such work shall be considered as overtime work. On all such overtime work an Inspector, and a survey crew, if required, will be present, unless determined not necessary by the Owner. The Contractor shall reimburse the Owner for the full amount of the straight time plus overtime costs to the Owner for employees of the Owner, consultants, or government agencies required to work overtime hours.

The Contractor authorizes the Owner to deduct all such costs from any amounts due, or to become due the Contractor.

Overtime due to special construction problems, such as concrete finishing, asphalt rolling, making live sewer hookups, alleviating traffic problems, etc., will not be charged if the Engineer determines that the waiver of reimbursement of overtime charges is justified and deemed to be in the best interests of the Owner.

Section 54: OWNER'S CONSTRUCTION.

The Owner reserves the right to furnish in connection with the Project, construction which is not included in the Contract either by the Owner's forces or by the forces of other contractors.

Section 55: OTHER CONTRACTS.

(a) The Contractor shall ascertain to its own satisfaction the scope of the Project and the nature of any other contracts that have been or may be entered into by the Owner in the prosecution of the Project, to the end that the Contractor may perform the Contract in coordination with such other contracts, if any. Nothing herein contained shall be interpreted as granting to the Contractor exclusive occupancy of the Project site. The Contractor shall not cause any unreasonable hindrance or delay to any other contractor working on the Project. If, in the opinion of the Engineer, the performance of the Contract is likely to be interfered with by the simultaneous performance of some other contract or contracts to which the Owner is a party or by the Owner's own forces, the Owner may, but is not obligated to, decide which contractors shall cease a part of or all of their construction temporarily and which contractor shall continue, or whether the construction under all contracts can be coordinated so that all contractors may proceed simultaneously. The Owner shall not be responsible for any delays or damages suffered or extra costs incurred by the Contractor resulting directly or indirectly from the performance, failure to perform or attempted performance by any other contractor of any other contract.

(b) The Contractor shall afford other contractors reasonable opportunity for the introduction and storage of their materials and the execution of their construction at the Project site and shall properly connect and coordinate its construction with theirs. If another contractor or contractors are working in the same area, with equal rights and privileges, it shall be the responsibility of the Contractor to make whatever arrangements with said other contractors as are necessary for the proper execution and coordination of the construction.

(c) If any part of the Contractor's construction depends upon the construction of any other contractor for proper execution or results, the Contractor shall inspect the other contractor's construction and, at least ten (10) days prior to the time the Contractor begins construction on such part, report to the Engineer in writing any defects in such other contractor's construction that renders it unsuitable for such proper execution and results. Failure on the part of the Contractor to so inspect and report shall constitute an acceptance of the other contractor's construction as fit and proper for the reception of the Contractor's construction, except as to defects which may subsequently develop in the other contractor's construction.

(d) The Contractor agrees to save the Owner and the Engineer harmless from any claim, suit or demand of any other contractor by reason of the failure of the Contractor to conform with the Construction Schedule or construction time.

Section 56: LANDS BY OWNER.

Unless otherwise provided in the Special Conditions, the Owner will provide the lands upon which the construction under the Contract is to be furnished, together with the right-of-access to such lands. The Contractor shall confine its equipment, storage of materials, and construction operations to such limits as may be directed by the Owner, and shall not unreasonably encumber the premises with its materials; provided, however, such discretion by the Owner shall not impose upon the Owner any duty or responsibility for the safety or loss or damage to any equipment, materials, other property or project safety, all of such to remain the responsibility of Contractor.

Section 57: LANDS BY CONTRACTOR.

The Contractor shall provide at its own expense and with no cost or liability to the Owner, any additional land and access thereto, not shown or described in the Contract Documents as provided by the Owner that may be required for temporary construction facilities or storage of materials. The Contractor shall confine its equipment, storage of materials and operation of its workmen to those areas described in the Contract Documents and such additional areas as it provides at its own expense.

Section 58: EMPLOYEES.

The Contractor shall at all times enforce strict discipline and good order among its employees and shall not employ or continue to employ on the Project anyone not skilled in the work assigned to it or any person unsatisfactory to the Owner. All employees who perform any work shall be properly licensed, and shall be the holders of all certificates of fitness, and permits as may be required by law.

Section 59: PROJECT SAFETY.

(a) The Contractor shall exercise all precautions for the safety of its employees and of the general public and of the Owner's employees and property, and shall comply with all applicable provisions of federal, state, and municipal safety laws, building and construction codes, and the safety rules and other regulations of the Owner, including, but not limited to, the requirements of

the U.S. Occupational Safety and Health Administration (OSHA) or applicable state statutes in lieu thereof. The Contractor shall also comply with the recommendations in the "Manual of Accident Prevention in Construction of the Associated General Contractors of America" insofar as applicable, unless such recommendations are incompatible with federal, state or municipal laws or regulations. Monthly reports of all lost-time accidents shall be promptly submitted to and shall include such data as are requested by the Owner.

(b) The Contractor shall enforce all instructions of the Owner regarding signs, advertising, fires, danger signals, barricades, and smoking, and shall require all persons employed in the construction to comply with all building, post or institutional regulations while on the premises. The Contractor shall require all employees to be familiar with and comply with the Owner's safety regulations. The Contractor shall not permit any part of any structure to be loaded with a weight exceeding its maximum allowable loading or that will otherwise jeopardize its safety.

(c) Existing traffic and street name signs which will interfere with construction shall be removed by the Contractor and stored in a safe place. These signs shall not be removed until the Engineer has so directed and until the necessary measures have been taken to safeguard traffic after the signs have been removed. Preservation and maintenance of the signs shall be the sole responsibility of the Contractor. Upon completion of the project, the Contractor will reset all such signs in their permanent location at no cost to the Owner.

(d) The Contractor shall provide adequate signs, barricades, signal lights and watchmen and take all necessary precautions for the protection of the construction and the safety of the public. All barricades and obstructions shall be protected at night by satisfactory signal lights which shall be kept lighted from sunset to sunrise. Barricades shall be constructed, painted, and placed in accordance with the manual on Uniform Traffic Control Devices, published by the United States Department of Transportation.

(e) The Contractor shall at all times so conduct its work as to ensure the least possible obstruction to traffic and inconvenience to the general public and the residents in the vicinity of the Project, and to ensure the protection of persons and property in a manner satisfactory to the Owner. No road or street shall be closed to the public except with the permission of the Owner and the proper governmental authority. Emergency traffic such as police, fire and disaster units, shall be provided reasonable access at all times. The Contractor shall be liable for any damages which may result from his failure to provide such reasonable access.

(f) When work is being performed below the standards required herein, or other applicable standards, or when the Engineer or Owner believes the condition endangers the safety of the general public, employees of the Project, or any property, including the buildings or property of the Owner, the Engineer may immediately issue a written stop-work order describing the sub-standard work and deliver the same to the Contractor. The Contractor shall cease work and not resume work on the stopped portion of the project until acceptable remedial action has been taken. Such protective measures shall not be construed as releasing the Contractor of any obligation or liability arising under the Contract and shall be at no cost, expense, or liability, for stopping the work of otherwise, to the Owner.

Section 60: INSTRUMENT SURVEYS.

(a) The Owner will furnish the instrument surveys necessary to establish certain bench marks, base lines and property boundaries specifically noted on the Contract Drawings and such construction surveys, if any, as are specifically required to be provided by the Owner in the Special Conditions. From the information provided by the Owner, the Contractor shall develop and make such additional detailed surveys as are needed for construction, such as slope stakes, batter boards, stakes for pile locations and other working points, lines and elevations.

(b) All bench marks, base lines, and property boundaries,
as originally established by the Owner, shall thereafter be maintained by the Contractor who shall be responsible for keeping their accuracy and who shall pay to the Owner the reasonable cost to the Owner of re-establishing them if they are disturbed. The Contractor shall notify the Engineer in writing at least ten (10) days in advance of the time the Contractor will commence work on any parts of the construction requiring surveys to be furnished by the Owner.

(c) The Contractor shall provide reasonable and necessary opportunities and facilities to the Engineer for setting points and making measurements during construction.

Section 61: PROTECTION OF PROPERTY.

(a) The Contractor shall continuously maintain full and adequate protection of all its construction, the Owner's buildings and other property and the adjacent public and private property from damage, injury, or loss arising from, or in relation to, the construction. The Contractor shall promptly pay for any damage, injury or loss resulting from the act or omission of Contractor or the lack of adequate protection, and upon the failure to do so the Owner shall be entitled to withhold and pay from any amounts otherwise due the Contractor, or from any retainage, any such claim for damages or pursue any other remedy, including suspension or termination of the Contract without liability.

(b) The Contractor shall not enter upon public or private property for any purpose without obtaining permission from the proper public authority or private property owner. In the event of construction on state highways, city or public roads, or any public right-of-way, it will be the Contractor's responsibility to notify the authority having jurisdiction thereover before beginning construction and to ascertain that the schedule of operations proposed is satisfactory to the authority.

(c) Wherever construction under the Contract is undertaken on easements or rights-of-way over private property, or public easements, rights-of-way, or franchise, all construction operations shall be confined to the limits of such easement, right-of-way or franchise and be completed so as to cause the least amount of disturbance and a minimum amount of damage.

(d) Construction across public or private property shall be carried out in one (l) continuous operation with immediate restoration and cleanup of the construction area. If the Contractor should fail to perform such construction, restoration and cleanup continuously, the

Owner may give the Contractor a written notice to do so. In the event of failure by the Contractor to complete such construction, restoration and cleanup within five (5) days after receipt of such notice, the Owner may complete the same to the extent the Owner deems advisable. The cost of all labor, material, supervision and other expenses incurred by the Owner in so doing shall be paid by the Contractor to the Owner and may be deducted from any payments due the Contractor under the Contract.

(e) The Contractor shall protect and maintain all underground or above-ground utilities and structures affected by the construction and all lawns, shrubs, trees, fences, and other improvements on property crossed by or adjacent to its operations, and all damage shall be repaired and restored by the Contractor at its expense in a satisfactory manner. The Contractor will be responsible for all damage caused by its construction to roads, highways, ditches, walls, bridges, culverts, utilities, barricades, lights or other property, whether such damage be at the Project site or elsewhere and the Contractor shall repair or replace at its own expense all such damage in a satisfactory manner.

(f) It is expressly understood that the Contractor shall restore, at Contractor's sole cost and expense, all property, whether public or private, the use of which is obtained by easement, permit or right-of-way, to a condition at least equal to its original condition. Before beginning construction the Contractor shall file with the Engineer properly identified and dated photographs of such property as may be designated on the Contract Drawings or described in the Special Conditions.

Section 62: CUTTING AND PATCHING.

The Contractor shall at its own expense do all necessary cutting and patching of its construction that may be required in order to properly receive the construction of other contractors on the project or as required by the Contract Documents. The Contractor shall restore all such cut or patched construction to a condition satisfactory to the Owner. The cost resulting from replacement of defective cutting and patching construction shall be borne by the Contractor.

Section 63: CLEANUP.

At the time of termination or suspension for an extended period of all or any portion of the construction, or at completion but before final acceptance by the Owner, the Contractor at its own expense shall remove from the Owner's property and from all public and private property, all of its equipment and such unused materials as the Owner has made no payment for, temporary structures, rubbish and waste materials resulting from its operations and leave the Project site in a neat and orderly fashion satisfactory to the Owner. The Contractor shall at all times during the progress of the construction maintain the site in as neat and orderly a condition as construction operations will permit. In the event the Contractor fails to do so, in addition to any other remedy, including declaring the Contractor in default, the Owner may remove and store such equipment and unused materials and dispose of rubbish and waste at the expense of the Contractor. The cost of such removal, storage and disposal may be deducted from any payment due the Contractor.

Section 64: SANITARY PROVISIONS.

The Contractor shall furnish and maintain temporary toilet facilities of a type, number and location satisfactory to the Owner and all public authorities having jurisdiction, for all workmen employed for the Project. The Contractor shall maintain the same in a sanitary condition from the beginning of the construction until completion and shall then remove the temporary toilet facilities and disinfect the premises.

Section 65: INDEX OF ACCOUNTS.

Prior to final payment, or at any other time if requested by Owner to evaluate any claim, or potential claim by the Contractor, and at the option of the Owner, the Contractor shall furnish to the Owner a complete accounting of the actual costs of labor, material, and other charges, and certified copies of all invoices for materials and payrolls for all labor incorporated into the Project.

Section 66: EXISTING UTILITIES AND IMPROVEMENTS.

(a) The Contractor shall remove such existing improvements on the Project site as may be necessary for the performance of the construction and, unless otherwise specified in the Special Conditions, shall rebuild the existing improvements in as good a condition as found; provided that existing improvements which interfere with the performance of the construction shall be maintained by the Contractor until their removal is authorized or directed by the Owner.

(b) The Contractor shall make all necessary arrangements and do all things required to avoid interference with the maintenance and operation of power, telegraph, telephone, water, sewer, gas and other utility lines, properties, and facilities of every kind, all in a manner satisfactory to the owners and operators thereof.

(c) If construction under the Contract crosses highways, railroads, streets, or other utilities under the jurisdiction of the state, borough, cities, federal government, or other public body, public utility, or private entity, the Contractor shall secure written permission from the proper authority before executing such construction. A copy of this written permission shall be filed with the Owner before any construction is started. The Contractor shall furnish a written release from the proper authority before final acceptance of the construction by the Owner.

(d) Existing utilities indicated anywhere on the Contract Drawings have been plotted from information currently available to the Engineer. The source of information generally consists of construction records and other data obtained verbally from officials associated with the particular utility. The data is shown on the Contract Drawings for whatever benefit the Contractor may derive, and unless specific instructions or data concerning certain utilities are set forth in the Special Conditions, the data shown on the Contract Drawings shall not necessarily be considered precise or complete, and the Owner and the Engineer make no guarantee as to completeness, precision or dimensions, and that other aboveground or underground utilities or facilities not shown on the Contract Drawings may be encountered during the course of construction. In any case, minor lines, such as water, gas and sewer may not be indicated. This shall in no way relieve

the Contractor from its responsibility for maintenance of existing utilities and performance of the Contract. Under no circumstances will errors or omissions in location of existing utilities or improvements, whether they be visible from the surface, buried or otherwise obscured, be considered as a basis for additional compensation to the Contractor.

(e) The Contractor shall be responsible for all damage to existing utilities and facilities during construction and shall restore all damaged facilities to their original condition to the satisfaction of the Owner and the Owner of the utilities and facilities at no cost to the Owner.

Section 67: INDEPENDENT CONTRACTOR; NO AUTHORITY TO BIND OWNER.

The Contractor is an independent Contractor and is not, and shall not be construed to be a partner, joint venturer, employee or agent of the Owner and shall not, and is not authorized to, enter into or make any contracts, agreements, or enter into any other understanding with any other person, corporation, partnership, joint venturer, or other entity, in the name of the Owner.

Section 68: NO THIRD PARTY BENEFICIARIES.

Nothing in this Contract shall be construed to give any person other than the Owner and the Contractor any legal or equitable right, remedy or claim under this Contract, but it shall be held to be for the sole and exclusive benefit of the Owner and the Contractor.

Section 69: CONTRACTOR QUALIFIED.

The Contractor expressly represents and warrants it is the holder of all professional, business or other licenses or permits and is qualified and capable of performing all of the work covered or called for by the Contract and is presently ready, able and willing to undertake and perform all of such work and services, and supply all necessary materials, in a good, safe, and workmanlike manner, at the times, in the manner, and pursuant to the terms, conditions and provisions, and for the compensation and payments provided for in the Contract.

Section 70: ENTIRE AGREEMENT.

This Contract, and any schedules, appendices or exhibits attached thereto set forth all the covenants, promises, agreements, conditions and understandings between the parties hereto, and there are no covenants, promises, agreements, conditions or understandings, either oral or written, between them other than as herein set forth. Except as herein otherwise expressly provided, no contemporaneous or subsequent agreement, understanding, alteration, amendment, change or addition thereto, or any schedule, appendix, exhibit or attachment thereto shall be binding upon the parties hereto. This Contract constitutes a final, complete and exclusive statement of the agreement between the parties.

Section 71: LAW APPLICABLE.

The laws of the State of Alaska shall govern the construction, validity, performance and enforcement of this Contract. Venue as to any action, claim, or proceeding arising out of, or based upon this Contract, including, but not limited to, any action for declaratory or injunctive relief, shall be the appropriate court sitting in the City of Ketchikan, First Judicial District, Alaska.

Section 72: REMEDIES.

Except as may be otherwise provided in this Contract, all disputes, claims, counterclaims, and other matters in question between the Owner and the Contractor arising out of or relating to this Contract or the breach thereof will be decided in a court of competent jurisdiction.

SPECIAL CONDITIONS

The General Conditions are supplemented and/or amended by the following Special Conditions:

Section 1: PAYMENTS

(a) Retainage

Until such time as the work is accepted by the Owner, the retained percentage may be ten percent (10%) of the value of the completed work, provided, however, when the dollar value of the completed work has reached fifty percent (50%) or more, the Contractor may request that the retainage by reduced to five percent (5%). The Owner may, but shall not be required to, reduce the retainage based on the Contractor's progress schedule, clean-up, contract completion cost, and other factors.

Should the amount due the Contractor under the estimate and Request for Payment for any given month be less than five thousand dollars ($5,000), at the option of the Engineer, no payment shall be made for that month.

Partial payments shall not be construed as an acceptance or approval of any part of the work covered thereby, and they shall in no manner relieve the Contractor of responsibility for defective workmanship or material.

The estimates upon which partial payments are based are not represented to be accurate estimates, and all quantities shown therein are subject to correction in the final estimate. If the Contractor uses such estimates as a basis for making payment to subcontractors, he does so at his own risk, and he shall bear all loss that may result.

The making of partial payments under the Contract, either before or after the date set for completion of the work, shall not operate to invalidate any of the provisions of the Contract or release the surety.

At the time payment is made for any materials which have been stored at or near the site, the ownership of such materials shall be vest in the Owner, and they shall remain in storage until used on the work, however, the Contractor shall have the continuing duty and responsibility to protect all such items and any loss or damage thereto shall be at the cost and expense of, and shall be paid by the Contractor. Such materials shall not be used on other work.

(b) Advances on Material

For materials delivered and held in storage upon the work (or near the site of the work if approved by the Engineer), allowances will be made in the partial payments

to the Contractor. These allowances shall be in amounts not exceeding one hundred percent (100%) of the net cost to the Contractor of the material f.o.b. the work, and from such allowances there shall be retained the percentages regularly provided for in connection with partial payments.

At the option of the Engineer, no allowance for materials shall be made on any partial payment or estimate unless the total allowable value for all materials on hand is at least one thousand dollars ($1,000) and no allowance shall be made upon any single class of material the value of which is not at least five hundred dollars ($500). The inventory of materials for which advances are requested shall be kept to a reasonable size as approved by the Engineer. No allowance shall be made upon fuels, supplies, forms, lumber, falsework, or other materials, or on temporary structures of any kind, which will not become an integral part of the finished construction.

As a basis for determining the amount of advances on material, the Contractor shall make available to the Engineer such invoices, freight bills, and other information concerning the materials in question, as the Engineer may request.

Should there be reasonable evidence, in the opinion of the Engineer, that the Contractor is not making prompt payment for materials on hand, allowances for material on hand will be omitted from partial payment.

(c) **Allowances for Materials Left on Hand**

Materials not required by the unit or lump sum prices named in the Bid Proposal but delivered to the work at the order of the Engineer but left unused due to changes in plans, shall, if the materials are not practicably returnable for credit, be purchased from the Contractor by the Owner at their actual cost (without percentage allowance for profit), and shall thereupon become the property of the Owner.

(d) **Final Payment**

Final estimate and final request for payment shall be made as provided in Section 48 of the General Conditions.

(e) **Suspension of Payments**

No partial or final payment shall be made as long as any order made by the Engineer to the Contractor in accordance with the specifications or Contract Documents remains uncomplied with.

(f) **Correction of Work after Final Payment**

Neither payment of all or any portion of the contract price, final acceptance, notice

of acceptance of construction, nor any provision in the Contract Documents shall relieve the Contractor of responsibility for faulty materials or workmanship. Contractor shall remedy any defects due thereto and proceed as provided in Section 265, Warranties, and as otherwise provided in the Contract.

(g) **Payments**

Payments under the Contract shall be paid in cash (check) by the Owner unless otherwise provided.

(h) **Final Payment - Certificate of Compliance**

No final payment shall be made until the Contractor shall file with the Engineer, prior to acceptance of the work, a Certification of Compliance in form substantially as follows: "I (we) hereby certify that all work has been performed and materials supplied in accordance with the plans, specifications, and contract documents for the above work, and that:

a. Not less than the prevailing rates of wages as ascertained by the governing body of the contracting agency has been paid to laborers, workmen and mechanics employed on this work;

b. There have been no unauthorized substitutions of subcontractors; nor have any subcontracts been entered into without the names of the subcontractors having been submitted to the Engineer prior to the start of such subcontracted work;

c. No subcontract was assigned or transferred or performed by any subcontractor other than the original subcontractor, without prior notice having been submitted to the Engineer together with the names of all subcontractors;

d. All claims for material and labor and other service performed in connection with these specifications have been paid;

e. All monies due to the State Industrial Accident Fund, the State Unemployment Compensation Trust Fund, the State Tax Commission, Hospital Associations, and/or others have been paid;

f. No asbestos containing materials have been incorporated in the project and the project is "asbestos-free".

(i) **Final Release**

Before the Owner pays the Contractor the final payment for the work, the Contractor shall sign and deliver to the Owner a statement of claims and final release sworn to under oath and duly notarized on the form included in these

contract documents.

Section 2: FORMS

The form of Contractor's Request for Payment, the Statement of Claims, and the Final Release, that shall be required and used shall be on the forms set forth and included in these contract documents.

Section 3: ALASKA FOREST PRODUCTS

Pursuant to AS 36.15.010 timber, lumber, and manufactured lumber products originating in this state from local forests shall be used wherever practical or specified.

Section 4: ARCHAEOLOGICAL REMAINS

Pursuant to AS 41.35 Construction shall be halted if archaeological remains are uncovered in order to permit archaeological survey. The Contractor shall notify the Owner and the State Archaeologist, Department of Natural Resources, if archaeological remains are found. The Owner will then address and resolve the matter.

Section 5: LIQUIDATED DAMAGES

Pursuant to Section 7 of the General Conditions, liquidated damages for failure to complete all work called for under the Contract Documents by the time required to complete such work, as specified in Section 2 (Construction time) of the Agreement and Section 6 of these Special Conditions, are fixed at Four Hundred Dollars ($400.00) per calendar day.

Section 6: CONSTRUCTION TIME

Construction Time is June 6, 2024 to August 23, 2024.

Section 7: SITE ACCESS

All access to the project site prior to the June 6, 2024 must be coordinated with the Director of Maintenance, Craig City School District.

SECTION 011000
SUMMARY

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
1. Project information.
2. Work covered by Contract Documents.
3. Work under separate contracts.
4. Access to site.
5. Coordination with occupants.
6. Work restrictions.
7. Specification and Drawing conventions.

B. Related Requirements:
1. Section 015000 "Temporary Facilities and Controls" for limitations and procedures governing temporary use of Owner's facilities.

1.2 PROJECT INFORMATION

A. Project Identification: Craig High School Biomass Project

1. Project Location: 1 Panther Way, Craig, AK 99921.

2. Owner: Owner's Representative: Chris Reitan, Superintendent, Craig City School District, PO Box800/100 School Rd., Craig, AK, 99921 (907)826.3274

B. Project Manager: R&M Engineering-Ketchikan, Inc., 7180 Revilla Road, Suite 300, Ketchikan, AK 99901, (907) 225-7197.

1.3 WORK COVERED BY CONTRACT DOCUMENTS

A. The Work of Project is defined by the Contract Documents and consists of the following:

1. This project includes the construction of a 2880 SF prefabricated metal building that will serves as a wood shop. The prefabricated metal building, including all man doors, overhead doors, vinyl windows, metal SIP wall and roof panels, liner panels, soffit panels, fascia, gutters, snow guards, and all primary and secondary steel as well as has been procured by the Owner and is at the project site. Scope of work includes the erection of the metal building, construction of the concrete foundation, and all interior walls and finishes.

Mechanical work consists of the installation of a new dust collection system.

Electrical work consists of lighting, power, and heat.

Site has been cleared and prepped for the building.

Refer to the Contract Documents for all indicated Work.

B. Type of Contract:

1. Project will be constructed under a single prime contract.

1.4 WORK UNDER SEPARATE CONTRACTS

A. General: Cooperate fully with separate contractors so work on those contracts may be carried out smoothly, without interfering with or delaying Work under this Contract or other contracts. Coordinate the Work of this Contract with work performed under separate contracts.

1.5 ACCESS TO SITE

A. General: Each Contractor shall have full use of Project site for construction operations during construction period. Contractor's use of Project site is limited only by Owner's right to perform work or to retain other contractors on portions of Project.

B. Use of Site: Limit use of Project site to areas within the Contract limits indicated. Do not disturb portions of Project site beyond areas in which the Work is indicated.
1. Driveways, Walkways, and Entrances: Keep driveways loading areas, and entrances serving premises clear and available to Owner, Owner's employees, and emergency vehicles at all times. Do not use these areas for parking or for storage of materials.

C. Condition of Existing Building: Maintain portions of existing building affected by construction operations in a weathertight condition throughout construction period. Repair damage caused by construction operations.

1.6 COORDINATION WITH OCCUPANTS

A. Partial Owner Occupancy: Owner will occupy the premises during entire construction period. Cooperate with Owner during construction operations to minimize conflicts and facilitate Owner usage. Perform the Work so as not to interfere with Owner's operations. Maintain existing exits unless otherwise indicated.
1. Provide not less than 72 hours' notice to Owner of activities that will affect Owner's operations.

B. Owner Limited Occupancy of Completed Areas of Construction: Owner reserves the right to occupy and to place and install equipment in completed portions of the Work, prior to Substantial Completion of the Work, provided such occupancy does not interfere with completion of the Work. Such placement of equipment and limited occupancy shall not constitute acceptance of the total Work.

1.7 WORK RESTRICTIONS

A. Work Restrictions, General: Comply with restrictions on construction operations.

1. Comply with limitations on use of public streets and with other requirements of authorities having jurisdiction.

B. On-Site Work Hours: Limit work in the existing building to normal business working hours of 6:30 a.m. to 7:00 p.m., Seven days a week, unless otherwise indicated.

C. Existing Utility Interruptions: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after providing temporary utility services according to requirements indicated:

1. Notify Project Manager & Owner not less than two days in advance of proposed utility interruptions.

D. Restricted Substances: Use of tobacco products and other controlled substances within the existing building or on Project site is not permitted.

1.8 SPECIFICATION AND DRAWING CONVENTIONS

A. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:

1. Imperative mood and streamlined language are generally used in the Specifications. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.

2. Specification requirements are to be performed by Contractor unless specifically stated otherwise.

B. Division 01 General Requirements: Requirements of Sections in Division 01 apply to the Work of all Sections in the Specifications.

PART 2 - PRODUCTS (Not Used)
PART 3 - EXECUTION (Not Used)

END OF SECTION 011000

SECTION 012600
CONTRACT MODIFICATION PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for handling and processing Contract modifications.

1.2 PROPOSAL REQUESTS

A. Owner-Initiated Proposal Requests: Project Manager will issue a detailed description of proposed changes in the Work that may require adjustment to the Contract Sum or the Contract Time. If necessary, the description will include supplemental or revised Drawings and Specifications.

1. Work Change Proposal Requests issued by Project Manager are not instructions either to stop work in progress or to execute the proposed change.
2. Within time specified in Proposal Request or 20 days, when not otherwise specified, after receipt of Proposal Request, submit a quotation estimating cost adjustments to the Contract Sum and the Contract Time necessary to execute the change.

    a. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
    b. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
    c. Include costs of labor and supervision directly attributable to the change.
    d. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.

B. Contractor-Initiated Proposals: If latent or changed conditions require modifications to the Contract, Contractor may initiate a claim by submitting a request for a change to Project Manager within 21 days of the notice of the claim.

1. Include a statement outlining reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed

change. Indicate the effect of the proposed change on the Contract Sum and the Contract Time.

2. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
3. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
4. Include costs of labor and supervision directly attributable to the change.
5. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.

1.3 CHANGE ORDER PROCEDURES

A. On Owner's approval of a Work Change Proposal Request, Project Manager will issue a Change Order for signatures of Owner and Contractor on AIA Document G701 or similar document.

1.4 CONSTRUCTION CHANGE DIRECTIVE

A. Construction Change Directive: Project Manager may issue a Construction Change Directive on AIA Document G714 or similar document. Construction Change Directive instructs Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order.

B. Documentation: Maintain detailed records on a time and material basis of work required by the Construction Change Directive.

1. After completion of change, submit an itemized account and supporting data necessary to substantiate cost and time adjustments to the Contract.

C. Documentation: Maintain detailed records on a time and material basis of work required by the Work Change Directive.

1. After completion of change, submit an itemized account and supporting data necessary to substantiate cost and time adjustments to the Contract.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 012600

SECTION 013100
PROJECT MANAGEMENT AND COORDINATION

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative provisions for coordinating construction operations on Project including, but not limited to, the following:

1. Requests for Information (RFIs).
2. Project meetings.

1.2 DEFINITIONS

A. RFI: Request from Owner, Project Manager, or Contractor seeking information required by or clarifications of the Contract Documents.

1.3 GENERAL COORDINATION PROCEDURES

A. Coordination: Coordinate construction operations included in different Sections of the Specifications to ensure efficient and orderly installation of each part of the Work. Coordinate construction operations, included in different Sections that depend on each other for proper installation, connection, and operation.

1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.

1.4 REQUESTS FOR INFORMATION (RFIs)

A. General: Immediately on discovery of the need for additional information or interpretation of the Contract Documents, Contractor shall prepare and submit an RFI in the form specified.

1. Project Manager will return RFIs submitted to Project Manager by other entities controlled by Contractor with no response.
2. Coordinate and submit RFIs in a prompt manner so as to avoid delays in Contractor's work or work of subcontractors.

B. Content of the RFI: Include a detailed, legible description of item needing information or interpretation and the following:

1. Project name.
2. Date.

3. Name of Contractor.
4. Name of Project Manager.
5. RFI number, numbered sequentially.
6. RFI subject.
7. Specification Section number and title and related paragraphs, as appropriate.
8. Drawing number and detail references, as appropriate.
9. Field dimensions and conditions, as appropriate.
10. Contractor's suggested resolution. If Contractor's solution(s) impacts the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
11. Attachments: Include sketches, descriptions, measurements, photos, Product Data, Shop Drawings, coordination drawings, and other information necessary to fully describe items needing interpretation.

C. RFI Forms: AIA Document G716 Software-generated form with substantially the same content as indicated above, acceptable to Project Manager.

D. Project Manager's Action: Project Manager will review each RFI, determine action required, and respond. Allow seven working days for Project Manager's response for each RFI. RFIs received by Project Manager after 1:00 p.m. will be considered as received the following working day.

1. Project Manager’s action may include a request for additional information, in which case Project Manager’s time for response will date from time of receipt of additional information.
2. Project Manager’s action on RFIs that may result in a change to the Contract Time or the Contract Sum may be eligible for Contractor to submit Change Proposal according to Section 012600 "Contract Modification Procedures."

    a. If Contractor believes the RFI response warrants change in the Contract Time or the Contract Sum, notify Project Manager in writing within 10 days of receipt of the RFI response.

1.5 PROJECT MEETINGS

A. General: Schedule and conduct meetings and conferences at Project site unless otherwise indicated.

1. Attendees: Inform participants and others involved, and individuals whose presence is required, of date and time of each meeting. Notify Owner and Project Manager of scheduled meeting dates and times.
2. Agenda: Prepare the meeting agenda. Distribute the agenda to all invited attendees.
3. Minutes: Entity responsible for conducting meeting will record significant discussions and agreements achieved. Distribute the meeting minutes to everyone concerned, including Owner and Project Manager, within three days of the meeting.

B. Preconstruction Conference: Project Manager will schedule and conduct a preconstruction conference before starting construction, at a time convenient to Owner and Project Manager, but no later than 15 days after execution of the Agreement.

1. Attendees: Authorized representatives of Owner and Project Manager, Contractor and its superintendent; major subcontractors and other concerned parties shall attend the conference. Participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.

   a. Unless previously submitted to the Project Manager or Owner, the Contractor shall bring one copy of each of the following submittals:

      1) Project Overview Bar Chart Schedule, based on Critical Path scheduling.
      2) Procurement schedule of Major equipment and materials requiring long lead times.
      3) Shop Drawings, Samples, Submittal Schedule.
      4) Name and telephone number of Contractor's representatives, including on- site Superintendent.
      5) Schedule of Values.

2. Agenda: Discuss items of significance that could affect progress, including the following:

   a. Tentative construction schedule.
   b. Critical work sequencing and long-lead items.
   c. Designation of key personnel and their duties.
   d. Procedures for processing field decisions and Change Orders.
   e. Procedures for RFIs.
   f. Procedures for testing and inspecting.
   g. Procedures for processing Applications for Payment.
   h. Submittal procedures.
   i. Preparation of record documents.
   j. Use of the premises and existing building.
   k. Work restrictions.
   l. Working hours.
   m. Owner's occupancy requirements.
   n. Responsibility for temporary facilities and controls.
   o. Procedures for moisture and mold control.
   p. Procedures for disruptions and shutdowns.
   q. Parking availability.
   r. Office, work, and storage areas.
   s. Equipment deliveries and priorities.
   t. First aid.

u. Security.
v. Progress cleaning.

3. Minutes: Entity responsible for conducting meeting will record and distribute meeting minutes.

C. Preinstallation Conferences: Conduct a preinstallation conference at Project site before each construction activity that requires coordination with other construction.

1. Attendees: Installer and representatives of manufacturers and fabricators involved in or affected by the installation and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting. Advise Project Manager of scheduled meeting dates.
2. Agenda: Review progress of other construction activities and preparations for the particular activity under consideration.
3. Record significant conference discussions, agreements, and disagreements, including required corrective measures and actions.
4. Reporting: Distribute minutes of the meeting to each party present and to other parties requiring information.
5. Do not proceed with installation if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of the Work and reconvene the conference at earliest feasible date.

D. Progress Meetings: Conduct progress meetings at regular intervals.

1. Attendees: In addition to representatives of Owner and Project Manager, each contractor, subcontractor, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.
2. Agenda: Review and correct or approve minutes of previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.
3. Minutes: Entity responsible for conducting the meeting will record and distribute the meeting minutes to each party present and to parties requiring information.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 013100

SECTION 013300
SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Definitions.
B. Submittal procedures.
C. Proposed product list.
D. Product data.
E. Shop Drawings.
F. Samples.
G. Other submittals.
H. Design data.
I. Test reports.
J. Certificates.
K. Construction photographs.
L. Contractor review.
M. Owner/Engineer review.

1.2 DEFINITIONS

A. Action Submittals: Written and graphic information and physical samples that require Owner/Engineer's responsive action.

B. Informational Submittals: Written and graphic information and physical Samples that do not require Owner/Engineer's responsive action. Submittals may be rejected for not complying with requirements.

1.3 SUBMITTAL PROCEDURES

A. Transmit each submittal with Submittal Transmittal Form provided to Contractor by Project Manager.

B. Sequentially number transmittal forms. Mark revised submittals with original number and sequential alphabetic suffix.

C. Identify: Project, Contractor, Subcontractor and supplier, pertinent Drawing and detail number, and Specification Section number appropriate to submittal.

D. Apply Contractor's stamp, signed or initialed, certifying that review, approval, verification of products required, field dimensions, adjacent construction Work, and coordination of information is according to requirements of the Work and Contract Documents.

E. Schedule submittals to expedite Project.

F. For each submittal for review, allow minimum 15 days excluding delivery time to and from Contractor.

G. Identify variations in Contract Documents and product or system limitations that may be detrimental to successful performance of completed Work.

H. Allow space on submittals for Contractor and Project Manager/Consultant review stamps.

I. When revised for resubmission, identify changes made since previous submission.

J. Distribute copies of reviewed submittals as appropriate. Instruct parties to promptly report inability to comply with requirements.

K. Submittals not requested will not be recognized nor processed.

L. Incomplete Submittals: Project Manager will not review. Complete submittals for each item are required. Delays resulting from incomplete submittals are not the responsibility of Project Manager.

1.4 PROPOSED PRODUCT LIST

A. Within 15 days after date of Notice to Proceed, submit list of major products proposed for use, with name of manufacturer, trade name, and model number of each product.

B. For products specified only by reference standards, indicate manufacturer, trade name, model or catalog designation, and reference standards.

1.5 PRODUCT DATA

A. Product Data: Action Submittal: Submit to Owner/Engineer for review for assessing conformance with information given and design concept expressed in Contract Documents.

B. Submit electronic submittals via email as PDF electronic files.

C. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturers' standard data to provide information specific to this Project.

D. Indicate product utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.

E. After review, produce copies and distribute according to "Submittal Procedures" Article and for record documents described in Section 017000 - Execution and Closeout Requirements.

1.6 SHOP DRAWINGS

A. Shop Drawings: Action Submittal: Submit to Project Manager for assessing conformance with information given and design concept expressed in Contract Documents.

B. Indicate special utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.

C. When required by individual Specification Sections, provide Shop Drawings signed and sealed by a professional Engineer responsible for designing components shown on Shop Drawings.

1. Include signed and sealed calculations to support design.
2. Submit Shop Drawings and calculations in form suitable for submission to and approval by authorities having jurisdiction.
3. Make revisions and provide additional information when required by authorities having jurisdiction.

D. Submit electronic submittals via email as PDF electronic files.

E. After review, produce copies and distribute according to "Submittal Procedures" Article and for record documents described in Section 017000 - Execution and Closeout Requirements.

1.7 SAMPLES

A. Samples: Action Submittal: Submit to Project Manager for assessing conformance with information given and design concept expressed in Contract Documents.

B. Samples for Selection as Specified in Product Sections:

1. Submit to Project Manager for aesthetic, color, and finish selection.
2. Submit Samples of finishes, textures, and patterns for Project Manager selection.

C. Submit Samples to illustrate functional and aesthetic characteristics of products, with integral parts and attachment devices. Coordinate Sample submittals for interfacing work.

D. Include identification on each Sample, with full Project information.

E. Submit number of Samples specified in individual Specification Sections; Project Manager will retain one.

F. Reviewed Samples that may be used in the Work are indicated in individual Specification Sections.

G. Samples will not be used for testing purposes unless specifically stated in Specification Section.

H. After review, produce copies and distribute according to "Submittal Procedures" Article and for record documents described in Section 017000 - Execution and Closeout Requirements.

1.8 OTHER SUBMITTALS

A. Closeout Submittals: Comply with Section 017000 - Execution and Closeout Requirements.

B. Informational Submittal: Submit data for Project Manager's knowledge as Contract administrator or for Owner.

B. Submit information for assessing conformance with information given and design concept expressed in Contract Documents.

1.9 TEST REPORTS

A. Informational Submittal: Submit reports for Project Manager's knowledge as Contract administrator or for Owner.

B. Submit test reports for information for assessing conformance with information given and design concept expressed in Contract Documents.

1.10 CERTIFICATES

A. Informational Submittal: Submit certification by manufacturer, installation/application Subcontractor, or Contractor to Project Manager, in quantities specified for Product Data.

B. Indicate material or product conforms to or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.

C. Certificates may be recent or previous test results on material or product but must be acceptable to Project Manager.

1.11 CONSTRUCTION PHOTOGRAPHS

A. Provide photographs of construction throughout progress of Work as specified and acceptable to Project Manager.

1.12 CONTRACTOR REVIEW

A. Review for compliance with Contract Documents and approve submittals before transmitting to Project Manager.

B. Contractor: Responsible for:

1. Determination and verification of materials including manufacturer's catalog numbers.

2. Determination and verification of field measurements and field construction criteria.

3. Checking and coordinating information in submittal with requirements of Work and of Contract Documents.

4. Determination of accuracy and completeness of dimensions and quantities.

5. Confirmation and coordination of dimensions and field conditions at Site.

6. Construction means, techniques, sequences, and procedures.

7. Safety precautions.

8. Coordination and performance of Work of all trades.

C. Stamp, sign or initial, and date each submittal to certify compliance with requirements of Contract Documents.

D. Do not fabricate products or begin Work for which submittals are required until approved submittals have been received from Project Manager.

1.13 PROJECT MANAGER REVIEW

A. Do not make "mass submittals" to Project Manager. "Mass submittals" are defined as three or more submittals or items in one day or six or more submittals or items in one week. If "mass submittals" are received, Project Manager's review time stated above will be extended as necessary to perform proper review. Project Manager will review "mass submittals" based on priority determined by Project Manager.

B. Informational submittals and other similar data are for Project Manager's information, do not require Project Manager's responsive action, and will not be reviewed or returned with comment.

C. Submittals made by Contractor that are not required by Contract Documents may be returned without action.

D. Submittal approval does not authorize changes to Contract requirements unless accompanied by Change Order.

E. Owner may withhold monies due to Contractor to cover additional costs beyond the second submittal review.

PART 2 - PRODUCTS - Not Used

PART 3 - EXECUTION - Not Used

END OF SECTION 013300

SECTION 015000
TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes requirements for temporary utilities, support facilities, and security and protection facilities.

B. Related Requirements:

1. Section 011000 "Summary" for work restrictions and limitations on utility interruptions.

1.2 USE CHARGES

A. General: Installation and removal of and use charges for temporary facilities shall be included in the Contract Sum unless otherwise indicated. Allow other entities to use temporary services and facilities without cost, including, but not limited to, Architect, testing agencies, and authorities having jurisdiction.

B. Water Service from Existing System: Water from Owner's existing water system is available for use without metering and without payment of use charges. Provide connections and extensions of services as required for construction operations.

C. Electric Power Service from Existing System: Electric power from Owner's existing system is available for use without metering and without payment of use charges. Provide connections and extensions of services as required for construction operations.

PART 2 - PRODUCTS

2.1 EQUIPMENT

A. Fire Extinguishers: Portable, UL rated; with class and extinguishing agent as required by locations and classes of fire exposures.

PART 3 - EXECUTION

3.1 TEMPORARY UTILITY INSTALLATION

A. General: Install temporary service or connect to existing service.

B. Water Service: Connect to Owner's existing water service facilities. Clean and maintain water service facilities in a condition acceptable to Owner. At Substantial Completion, restore these facilities to condition existing before initial use.

C. Sanitary Facilities: Provide temporary toilets, wash facilities, and drinking water for use of construction personnel. Comply with requirements of authorities having jurisdiction for type, number, location, operation, and maintenance of fixtures and facilities.

D. Electric Power Service: Connect to Owner's existing electric power service. Maintain equipment in a condition acceptable to Owner.

3.2 SUPPORT FACILITIES INSTALLATION

A. Traffic Controls: Comply with requirements of authorities having jurisdiction.

1. Protect existing site improvements to remain including curbs, pavement, and utilities.
2. Maintain access for fire-fighting equipment and access to fire hydrants.

B. Parking: Use designated areas of Owner's existing parking areas for construction personnel.

C. Waste Disposal Facilities: Provide waste-collection containers in sizes adequate to handle waste from construction operations. Comply with requirements of authorities having jurisdiction. Comply with progress cleaning requirements in Section 017300 "Execution."

3.3 SECURITY AND PROTECTION FACILITIES INSTALLATION

A. Protection of Existing Facilities: Protect existing vegetation, equipment, structures, utilities, and other improvements at Project site and on adjacent properties, except those indicated to be removed or altered. Repair damage to existing facilities.

B. Barricades, Warning Signs, and Lights: Comply with requirements of authorities having jurisdiction for erecting structurally adequate barricades, including warning signs and lighting.

C. Temporary Egress: Maintain temporary egress from existing occupied facilities as indicated and as required by authorities having jurisdiction.

3.4 MOISTURE AND MOLD CONTROL

A. Contractor's Moisture Protection Plan: Avoid trapping water in finished work. Document visible signs of mold that may appear during construction.

B. Exposed Construction Phase: Before installation of weather barriers, when materials are subject to wetting and exposure and to airborne mold spores, protect materials from water damage and keep porous and organic materials from coming into prolonged contact with concrete.

C. Partially Enclosed Construction Phase: After installation of weather barriers but before full enclosure and conditioning of building, when installed materials are still subject to infiltration of moisture and ambient mold spores, protect as follows:

1. Discard or replace water-damaged and wet material.
2. Discard, replace, or clean stored or installed material that begins to grow mold.
3. Perform work in a sequence that allows any wet materials adequate time to dry before enclosing the material in drywall or other interior finishes.

3.5 OPERATION, TERMINATION, AND REMOVAL

A. Termination and Removal: Remove each temporary facility when need for its service has ended, when it has been replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.

1. Materials and facilities that constitute temporary facilities are property of Contractor. Owner reserves right to take possession of Project identification signs.
2. At Substantial Completion, repair, renovate, and clean permanent facilities used during construction period. Comply with final cleaning requirements specified in Section 017700 "Closeout Procedures."

END OF SECTION 015000

SECTION 017300
EXECUTION

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes general administrative and procedural requirements governing execution of the Work including, but not limited to, the following:

1. Installation of the Work.
2. Cutting and patching.
3. Progress cleaning.
4. Protection of installed construction.

B. Related Requirements:

1. Section 011000 "Summary" for limits on use of Project site.
2. Section 017700 "Closeout Procedures" for submitting documents.

PART 2 - PRODUCTS

2.1 MATERIALS

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

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

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

PART 3 - EXECUTION

3.1 EXAMINATION

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

1. Examine walls and roofs for suitable conditions where products and systems are to be installed.

2. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.

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

3.2 PREPARATION

A. Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

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

C. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents caused by differing field conditions outside the control of Contractor, submit a request for information to Architect according to requirements in Section 013100 "Project Management and Coordination."

3.3 INSTALLATION

A. General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.

1. Make vertical work plumb and make horizontal work level.

B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.

C. Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Substantial Completion.

D. Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.

E. Sequence the Work and allow adequate clearances to accommodate movement of construction items on site and placement in permanent locations.

F. Tools and Equipment: Do not use tools or equipment that produce harmful noise levels.

G. Templates: Obtain and distribute to the parties involved templates for work specified to be factory prepared and field installed. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing products to comply with indicated requirements.

H. Attachment: Provide blocking and attachment plates and anchors and fasteners of adequate size and number to securely anchor each component in place, accurately located and aligned with other portions of the Work. Where size and type of attachments are not indicated, verify size and type required for load conditions.

I. Joints: Make joints of uniform width. Where joint locations in exposed work are not indicated, arrange joints for the best visual effect. Fit exposed connections together to form hairline joints.

J. Hazardous Materials: Use products, cleaners, and installation materials that are not considered hazardous.

3.4 CUTTING AND PATCHING

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

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

B. Temporary Support: Provide temporary support of work to be cut.

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

D. Adjacent Occupied Areas: Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas.

E. 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. 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.
2. Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weathertight condition and ensures thermal and moisture integrity of building enclosure.

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

3.5 PROGRESS CLEANING

A. General: Clean Project site and work areas daily, including common areas. Enforce requirements strictly. Dispose of materials lawfully.

B. Site: Maintain Project site free of waste materials and debris.

C. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.

1. Remove liquid spills promptly.
2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.

D. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.

E. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.

F. Exposed Surfaces in Finished Areas: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.

G. Waste Disposal: Do not bury or burn waste materials on-site. Do not wash waste materials down sewers or into waterways.

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

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

END OF SECTION 017300

SECTION 017700
CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for contract closeout and final payment, including, but not limited to, the following:

1. Substantial Completion procedures.
2. Final completion procedures.
3. Final cleaning.
4. Repair of the Work.

1.2 CLOSEOUT SUBMITTALS

A. Certificates of Release: From authorities having jurisdiction.

1.3 MAINTENANCE MATERIAL SUBMITTALS

A. Schedule of Maintenance Material Items: For maintenance material submittal items specified in other Sections.

1.4 SUBSTANTIAL COMPLETION PROCEDURES

A. Contractor's List of Incomplete Items: Prepare and submit a list of items to be completed and corrected (Contractor's punch list), indicating the value of each item on the list and reasons why the Work is incomplete.

B. Inspection: Submit a written request for inspection to determine Substantial Completion a minimum of 10 days prior to date the work will be completed and ready for final inspection and tests. On receipt of request, Project Manager will either proceed with inspection or notify Contractor of unfulfilled requirements. Project Manager will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by Project Manager, that must be completed or corrected before certificate will be issued.

1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.
2. Results of completed inspection will form the basis of requirements for final completion.

1.5 FINAL COMPLETION PROCEDURES

A. Inspection: Submit a written request for final inspection to determine acceptance. On receipt of request, Project Manager will either proceed with inspection or notify Contractor of unfulfilled requirements. Project Manager will prepare a final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.

1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.

PART 2 - PRODUCTS (Not Used)

PART 3 – EXECUTION

3.1 FINAL CLEANING

A. General: Perform final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.

1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a designated portion of Project:

a. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.
b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
c. Rake grounds that are neither planted nor paved to a smooth, even-textured surface.
d. Remove tools, construction equipment, machinery, and surplus material from Project site.
e. Leave Project clean and ready for occupancy.

3.2 REPAIR OF THE WORK

A. Complete repair and restoration operations before requesting inspection for determination of Substantial Completion.

B. Repair or remove and replace defective construction. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment. Where damaged or worn items cannot be repaired or restored, provide replacements. Remove and replace operating components that cannot be repaired. Restore damaged construction and permanent facilities used during construction to specified condition.

1. Remove and replace chipped, scratched, and broken glass, reflective surfaces, and other damaged transparent materials.
2. Touch up and otherwise repair and restore marred or exposed finishes and surfaces. Replace finishes and surfaces that that already show evidence of repair or restoration.

END OF SECTION 017700

SECTION 017839
PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for project record documents, including the following:

1. Record Drawings.
2. Record Product Data.

1.2 CLOSEOUT SUBMITTALS

A. Record Drawings: Comply with the following:

1. Number of Copies: Submit one set(s) of marked-up record prints.

B. Record Product Data: Submit one paper copy or an annotated PDF electronic files and directories of each submittal.

PART 2 - PRODUCTS

2.1 RECORD DRAWINGS

A. Record Prints: Maintain one set of marked-up paper copies of the Contract Drawings and Shop Drawings, incorporating new and revised Drawings as modifications are issued.

1. Preparation: Mark record prints to show the actual installation where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is Installer, subcontractor, or similar entity, to provide information for preparation of corresponding marked-up record prints.

a. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later.
b. Record data as soon as possible after obtaining it.
c. Record and check the markup before enclosing concealed installations.

2. Mark the Contract Drawings and Shop Drawings completely and accurately. Use personnel proficient at recording graphic information in production of marked-up record prints.
3. Note Construction Change Directive numbers, alternate numbers, Change Order numbers, and similar identification, where applicable.

PART 3 - EXECUTION

3.1 RECORDING AND MAINTENANCE

A. Recording: Maintain one copy of each submittal during the construction period for project record document purposes. Post changes and revisions to project record documents as they occur; do not wait until end of Project.

B. Maintenance of Record Documents and Samples: Store record documents and Samples in the field office apart from the Contract Documents used for construction. Do not use project record documents for construction purposes. Maintain record documents in good order and in a clean, dry, legible condition, protected from deterioration and loss. Provide access to project record documents for Architect's reference during normal working hours.

END OF SECTION 017839

SECTION 020210
EXISTING UTILITIES

PART 1 - GENERAL

1.1 PUBLIC AND PRIVATE UTILITIES

A. Existing above-ground utilities, including but not limited to power transmission and distribution, telegraph, telephone and traffic control systems, whether shown on the drawings or not, shall be maintained, relocated, rerouted, removed and restored as may be necessary by the Contractor in a manner satisfactory to owners and operators of the utilities.

B. Existing major underground utilities and appurtenant structures, whether shown on the drawings or not, shall be maintained, relocated, rerouted, removed and restored by the Contractor. In the following special cases, the Contractor will be reimbursed in accordance with the General Conditions for all costs of modifying, rerouting, relaying or maintaining service of major underground utilities.

1. An existing utility is found during construction to cross the ditch line at an elevation between the top and bottom of the proposed pipeline or structure to be constructed under this contract together with the required pipe zone.
2. An existing underground utility is found during construction to cross or project within the utility conflict limits for the proposed work at an angle of 30° or less at any elevation.
3. For the purposes of these special cases, utility conflict limit shall be two (2) feet either side of the edge of the pipe.
4. The existing water line is excluded from this special case and no reimbursement will be made for conflicts.
5. In no case shall the Contractor be reimbursed if the conflict is clearly shown on the drawings.

C. Minor underground utility service lines, including but not limited to sanitary sewer services, gas services, water services, house or yard drains, and electricity or telephone services and driveway culverts shall be maintained, relocated, rerouted, removed and restored by the Contractor with the least possible interference with such services and in no case shall the interference of such service lines be considered for extra compensation under any of the special cases listed above, except sanitary sewer service occurring at an elevation between the top and bottom of the proposed pipeline or structure together with the pipe zone.

D. The right is reserved by owners of public utilities and franchises to enter upon any street, road, right-of-way, or easement for the purpose of maintaining their property and for making necessary repairs or adjustments caused by the Contractor's operations. The Contractor shall save the Owner harmless of any costs so incurred.

E. For purpose of this section, "pipe zone" is defined as extending from the bottom of the required excavation to six (6) inches over the top of the pipe.

PART 2 – PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 QUALITY ASSURANCE

A. It is recommended that the Contractor make arrangements with the applicable utility company or department to aid in the location and maintenance of existing utilities.

3.2 RESTORATION OF DRAINAGE FACILITIES

A. Where it is necessary for drainage facilities to be removed and replaced, existing pipe and catch basins may be reinstalled when approved by the agency having jurisdiction.

B. The materials shall be cleaned.

C. When it is necessary to replace existing pipe or catch basins, the new materials shall be of equal strength and similar design to existing materials.

D. Installation shall be in accordance with the applicable provisions of these specifications.

E. All costs, whether new or existing facilities are installed, shall be considered to be included in the prices bid for the various items and no additional payment shall be allowed.

END OF SECTION 020210

SECTION 023000
SUBSURFACE CONDITIONS

PART 1 - GENERAL

1.1 SOIL REPORTS

A. Any data on soil and/or subsurface conditions shown in the Plans or Specifications is not to be taken as a representation, but is based on limited information and is at best only an opinion; consequently, such data cannot be considered precise or complete and there is no guarantee as to its completeness, accuracy, or precision.

B. A limited soils investigation was performed for this project to determine general characteristics of the existing subsurface. Due to limited project budget, the scope was limited and may not have adequately addressed the subsurface conditions in all areas.

C. Additional Investigation:
   1. Contractor should visit the site and acquaint himself with site conditions before submitting a bid, and the submission of a bid will be prima facie evidence that he has done so.
   2. Prior to bidding, Contractor may make his own subsurface investigations to satisfy himself with site and subsurface conditions.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 QUALITY ASSURANCE

A. The Contractor shall readjust work performed that does not meet technical or design requirements.

B. The Contractor shall make no deviations from the Contract Documents without specific and written approval of the Owner.

C. The Contractor shall be responsible for obtaining approval from responsible agency or property owner before performing any exploratory excavations.

END OF SECTION 023000

SECTION 033000
CAST IN PLACE CONCRETE

PART 1 - GENERAL

1.1 STANDARDS AND CODES

A. ACI (American Concrete Institute) 211.1-89 - Standard Practice for Selecting Proportions for Normal, Heavyweight, or Mass Concrete
B. ACI 301-89 - Specifications for Structural Concrete for Buildings Reference standards and publications in ACI 301-89 are incorporated in this specification section by reference.
C. ACI 302.1R-89 Guide for Concrete Floor and Slab Construction
D. ACI 304R-89 - Recommended practice for measuring, mixing, transporting, and placing concrete
E. ACI 305R-89 - Hot weather concreting
F. ACI 306R-88 - Cold weather concreting
G. ACI 315-80 (rev. 1988) - Details and Detailing of Concrete Reinforcement
H. ACI 347R-88 - Recommended practice for concrete formwork
I. ACI SP15(89) - Field Reference Manual
J. ASTM (American Society for Testing & Material) C131 - Abrasion and Impact of Coarse Aggregate in Los Angeles Machine
K. ASTM D98 - Calcium Chloride (Accelerating Admixture)
L. International Building Code - 2012 edition

1.2 SUBMITTALS

A. Submittals shall include:

1. Project Data:

a. The Contractor shall submit, for each class of concrete, mix design data and test documentation as described in ACI 301, Chapter 3, Proportioning.

2. Concrete mix aggregate sieve analysis and Los Angeles wear.

3. Catalog data showing pertinent dimensions and details of forming accessories such as ties and accessories.

4. Catalog data on form materials indicating conformance with specifications.

5. Catalog data on all accessories, joint fillers, sealants, surface treatments, and curing materials.

6. Catalog data on concrete admixtures.

1.3 FIELD REFERENCES

A. The Contractor shall keep at least one copy of the following references in his or her field office at all times:

1. ACI 301-89 - Specifications for Structural Concrete for Buildings

2. ACI SP15(89) - Field Reference Manual

1.4 PRECEDENCE OF STANDARDS

A. In the event of conflicts among these specifications and referenced standards, the more stringent requirements shall apply.

PART 2 – PRODUCTS

2.1 CONCRETE

A. General: Concrete shall provide not less than the following compressive strength in twenty eight (28) days when Type I cement is used, and in seven (7) days when Type III cement is used. Compressive strength shall be in accordance with ASTM C31 and ASTM C39.

Application	Compressive Strength
Structural Uses	4000 psi
Sidewalks and pavement patches, curb and gutter	3000 psi
Thrust blocks and mass concrete for pipeline encasement	2000 psi

B. Hydraulic Cement: Concrete shall use Type I or Type III Portland Cement as required by the Drawings and Specifications. Hydraulic cement shall conform to ASTM C 150 "Specifications for Portland Cement" and ASTM C 175 "Specifications for Air entraining Portland Cement."
Cements conforming to Canadian standards substantially the same as ASTM will be acceptable subject to approval by Owner.

C. Aggregates: Concrete aggregates shall conform to ASTM C33 "Specifications for Concrete Aggregates" except that aggregates which have been shown by special test or actual service to produce concrete of the specified strength and durability may be used if approved by the engineer. Aggregates shall be washed, clean of sticks, roots, clay and deleterious substances prior to use. Coarse aggregate shall be 1 inch minus.

D. Air entrained concrete: Air entrained concrete shall be used. Either air entrained Portland Cement or an air entrained admixture shall be added at the mixer. The

volume of air in freshly mixed concrete shall be five (5) percent by volume, plus or minus (1) percent. Admixtures may be used only with the approval of Owner.

E. Cement and Water Content: Cement content and water content shall be determined by the Contractor to meet the strength requirements specified above, except as follows.

F. Water: Water used in mixing cement shall be clean and free from injurious amounts of oils, acids, alkalies, salts, organic materials or other substances that may be deleterious to concrete or steel.

G. Water reducing admixtures shall conform to "Specifica¬tion for Chemical Admixtures for Concrete" (ASTM C 494).

H. Calcium chloride or other chloride based accelerators shall not be used.

2.2 REINFORCING STEEL

A Steel bars: Reinforcing steel shall consist of round deformed bars. Deformed steel bars shall conform to one of the following ASTM Designations.

1 A 615 68 "Standard Specifications for Deformed Billet Steel bars for Concrete Reinforcement," Grade 60.
2 A 616 68 "Standard Specification for Rail Steel Deformed Bars for Concrete Reinforcement," Grade 60.
3 A 617 68 "Standard Specification for Axle Steel Deformed Bars for Concrete Reinforcement," Grade 60.

B. Welded Wire Fabric: Welded wire fabric used for reinforcement of concrete in pavement restoration shall be minimum AWG No. 6, 6-inch x 6-inch spacing, 75,000 pounds per square inch tensile strength, manufactured in accordance with ASTM Designation A 185.

2.3 ACCESSORIES

A. Epoxy Adhesive: A two-component compound, 100 percent solids, 100 percent reactive compound suitable for use on dry or damp surfaces. For bonding new concrete to old. "Concresive" Paste (LPL) or (SPL) by Master Builders Inc., or approved equal.

B. Vapor Barrier: ASTM D2103, 10 mil thick clear polyethylene film.

C. Form Release Agent: Colorless material which will not stain concrete, absorb moisture, or impair natural bonding or color characteristics of coating intended for use on concrete; Cast Off by Sonneborn.

D. Anchors: Coupling anchors, if used, shall be DECO Column Anchor and adjustable anchors shall be DECO Standard Anchor. All anchors shall be DECO Manufacturing Co., Decatur, Illinois, or equal.

E. Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcement in place:

1. Use wire bar-type supports complying with CRSI recommendations, unless otherwise indicated. Do not use wood, brick, and other unacceptable materials.
2. For slabs on ground, use supports with sand plates or horizontal runners where base material will not support chair legs.
3. For exposed-to-view concrete surfaces, where legs of supports are in contact with forms, provide supports with either hot-dip galvanized or plastic-protected legs.

F. Tie Wire: No. 16 American Wire Gauge or heavier, black annealed per ASTM A-82.

G. Expansion Joints: Expansion joint material shall be closed-cell polyethylene foam with a density of 2.95 pounds per cubic foot. Expansion joint material shall be Sonoflex F by Sonneborn, or equal.

H. Anchor bolts may be either drilled or cast-in-place, unless otherwise shown on the plans.

1. Drilled anchor bolts shall be Wedge Type expansion anchor, 316 stainless steel, Hilti Type HKB, or approved equal.
2. Drilled drop-in-type female expansion anchors shall be 303 stainless steel, Hilti Type HDI or approved equal.
3. Adjustable anchors for equipment, where used, shall be floating nut-type which will allow at least 1/2-inch movement of the fastening stud. The fastening stud shall be 316 stainless steel. Adjustable anchors shall be DECO Manufacturing Co., Decatur, Illinois, Standard Anchor or equal.

   All expansion anchors shall be male-type, projecting anchors unless female-type anchors are specifically called out otherwise.

2.4 CURING MATERIALS

A. Water: Conform to standards for mixing water, paragraph 2.03C.

B. Absorptive Mat: Burlap fabric of 9 oz./square yard, clean, roll goods.

C. Membrane Curing Compound: Conform to requirements of ASTM C309.

2.5 TESTS FOR MIX

A. Concrete shall be tested for slump by the owner in accordance with ASTM C 143; the maximum permissible slump shall not exceed 4 inches, the minimum slump shall be not less than 2 inches. One slump test will be taken for each truck load.

B. One entrained air test shall be taken by the owner for each set of test cylinders and at such additional times as may be ordered by the Owner.

C. Concrete shall develop the compressive strength indicated in this specification. The Owner shall require the testing laboratory to take one set of three test cylinders for each 25 cubic yards of the concrete placed, but not less than one set each day concrete is placed. The Contractor may take more cylinders if desired to demonstrate strength adequate for traffic. Cylinders shall be tested for compressive strength as follows: one lab cured at seven days, two lab cured at 28 days. Making and curing the test cylinders shall conform to ASTM C31, testing to ASTM C39. A copy of all test reports shall be furnished to Contractor.

D. One additional test cylinder shall be taken during cold weather and shall be cured, on site, under the same conditions as the concrete it represents.

E. Concrete cylinder test data will be evaluated per Section 1903 of the 2012 International Building Code.

F. Materials which fail to meet contract requirements, as indicated by laboratory test, shall not be used in the work. The Contractor shall remove all defective material from the site.

PART 3 - EXECUTION

3.1 GENERAL

A. Unless otherwise specified, execution shall conform with ACI 301 and Chapter 19 of the 2012 International Building Code.

3.2 FORMWORK

A. Coordination: Coordinate formwork with the work of other trades as required for installation of inserts, conduit pipe sleeves, drains, hangers, supports, anchors, and similar items. Secure in position before concrete is poured.

B. Installation:

1. General: Construct the forms to meet the tolerances specified in ACI 301. Provide for openings, offsets, chamfers, blocking, and other features required on the work. Provide for easy removal of forms without damage to concrete surfaces. Keep formwork clear of wood chips, clogs, and other deleterious material. Form all concrete surfaces. Earth side walls permitted only with Engineer's approval.

2. Forms: Provide MDO forms for all surfaces exposed to view. The MDO panels shall be attached to the studs, walers, etc., using countersunk, power-driven screws. The countersunk hole shall be filled with putty and sanded smooth.

   Provide B Grade, Class 1 plywood forms for all non-exposed surfaces.

   Set plywood panels tightly together to prevent loss of concrete mortar. Carefully form intersecting planes to provide true clean-cut corners with edge grain of plywood not exposed as form for concrete. Back joints with extra studs or girts to maintain true, square intersections. Use extra studs, walers, and bracing as required to prevent bowing of forms between studs. Reusable steel forms of approved design may be used for cast-in-place manholes.

3. Form Ties: Provide cone form ties at exposed surfaces. Set ties in straight rows, evenly spaced. Ties shall be water-seal-type with polyethylene washer in the center.

4. Chamfers: Except where 90-degree corners are specifically called out on drawings, at flush joints between concrete and other construction, and as otherwise detailed, provide 3/4-inch triangular wood or plastic strips; place and secure in forms at corners. Horizontal chamfer strips shall be installed with a maximum deviation in elevation of one inch in ten feet.

5. Form Release Agents: Coat contact surfaces of forms with form-coating compound before placing concrete. Apply in strict accordance with manufacturer's instructions, paying special attention to rate and method of application. Ensure that any agent can be disposed prior to coating or is compatible with any required coatings.

6. Deflections: Construct forms with spacing on supports and ties such that they will support the maximum pressure exerted by fluid concrete with an actual deflection not to exceed 1/32-inch, or 0.0025 times the support spacing, whichever is the larger, at the midpoint between supports.

7. Cambers: Design and erect formwork for anticipated deflection due to weight and pressure of fresh concrete as well as structural cambers as noted on drawings. Provide positive means for adjustment of shores and struts to take up settlement during placement.

C. Removal of Forms:

1. Formwork shall be designed for easy removal without damaging or marring finished surfaces of the concrete; take particular are in removing forms from exposed concrete surfaces. Prying against face of concrete will not be

permitted; where mechanical means are necessary to release forms, use wood wedges only, and then only if approved by the Engineer.

2. Do not remove forms and supports until concrete has attained sufficient strength to support anticipated loads.

   Use methods of form removal which will not cause overstressing of the concrete. Remove supports to permit the concrete to uniformly and gradually take the stress due to its own weight. Do not use high-impact methods to remove supports.

3. Reshoring: If early form removal is desired, reshore in such manner that at no time will large areas of new construction be required to support their own weight; allow no live loads on new construction until reshored; tighten reshores to take loads, taking care not to overtighten. Leave reshoring in place until concrete has attached 28-day strength.

4. Backfilling: Backfilling and compaction behind walls shall not commence until all walls have been poured and the concrete has reached its required 28-day strength as specified in item 2, above. Mechanical compaction adjacent to walls shall not be allowed within a distance equal to one half the backfill depth. Contractor shall be responsible for any cracking or damage to walls from the mechanical compaction.

D. Reuse of Forms: Use only forms that will provide surfaces of same quality as specified for original use.

3.3 REINFORCING

A. Handling:

1. Deliver reinforcing steel to the site bundled, tagged, and marked with metal tags indicating bar sizes, lengths, and other information corresponding with markings shown on placement diagrams.

2. Store reinforcement off the ground to prevent damage, excessive rust, dirt, and the like.

B. Placing:

1. General: Conform to applicable portions of reference specifications except as exceeded by provisions of drawings or specifications.
2. Condition: Reinforcement to be free from loose rust, mill scale, ice, and other materials which would reduce or destroy bond.
3. Positioning: Accurately place, support, and secure reinforcement against displacement by formwork construction or concrete placement operations.

Locate and support reinforcing with chairs, runners, bolsters, spacers, and hangers as required.

4. Wire Fabric: Place fabric in as long lengths as practicable. Lap adjoining pieces at least one full mesh and lace splices with 16 gauge wire. Offset end laps in adjacent widths.
5. Splices and Reinforcements: Provide standard reinforcement splices by lapping ends, placing bars in contact, and tightly wire tying. Comply with requirements of 2012 International Building Code for minimum lap of spliced bars.

3.4 PLACING CONCRETE - GENERAL REQUIREMENTS

A. Preparation:

1. Before placing concrete, all equipment for mixing and transporting the concrete shall be cleaned, all debris and ice shall be removed from the places to be occupied by the concrete, forms shall be thoroughly wetted (except in freezing weather) or oiled, and masonry filler units that will be in contact with concrete shall be well drenched, and the reinforcement shall be thoroughly cleaned of ice or other coatings. Standing water shall be removed from place of deposit before concrete is placed unless specified or indicated on the drawings.
2. Foundations for footings and grade slabs shall be prepared in accordance with ACI 301 so as to prevent the subgrade from absorbing moisture or cement paste from freshly placed concrete.
3. Inserts and Embedded Items: In cooperation with all trades and other contractors, all inserts and fastening devices such as anchors, hangers, ties, bolts, pipes, conduits, waterstops, nailing strips, etc., shall be properly located and secured in position before concrete is placed. Where pipes pass through the structure, they shall be cast-in-place unless permission is given by the Engineer to do otherwise. Wherever these requirements interfere by the plans, the bars shall be spread and rearranged as directed by the Engineer.
4. Construction Joints: The location of construction joints not shown on the drawings shall be approved by the Engineer. Prior to placing new concrete against any previously poured concrete, the latter shall be roughened by cutting or chipping as required and cleaned of all loose concrete, debris, and laitance, and thoroughly soaked. Horizontal joints shall be covered with a layer of grout 1/2-inch thick before placing new concrete.

   At the joints between footings and walls, roughen the footing surface at the joint before placing concrete for walls.

5. Contraction Joints: The location of contraction joints shall be as shown on the plans or as approved by the Engineer.

B. Concrete Placement: Place concrete within 1-1/2 hours after it is mixed. Once concreting is started, it shall be carried on as a continuous operation until the placing of the panel or section is complete. Suspension of operations for more than 2 hours will not be permitted during a continuous placement, and this limit may be reduced by the Engineer. Flowable concrete may be pumped from the bottom of the form, pumping the full form height without stopping.

Concrete shall be placed generally in horizontal layers no more than 24 inches thick except as otherwise specified. When a monolithic layer cannot be completed in one operation, it shall be terminated with a vertical bulkhead. Feathering to less than 6 inches will not be permitted. Concrete shall be placed so as to avoid segregation of the materials and the displacement of the reinforcement. Where placing operations would involve the dropping of concrete through completed forms from heights of 6 or more feet for plain concrete and 4 or more feet through installed reinforcement, concrete so placed shall be discharged into hoppers feeding into flexible drop chutes. Encrustation of installed reinforcement by concrete spilled on it will be tolerated only for a length of time shorter than the encrustating concrete needs for drying out. Where conditions warrant, this procedure may be altered by the Engineer upon request of the Contractor.

C. Consolidation

1. Concrete shall be thoroughly consolidated by the proper use of immersion-type vibrators as specified in ACI 301.

2. Pumps may be used only if they can pump the mix designed. Do not add fine aggregate or water to the mix to satisfy the needs of a pumping device.

D. Cold and Hot Weather Placement:

1. Cold Weather Placing: Comply with ACI 306R to protect all concrete work from physical damage and reduced strength caused by frost, freezing actions, or low temperatures. Place no concrete against frozen earth.

   The concrete may be placed at 40°F (4°C) and below down to 20°F (-7°C), ambient temperature, without heating the mix and maintaining the noted protection if the specified "Freeze Protection Admixture" is added to the mix at 60 to 90 oz. per 100 pounds of cement per manufacturer's instructions. The ambient temperature must be 20°F (-7°C) or higher until initial set is reached and the hardened concrete has been sealed to prevent the ingress of additional water.

2. Hot Weather Placing: Cool ingredients before mixing as necessary to maintain concrete temperature at time of placement below 80°F (32°C). Mixing water may be chilled, or chopped ice may be used to control temperature provided the water in the ice is used as part of the mix water and included in calculating the water/cement ratio. Follow the requirements

of ACI 305R in producing and placing concrete in ambient temperatures over 80°F (27°C).

The specified second-generation superplasticizer may be used in place of cooling for concrete with concrete temperatures 80°F (27°C) and over. Work with the ready-mix producer and admixture manufacturer to make a mix using a second-generation plasticizer to control the concrete temperature rise.

During dry, windy weather, erect windbreaks and/or sunshades and protect the concrete surface immediately after placing and leveling using either a fog spray or the specified Hot Weather Finishing Aid, during the entire finishing operation, until curing is applied.

END OF SECTION 033000

SECTION 061000
ROUGH CARPENTRY

PART 1 - GENERAL

1.1 RELATED WORK SPECIFIED ELSEWHERE

A. Insulation: Section 072116.
B. Painting: Section 099123.

1.2 QUALITY ASSURANCE

A. Grading rules of the following shall apply for lumber and plywood:
   1. West Coast Lumber Inspection Bureau (WCLIB).
   2. Western Wood Products Association (WWPA).
   3. Softwood Plywood - Construction and Industrial: Product Standard PS-1.
   4. Hardwood Plywood - Product Standard PS-51.
   5. Finish Carpentry and Cabinets - Quality Standards of the Architectural Woodwork Institute (AWI).
   6. AWPB - American Wood Preservers Bureau.
   7. FS - Federal Specifications.

B. Grade Marks: Identify all lumber and plywood by official grade mark:
   1. Lumber grading rules and wood species conform to voluntary Product Standard PS-20.
   2. Lumber grade stamp (except finish millwork and trim). Symbol of grading agency, mill number or name, grade of lumber, species or species grouping or combination designation, rules under which graded, and condition of seasoning at time of manufacture.
      a.S-GRN: Unseasoned
      b.S-Dry: Maximum 19% moisture content
      c.MC-15 or KD: Maximum of 15% moisture content
      d.Dense.
   3. Softwood Plywood: Appropriate grade trademark of the American Plywood Association.
      a.Type, grade, class, and Identification Index.
      b.Inspection and testing agency mark.
   4. Hardwood Plywood: Appropriate grade mark of qualified inspection, testing, or grading agency.

C. Testing: ASTM E 84 maximum 25 flame spread rating.

D. Requirements of Regulatory Agencies:
   1. Fire Hazard Classification: Underwriter's Laboratories, Inc., for treated lumber and plywood.

2. Preservative Treated Lumber and Plywood: American Wood Preservers Bureau, Quality Mark.
3. Pressure Treated Material: American Wood Preservers Bureau Standards.
4. Span Tables: National Forest Products Association.
5. Working Stresses: Softwood Lumber, National Design Specification, National Forest Products Association.
6. Construction: Conform to the International Building Code.

1.3 SUBMITTALS

A. Shop Drawings: Submit shop drawings indicating framing connection details, fastener connections, and dimensions, pattern of plywood.

B. Certification:
1. Pressure Treated Wood: Submit certification by treating plant stating chemicals and process used, net amount of salts retained, and conformance with applicable standards.
2. Preservation Treated Wood: Submit certification for waterborne preservative that moisture content was reduced to 19% maximum, after treatment.
3. Fire-retardant Treatment: Submit certification by treating plant that fire-retardant treatment materials comply with governing ordinances and that treatment will not bleed through finished surfaces.

1.4 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Immediately upon delivery to job site, place materials in area protected from weather.

B. Store materials a minimum of 6 inches above ground on framework or blocking and cover with protective waterproof covering providing for adequate air circulation or ventilation.

C. Do not store seasoned materials in wet or damp portions of building.

D. Protect fire-retardant materials against high humidity and moisture during storage and erection.

E. Protect sheet material surfaces and corners while unloading.

PART 2 - PRODUCTS

2.1 LUMBER

A. Dimensions
1. Specified lumber dimensions are nominal.

2. Actual dimensions conform to industry standards established by the American Lumber Standards Committee and the rules writing agencies.

B. Moisture Content
1. Unseasoned or 19% maximum at time of permanent closing in of building or structure, for lumber 2 inches or less nominal thickness.
2. All finish lumber must be kiln-dried to an average moisture content range as follows:

Exterior Work - 9% to 12%
Interior Work - 6% to 11%

C. Grade shall be as indicated below unless stated otherwise on the Drawings.
1. General framing, studs, plates, blocking, furring, braces and nailers shall be Standard and Better or Stud Grade.
2. Structural joists and planks, 2" to 4" thick x 5" and wider and headers shall be Douglas Fir Coast Region No. 1, FB = 1500 psi minimum.
3. Beams, stringers, posts, and timbers shall be Douglas Fir Coast Region No. 1 or Larch No. 1.
4. Interior trim shall be Douglas Fir, C Select Grade, or AWI Custom Grade.

2.2 PLYWOOD

A. All plywood exterior grade DFPA C-C or better. All knots plugged in surfaces exposed to view.

B. Thicknesses as tabulated on Drawings but not less than:
1. 1/2" for roof sheathing
2. 3/8" for wall sheathing
3. 5/8" for subflooring
4. 1/4" for underlayment

2.4 PRESERVATIVE TREATED WOOD PRODUCTS

A. Waterborne salt preservatives for painted, stained, or exposed natural wood product:
1. AWPB LP-2, above ground application.
2. AWPB LP-22, ground contact application.
3. Lumber redried to maximum moisture content of 19% stamped "DRY".
4. AWPB LP-44, ground contact application, volatile petroleum solvent.
5. AWPB LP-7, above ground application, heavy petroleum solvent - penta solution for outdoor applications exposed to weather where painting is not required.
6. AWPB LP-77, ground contact application, heavy petroleum solvent - penta solution.

B. Creosote and creosote preservatives for wood placed in ground or in water:
1. AWPB LP-5, above ground application, creosote or creosote coal tar

solutions.

2. AWPB LP-55, ground contact application, creosote or creosote coal tar solution.

2.5 ROUGH HARDWARE

A. Bolts:
1.FS FF-B-575.
2.FS FF-B-584.

B. Nuts: FS FF-N-836.

C. Expansion Shields: FS FF-S-325.

D. Lag Screws and Bolts: FS FF-B-561.

E. Toggle Bolts: FS FF-B-588.

F. Wood Screws: FS FF-S-111.

G. Nails and Staples: FS FF-N-105.

H. Metal Nailing Discs:
1. Flat caps, minimum 1 inch diameter
2. Minimum 30 ga. sheet metal.
3. Formed to prevent dishing.
4. Bell or cub shapes not acceptable.

H. Joist Hangers, and Framing Anchors: Type as noted on Drawings. Zinc-coated steel. Timber Engineering Co., Simpson, or equivalent.

J. Provide all fasteners and miscellaneous hardware required for assembly and anchoring finish woodwork.

PART 3 - EXECUTION

3.1 SURFACE CONDITIONS

A. Verify that surfaces to receive rough carpentry materials are prepared to exact grades and dimensions.

3.2 INSTALLATION

A. Sills: Secure sills with ½" x 8 in. minimum size anchor bolts embedded in the structure minimum of 6 in. spaced maximum of 4 ft. o.c.

B. Posts and Columns: Erect posts straight, plumb with straight edge and level, and

brace with tack boards at plate and sill.

C. Stud Framing:
   1. Plates and Stud Members:
      a. Provide single bottom plate and double top plates, 2 inches thick by width of studs.
      b. Overlap double top plate at corners and intersections. Lower member of double top plate shall be spliced over a stud.
      c. Anchor bottom plate to concrete structure with anchor bolts, expansion sleeves and lag bolts, or power driven studs, spaced 4 ft. o.c.
      d. Triple studs at corners and partition intersections.
      e. Anchor studs abutting masonry or concrete with ½" anchor bolts, maximum spacing of 4 ft. o.c.
      f. Partition parallel to floor joists below: Locate joists directly below studs.
      g. Frame Openings:
         (1)Double studs and headers: openings less than 4 feet.
         (2)Triple studs and headers: openings 4 feet and greater unless otherwise shown.
   2. Headers: See plans.
   3. Blocking: Install on all single story partitions over 8 feet high and multi-story partitions.
   4. Corner Bracing: Run continuous bracing member diagonally from intersection of post and girt to point on sill approximately 4 feet away, or three stud spaces.

D. Joist Framing:
   1. Install with crown edge up.
   2. Support ends of each member minimum 1½" of bearing on wood or metal.
   3. Support ends of each member minimum 3 in. of bearing on masonry.
   4. Laterally support joists alternately at ends with solid blocking 2 inches thick by depth of joists, between members crossing bearing point.
   5. Lap members framing from opposite sides of beams, girders, or partitions, minimum 4 in. over support.
   6. Provide solid blocking between joists under door posts.
   7. Notches:
      a. Do not notch in middle third of joists.
      b. Notches in top or bottom of joists: Maximum of 1/8 depth of member.
      c. Notched ends: Maximum of ¼ depth of member.
   8. Bored holes: Maximum 1/3 depth of member, 2 in. minimum distance to top or bottom of joists.
   9. Bridging: Nominal depth-to-thickness ratio of joists exceeding 6, install bridging at 8 ft. intervals.

E. Rafters:
   1. Double rafters at opening in roof framing to provide headers and trimmers, and support with metal hangers.
   2. At ridge, place rafters directly opposite each other and nail to ridge member or support with metal hangers.
   3. Locate collar beams at every third pair of rafters, one-third distance to ceiling joists.

F. Beams and Girders:
   1. Install with crown edge up.
   2. Nail built-up beams or girders with two rows of 20d nails spaced maximum of 2 ft. 8 in. o.c., locating one row near top edge and other near bottom edge of member.
   3. Beams or girders framed into pockets of exterior concrete or masonry walls: Provide minimum of 1 in. air space between sides and ends of wood members and concrete or masonry wall. Preservative treat as specified.

G. Miscellaneous Framing:
   1. Firestops:
      a. Stud Walls: 2 in. thick x depth of member blocking at each floor level and top story ceiling level.
      b. Floor and Ceiling Framing: 2 in. thick x depth of wood member blocking, fitted to fill openings from one space to another to prevent drafts.
      c. Chimneys and Fireplaces: Keep wood framing minimum of 2 in. from outside face of masonry and 4 in. from fireplace back wall.
      d. At all other locations required by UBC provisions.
   2. Framing for Mechanical Work:
      a. Frame members for passage of pipes and ducts to avoid cutting structural members.
      b. Do not cut, notch, or bore framing members for passage of pipes or conduits without concurrence of Engineer.

H. Wood Decking:
   1. Frame members for passage of pipes and ducts to avoid cutting structural members.
   2. Toenail groove to tongue at a maximum of 30 in. on centers.

I. Roof Sheathing (unless otherwise noted):
   1. Install plywood with face grain perpendicular to supports, using panel with continuous end joints over two or more spans staggered between panels and located over supports.
   2. Allow minimum space of 1/8 in. between end joints and ¼ in. between edge joints for expansion and contraction of panels.

J. Wall Sheathing (unless otherwise noted):
   1. Install plywood with face grain horizontal or vertical.

2. Allow minimum 1/8 in. space at end joints and ¼ in. at edge joints.

K. Subflooring:
1. Install with face grain perpendicular to joists; end joints occurring over the joists.
2. Allow 1/16 in. space at end joints and 1/8 in. at edge joints. Stagger panel end joints.

L. Gypsum Sheathing:
1. Apply square edge sheathing with long dimension parallel with supports.
2. Sides and edges abut vertical framing members, top and bottom plates or headers.
3. Attach sheeting using nails spaced at 8 inch o.c. at all edges of sheet and 8 inch o.c. on intermediate support.
4. Joint treatment with U.S. Gypsum Co. Perf-A-Tape system or equivalent.
5. Protect exposed corners with U.S. Gypsum Co. Perf-A-Bead or equivalent molding embedded in joint compound per manufacturer's recommendations.
6. Finish sand all areas to smooth, even surfaces suitable for painting.

M. Pressure Treated Wood:
1. Provide pressure-treated wood for all framing, blocking, furring, nailing strips built into exterior masonry walls, wood in contact with concrete and in conjunction with gravel stops and built-up roofing.
2. Re-dry and clean lumber, after treatment, to maximum moisture content of 19% stamped "DRY".
3. Apply two brush coats of same preservative used in original treatment to all sawed or cut surfaces of treated lumber.

N. Cabinets:
1. Fabricate cabinet units with laminated plastic over plywood on exposed faces. Conform to AWI Quality Standards, Premium Grade, reveal overlay design, for units shown on Drawings.
2. Assemble units as far as possible in shop for field installation.
3. Install units plumb and level, without distortion. Adjust doors and drawers for smooth operation. Provide self edged plastic laminate counter top with 4-inch back and side splash.
4. Follow manufacturer's instructions for installation of hardware items. Make all work neat and secure, developing full strength of components and providing intended function.

3.3 NAILING SCHEDULE

A. Nailing shall conform to the schedule in the latest edition of the International Building Code.

END OF SECTION 061000

SECTION 072100
THERMAL INSULATION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Extruded polystyrene foam-plastic board insulation.

1.2 ACTION SUBMITTALS

A. Product Data: For the following:

1. Extruded polystyrene foam-plastic board insulation.

1.3 INFORMATIONAL SUBMITTALS

A. Installer's Certification: Listing type, manufacturer, and R-value of insulation installed in each element of the building thermal envelope.

B. Product test and research reports.

PART 2 - PRODUCTS

2.1 EXTRUDED POLYSTYRENE FOAM-PLASTIC BOARD INSULATION

A. Extruded Polystyrene Board Insulation, Type IV: ASTM C578, Type IV, 25-psi minimum compressive strength.

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

a. Dow Chemical Company (The).
b. DuPont de Nemours, Inc.
c. Owens Corning.

2. Flame-Spread Index: Not more than 25 when tested in accordance with ASTM E84.
3. Smoke-Developed Index: Not more than 450 when tested in accordance with ASTM E84.
4. Labeling: Provide identification of mark indicating R-value of each piece of

insulation 12 inches and wider in width.

2.2 ACCESSORIES

A. Insulation for Miscellaneous Voids:

1. Glass-Fiber Insulation: ASTM C764, Type II, loose fill; with maximum flame-spread and smoke-developed indexes of 5, per ASTM E84.
2. Spray Polyurethane Foam Insulation: ASTM C1029, Type II, closed cell, with maximum flame-spread and smoke-developed indexes of 75 and 450, respectively, per ASTM E84.

B. Adhesive for Bonding Insulation: Product compatible with insulation and air and water barrier materials, and with demonstrated capability to bond insulation securely to substrates without damaging insulation and substrates.

C. Eave Ventilation Troughs: Preformed, rigid fiberboard or plastic sheets designed and sized to fit between roof framing members and to provide ventilation between insulated attic spaces and vented eaves.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Comply with insulation manufacturer's written instructions applicable to products and applications.

B. Install insulation that is undamaged, dry, and unsoiled and that has not been left exposed to ice, rain, or snow at any time.

C. Install insulation with manufacturer's R-value label exposed after insulation is installed.

D. Extend insulation to envelop entire area to be insulated. Fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.

E. Provide sizes to fit applications and selected from manufacturer's standard thicknesses, widths, and lengths. Apply single layer of insulation units unless multiple layers are otherwise shown or required to make up total thickness or to achieve R-value.

3.2 INSTALLATION OF SLAB INSULATION

A. On vertical slab edge and foundation surfaces, set insulation units using manufacturer's recommended adhesive according to manufacturer's written instructions.

END OF SECTION 072100

SECTION 076200
SHEET METAL FLASHING AND TRIM

PART 1 - GENERAL

1.1 REFERENCES

A. The following is a list of standards which may be referenced in this section:

1. Aluminum Association (AA):
   a. 35-80, Specifications for Aluminum Sheet Metal Work in Building Construction.
   b. 45-80, Designation System for Aluminum Finishes.
2. American Society for Testing and Materials (ASTM):
   a. A153-95, Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
   b. A167-91, Standard Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip (R 1994).
   c. A653/A653M-95, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvanealed) by the Hot-Dip Process.
   d. B32-89, Standard Specification for Solder Metal (R 1995).
   e. B209-90, Standard Specification for Aluminum and Aluminum Alloy Sheet and Plate.
   f. B370-88, Standard Specification for Copper Sheet and Strip for Building Construction (R 1995).
   g. D1187-95, Standard Specification for Asphalt-Base Emulsions for Use as Protective Coatings for Metal.
   h. D4586-93, Standard Specification for Asphalt Roof Cement, Asbestos-Free.
3. Federal Specifications (FS): QQ-L-201F(2), Lead Sheet (11/17/70).
4. Sheet Metal and Air Conditioning Contractors National Association (SMACNA): Architectural Sheet Metal Manual, 5th Edition, 1993.

1.2 SUBMITTALS

A. Shop Drawings:

1. Show joints, types and location of fasteners, and special shapes.
2. Catalog data for stock manufactured items.

B. Samples: Color samples for items to be factory finished.

1.3 DELIVERY, HANDLING, AND STORAGE

A. Package and protect during shipment.

B. Inspect for damage, dampness, and wet storage stains upon delivery to the Work site.

C. Remove and replace damaged or permanently stained materials that cannot be restored to like-new condition.

D. Carefully handle to avoid damage to surfaces, edges, and ends.

E. Do not open packages until ready for use.

F. Store materials in dry, weathertight, ventilated areas until immediately before installation.

PART 2 - PRODUCTS

2.1 METAL

A. Galvanized Sheet Steel: ASTM A525-93 and ASTM A526-90, G90, commercial quality copper bearing steel, thickness 0.0217-inch (26 U.S. Standard gauge), unless otherwise shown.

2.2 DOWNSPOUTS, GUTTERS, SCUPPERS, AND CONDUCTOR HEADS

A. By metal building manufacturer.

1. Gutter color to match trim.
2. Downspout color to match siding.

2.3 ANCILLARY MATERIALS

A. Solder: ASTM B32-89, alloy composition Sn 50.

B. Soldering Flux: ASTM B32-89, Type RA.

C. Sealer Tape: Polyisobutylene sealer tape.

D. Isolation Tape: Butyl or polyisobutylene, internally reinforced, or 20-mil thick minimum polyester.

E. Fasteners: For Galvanized Steelwork: Steel, galvanized per ASTM A153-95 or stainless steel fasteners.

2.4 FABRICATION OF FLASHING

A. Field measure prior to fabrication.

B. Fabricate in accordance with SMACNA Architectural Sheet Metal Manual.

C. Accurately form flashings to shapes shown and detailed, with angles and lines in true alignment.

D. Form arris and angles true to line and surfaces free of waves and buckles.

E. Form bends to 1/16-inch inside radius.

F. Hem exposed edges.

G. Reinforcements and Supports: Provide same material as flashing unless other material is shown. Steel, where shown or required, shall be galvanized or stainless.

H. Rigid Joints and Seams: Make mechanically strong. Solder galvanized and stainless steel metal joints. Do not use solder to transmit stress.

I. Fabricate sheet metal in 10-foot maximum lengths, unless otherwise indicated.

J. At exposed ends of counterflashing furnish weathertight closures.

K. Fabricate corners in one-piece with legs extending 30 inches each way to field joint. Lap, rivet, and solder corner seams watertight.

L. Neutralize soldering flux.

M. Solvent clean sheet metal. Surfaces to be in contact with roofing or otherwise concealed shall be coated with isolation paint.

PART 3 EXECUTION

3.1 INSTALLATION

A. Flashing:

1. Coordinate flashing Work with roofing Work for weathertight and watertight assembly.
2. Isolate metal from wood and concrete and from dissimilar metal with isolation tape or two coats of isolation paint.
3. Use only stainless steel fasteners to connect isolated dissimilar metals.
4. Joints: 10-foot maximum spacing and 2-1/2 feet from corners, butted with 3/16-inch space centered over matching 8-inch long backing plate with sealer tape in laps.
5. Set flanges of flashings and roof accessories on continuous sealer tape or in plastic roof cement on top of envelope ply of roofing. Nail flanges through sealer tape and at 3-inch maximum spacing. Touch up isolation paint on flanges.
6. Joints, Fastenings, Reinforcements, and Supports: Sized and located as required to preclude distortion or displacement due to thermal expansion and contraction.
7. Provide continuous holddown clips at counterflashing.
8. Conceal fastenings wherever possible.
9. Set flashing and sheet metal to straight, true lines with exposed faces aligned in proper plane without bulges or waves.

B. Prefabricated Systems:

1. Follow system manufacturer's applicable printed instructions.
2. Place color variations in pieces so no extremes are next to each other.

3.2 FINISH

A. Exposed Surfaces of Flashing and Sheet Metalwork: Free of dents, scratches, abrasions, or other visible defects, and clean and ready for painting where applicable. Color and finish to match adjacent siding, roofing, or trim.

END OF SECTION 076200

SECTION 079200
JOINT SEALANTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Silicone joint sealants.
2. Nonstaining silicone joint sealants.
3. Urethane joint sealants.
4. Mildew-resistant joint sealants.
5. Butyl joint sealants.

1.2 ACTION SUBMITTALS

A. Product Data: For each joint-sealant product.

B. Samples: For each kind and color of joint sealant required.

C. Joint-Sealant Schedule: Include the following information:

1. Joint-sealant application, joint location, and designation.
2. Joint-sealant manufacturer and product name.
3. Joint-sealant formulation.
4. Joint-sealant color.

1.3 INFORMATIONAL SUBMITTALS

A. Product test reports.

B. Sample warranties.

1.4 QUALITY ASSURANCE

A. Testing Agency Qualifications: Qualified according to ASTM C 1021 to conduct the testing indicated.

1.5 FIELD CONDITIONS

A. Do not proceed with installation of joint sealants under the following conditions:

1. When ambient and substrate temperature conditions are outside limits permitted by joint-sealant manufacturer or are below 40 deg F.
2. When joint substrates are wet.
3. Where joint widths are less than those allowed by joint-sealant

manufacturer for applications indicated.

4. Where contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

1.6 WARRANTY

A. Special Installer's Warranty: Installer agrees to repair or replace joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.

1. Warranty Period: Two years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 JOINT SEALANTS, GENERAL

A. Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by joint-sealant manufacturer, based on testing and field experience.

B. VOC Content of Interior Sealants: Sealants and sealant primers used inside the weatherproofing system shall comply with the following:

1. Architectural sealants shall have a VOC content of 250 g/L or less.
2. Sealants and sealant primers for nonporous substrates shall have a VOC content of 250 g/L or less.
3. Sealants and sealant primers for nonporous substrates shall have a VOC content of 775 g/L or less.

C. Colors of Exposed Joint Sealants: As selected by Architect from manufacturer's full range to match adjacent materials.

2.2 SILICONE JOINT SEALANTS

A. Silicone, S, NS, 25, NT: Single-component, nonsag, plus 25 percent and minus 25 percent movement capability, nontraffic-use, neutral-curing silicone joint sealant; ASTM C 920, Type S, Grade NS, Class 25, Use NT.

a. Dow Corning Corporation.
b. Tremco Incorporated.

2.3 NONSTAINING SILICONE JOINT SEALANTS

A. Nonstaining Joint Sealants: No staining of substrates when tested according to ASTM C

1248.

B. Silicone, Nonstaining, S, NS, 50, NT: Nonstaining, single-component, nonsag, plus 50 percent and minus 50 percent movement capability, nontraffic-use, neutral-curing silicone joint sealant; ASTM C 920, Type S, Grade NS, Class 50, Use NT.

a. Dow Corning Corporation.
b. Tremco Incorporated.

2.4 URETHANE JOINT SEALANTS

A. Urethane, S, P, 25, T, NT: Single-component, pourable, plus 25 percent and minus 25 percent movement capability, traffic- and nontraffic-use, urethane joint sealant; ASTM C 920, Type S, Grade P, Class 25, Uses T and NT.

a. BASF Corporation.
b. Pecora Corporation.

2.5 MILDEW-RESISTANT JOINT SEALANTS

A. Silicone, Mildew Resistant, Acid Curing, S, NS, 25, NT: Mildew-resistant, single-component, nonsag, plus 25 percent and minus 25 percent movement capability, nontraffic-use, acid-curing silicone joint sealant; ASTM C 920, Type S, Grade NS, Class 25, Use NT.

a. Dow Corning Corporation.
b. Tremco Incorporated.

2.6 JOINT-SEALANT BACKING

A. Cylindrical Sealant Backings: ASTM C 1330, Type C (closed-cell material with a surface skin) and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance.

B. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer.

2.7 MISCELLANEOUS MATERIALS

A. Primer: Material recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.

B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials.

PART 3 - EXECUTION

3.1 PREPARATION

A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions and the following requirements:

1. Remove laitance and form-release agents from concrete.
2. Clean nonporous joint substrate surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion.

B. Joint Priming: Prime joint substrates where recommended by joint-sealant manufacturer or as indicated by prior experience.

INSTALLATION OF JOINT SEALANTS

C. General: Comply with ASTM C 1193 and joint-sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.

D. Install sealant backings of kind indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.

E. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.

F. Install sealants using proven techniques that comply with the following and at the same time backings are installed:

1. Place sealants so they directly contact and fully wet joint substrates.
2. Completely fill recesses in each joint configuration.
3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.

G. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants to form smooth, uniform beads of configuration indicated. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces. Provide concave joint profile per Figure 8A in ASTM C 1193 unless otherwise indicated.

3.2 JOINT-SEALANT SCHEDULE

A. Joint-Sealant Application: Exterior joints in vertical surfaces and horizontal nontraffic surfaces.

1. Joint Locations:
   a. Joints between metal panels.
   b. Perimeter joints between materials listed above and frames of doors, windows and louvers.
   c. Other joints as indicated on Drawings.
2. Joint Sealant: Silicone, nonstaining, S, NS, 50, NT.
3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors to match adjacent materials.

B. Joint-Sealant Application: Exterior joints in vertical and horizontal traffic and nontraffic surfaces.

1. Joint Locations:
   a. Joints between concrete and metal.
   b. Perimeter joints between materials listed above and frames of doors, windows and louvers.
2. Joint Sealant: Urethane, S, P, 25, T, NT.
3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors to match adjacent materials.

C. Joint-Sealant Application: Interior joints in vertical surfaces and horizontal nontraffic surfaces not subject to significant movement.

1. Joint Locations:

   a. Control joints on exposed interior surfaces of exterior walls.
   b. Perimeter joints between interior wall surfaces and frames of doors and windows.
2. Joint Sealant: Acrylic latex.
3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors to match adjacent materials.

END OF SECTION 079200

SECTION 092900
GYPSUM BOARD

PART 1 - GENERAL

1.1 QUALITY ASSURANCE

A. General: Regardless of the minimum specifications herein, utilize materials and applications recommended by the manufacturer.

B. Applicator's Qualifications: Use only workers regularly employed in this type of work who can show experience in the application of similar materials and the specific systems specified.

1.2 DELIVERY, STORAGE, AND HANDLING

A. Delivery: Deliver fire-rated materials bearing testing agency label and required fire classification numbers.

B. Storage:

1. Store materials inside, under cover, stacked flat, off floor.
2. Stack gypsum board so that long lengths are not over short lengths.
3. Avoid overloading floor system of storage area.
4. Store adhesives and finishing compounds in dry areas; protect against freezing at all times.

1.3 ENVIRONMENTAL CONDITIONS

A. Temperature:

1. In areas receiving gypsum board installation, maintain temperature range between 55 and 70 degrees F for 24 hours before, during, and after gypsum board and joint treatment application.
2. In areas receiving veneer plaster, where outside air temperature is less than 50 degrees F, maintain interior temperature range between 50 degrees F and 80 degrees F for a period of 1 week before, during, and 1 week after application of veneer plaster, base, and joint treatment.

B. Ventilation:

1. Provide ventilation during and following adhesives and joint treatment applications.
2. Use temporary air circulators in enclosed areas lacking natural ventilation.

3. Keep air circulation at a minimum level during veneer plastering to avoid excessive drying.
4. Under slow drying conditions, allow additional drying time between coats of joint treatment.
5. Protect installed materials from drafts of ambient air during hot, dry weather.

PART 2 - PRODUCTS

2.1 GYPSUM BOARD

A. Regular Board (GWB): ASTM C36-91, 5/8-inch thick with tapered edges, unless noted otherwise on Drawings.

2.2 FASTENERS FOR GYPSUM BOARD

A. Screws: ASTM C1002-88, self-drilling, self-tapping, bugle head, for use with power-driven tool.

1. Type S, 1-inch long for gypsum board to sheet metal.
2. Type W, 1-1/4 inches long for gypsum board to wood.

2.3 JOINT TREATMENT MATERIALS

A. Joint Tape for General Interior Applications: ASTM C475-89, perforated tape.

B. Joint Compound for General Interior Applications: ASTM C475-89, all-purpose, ready-mixed compound.

C. Joint Compound for Water-Resistant and Soffit Boards: Chemically curing, polyindurate type material as recommended by the manufacturer.

D. Joint Tape for Soffit Board: 2-inch wide 10 by 10 glass mesh tape.

2.4 ANCILLARY MATERIALS

A. Adhesives: As recommended by gypsum board manufacturer for intended use.

B. Sound Attenuation Blankets: ASTM C665-88, Type I (no facing), as required to fill cavity.

C. Acoustical Sealant: Nonsetting and nonstaining as manufactured by DAP, United States Gypsum, Tremco, or Ohio Sealants, Inc.

2.5 METAL ACCESSORIES

A. ASTM C1047-85, Zinc-Coated Metal.

1. Corner Bead: 1-1/4-inch by 1-1/4-inch:

a. United States Gypsum; Dur-A-Bead.
b. Gold Bond; standard corner beads.

2. Edge Trim:
   a. United States Gypsum; 200B metal trim.
   b. Gold Bond; No. 200 casing bead.
3. Metal Control Joint:
   a. United States Gypsum; No. 093.
   b. Gold Bond; E-Z strip control joint.

2.6 LIGHT-GAUGE METAL FRAMING

A. Carrying Channels: Cold-rolled steel, 16-gauge, free of rust, coated with factory-applied rust-inhibitive paint, 1-1/2 inches deep, weighing not less than 475 pounds per 1,000 linear feet.

B. Furring Channels: Roll-formed hat shaped section of 25-gauge galvanized steel with a face width of 1-3/8 inches and a depth of 7/8-inch.

C. Resilient Furring Channels: Roll-formed section of 25-gauge galvanized steel with face width of 1-1/2 inches designed for resilient attachment of gypsum board to framing.

1. Manufacturers and Products:
   a. United States Gypsum; RC-1 channel.
   b. Donn Corp.; DG-8 resilient channels.

2.7 NONSTRUCTURAL METAL FRAMING MEMBERS

A. ASTM C645-88, 25-gauge and 20-gauge galvanized C-studs with 1-5/8-inch flanges, and ancillary items for interior wall framing.

B. Dry wall studs, tracks, and accessories as manufactured by:

1. United States Gypsum.
2. Inryco-Milcor.
3. Gold Bond.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Inspect surfaces to receive gypsum board and related materials before beginning work and report to ENGINEER any defects in such work which will adversely affect the quality of work specified herein.

3.2 PREPARATION

A. General: Provide, install, and maintain necessary scaffold, staging, trestles, planking, and temporary heating, lighting, and ventilation as necessary for the duration of the gypsum board work.

B. Protection: Protect work of other trades.

C. Coordination:

1. Coordinate work with that of other trades. Check specifications and drawings of other trades to determine parts of work requiring coordination.
2. Cut and repair gypsum board systems for installation of omitted work.

D. Surface Preparation: Repair *defective* surfaces prior to starting work. Prepare as specified for application of specific materials.

3.3 ERECTION OF LIGHT-GAUGE NONSTRUCTURAL METAL FRAMING

A. Layout: Align partitions as shown on the Drawings.

B. Tracks:

1. Attach metal runner tracks to floor slabs with suitable fasteners located 2 inches from each end and spaced not more than 24 inches OC.
2. Attach tracks to suspended ceiling with toggle or molly bolts spaced 24 inches OC.

C. Studs:

1. ASTM C754-88.
2. Following manufacturer's printed instructions, position studs vertically, engaging floor and ceiling tracks and spaced as noted on Drawings.
3. Splice: When necessary, use 8-inch nested lap and one positive attachment per stud flange.
4. Place in direct contact with doorframe jambs, abutting partitions, and partition corners. Provide for anchorage of doorframes to studs.
5. Anchor all studs for shelf-walls and those adjacent to window and doorframes, partition intersections, and corners to ceiling and floor runner flanges. Securely anchor studs to jamb and head anchor clips of door or borrowed-light frames by bolt or screw attachment.
6. Over metal door and borrowed-light frames, place horizontally a cut-to-length section of runner, with a web-flanged bend at each end, and secure with one positive attachment per flange. Position a cut-to-length stud (extending to ceiling runner) at vertical panel joints over doorframe header.
7. Locate studs at abutting construction, partition intersections, and partition corners.

8. Spacing: At 24 inches OC, unless otherwise required by manufacturer.
9. At Doorframes and Cased Openings:
    a. Full height double studs, No. 20-gauge minimum, secured to jamb anchors by bolts, screws, or welds.
    b. Header Track: Secure to frame head anchors and double studs.
    c. Provide double channel stiffeners through studs above frame and extend at least one stud space beyond each jamb.
10. Windows: Similar framing to door openings with stiffeners both above and below.

11. Wall Mounting Accessories: Provide channels, horizontal studding, No. 16-gauge sheet 8 inches by 2 inches greater than stud spacing, or other members within walls as required to provide secure and adequate support.Furring:
12. Space furring channels the same as studs or as shown.
13. Around columns and beams construct furring as shown using metal studs and furring channels securely tied together and anchored in-place.
14. Attach resilient furring channels to wood framing with screws.

3.4 APPLICATION OF GYPSUM BOARD

A. Inspection and Preparation:

1. Check framing for accurate spacing and alignment.
2. Verify that spacing of installed framing does not exceed maximum allowable for thickness of gypsum board to be used.
3. Verify that frames are set for thickness of gypsum board to be used.
4. Do not proceed with installation of gypsum board until deficiencies are corrected and surfaces to receive gypsum board are acceptable.
5. Protrusions of framing, twisted framing members, or unaligned members must be repaired before installation of gypsum board is started.

B. General:

1. Meet requirements of ASTM C840-88 and GA-216-93.
2. Joints: Use gypsum board of maximum lengths to minimize end joints. Stagger end joints when they occur. Locate end joints as far as possible from center of wall or ceiling. Abut gypsum board without forcing. Neatly fit ends and edges of gypsum board. Do not place butt ends against tapered edges.
3. Support ends and edges of gypsum board panels on framing or furring members except for face layer of double layer and where ends are back blocked and floated.
4. Use metal edge trim where gypsum board abuts another material and where shown or noted on Drawings.
5. Use water-resistant board in restroom and janitor room walls.

6. Follow manufacturer's recommendation of good practice.

C. Over Framing:

1. Apply gypsum board first to ceiling and then to walls for single layer horizontal application.
2. Use vertical application for fire-rated walls.
3. Fasten gypsum board securely to framing using double screw method.

D. Fireproofing: Install fireproofing of columns, beams, and shaft walls as shown.

3.5 JOINT SYSTEM

A. Interior Gypsum Board: Conform to ASTM C840-88.

B. Required: On exposed gypsum board, behind casework.

C. Prefill: Fill V-grooves formed by abutting rounded edges of gypsum board with prefill joint compound. Fill V-joint flush and remove excess compound beyond groove. Leave clear depression to receive tape. Permit prefill joint compound to harden prior to application of tape.

D. Taping and Finishing Joints:

1. Taping or Embedding Coat: Apply compound in thin, uniform layer to joints and angles to be reinforced. Apply reinforcing tape immediately. Center tape over joint and seat tape into compound. Leave approximately 1/64-inch to 1/32-inch compound under tape to provide bond. Apply skim coat immediately following tape embedment but not to function as fill or second coat. Fold tape and embed in angles to provide true angle. Dry embedding coat prior to application of fill coat.
2. Filling Coat: Apply joint compound over embedding coat. Fill taper flush with surface. Apply fill coat to cover tape. Feather out fill coat beyond tape and previous joint compound line. For joints with no taper, feather out at least 4 inches on either side of tape. Do not apply fill coat on interior angles. Allow fill coat to dry prior to application of finish coat.
3. Finishing Coat: Spread joint compound evenly over and beyond fill coat on joints. Feather to smooth uniform finish. Apply finish coat to taped angles to cover tape and taping compound. Sand final application of compound to provide surface ready for decoration.
4. Filling and Finishing Depressions: Apply joint compound as first coat to fastener depressions. Apply at least two additional coats of compound after first coat is dry. Leave filled and finished depressions level with plane of surface.

E. Finishing Beads and Trim:

1. First Fill Coat: Apply joint compound to bead and trim. Feather out from ground to plane of the surface. Dry compound prior to application of second fill coat.
2. Second Fill Coat: Apply joint compound in same manner as first fill coat. Extend beyond first coat onto face of gypsum board. Dry compound prior to application of finish coat.
3. Finish Coat: Apply joint compound to bead and trim. Extend beyond second fill coat. Feather finish coat from ground to plane of surface. Sand finish coat to provide flat surface ready for decoration.

3.6 FINAL FINISHES

A. Levels of Finish: Conform to GA-214-93.

B. Level 1:

1. Taping or embedding coat only.
2. Use in concealed areas, and where indicated, unless a higher level is required for fire-resistive or sound-rated assemblies.

C. Level 3:

1. Taping, filling, and finishing coats.
2. Use on surfaces indicated to have spray texture or ceramic tile.

D. Level 4:

1. Taping, filling, and finishing coats plus two separate coats applied over joints, angles, fastener heads, and trim accessories.
2. Sand between coats and after last coat.
3. Use on surfaces indicated to receive wall coverings.

E. Level 5:

1. Same as Level 4, plus a thin, smooth, uniform skim coat of joint compound, or product specially formulated for this purpose, over entire surface.
2. Produce surfaces free of tool marks and ridges, ready for decoration.
3. Use on surfaces not indicated otherwise, those indicated to receive gloss, semi-gloss, and nontextured flat paints, and where indicated.

3.7 ADJUST AND CLEAN

A. Clean: Remove droppings or texture overspray from walls, windows, and floor, leaving room clean for following trades.

B. Nail Pop: Repair nail pop by driving new nail approximately 1-1/2 inches from nail pop and reseat nail. When face paper is punctured, drive new nail or screw approximately 1-1/2 inches from *defective* fastening and remove *defective* fastening. Fill damaged surface with compound.

C. Ridging:

1. Do not repair ridging until condition has fully developed, approximately 6 months after installation or one heating season.
   a. Sand ridges to reinforcing tape without cutting through tape.
   b. Fill concave areas on both sides of ridge with topping compound.
   c. After fill is dry, blend in topping compound over repaired area.
2. Fill cracks with compound and finish smooth and flush.

END OF SECTION 092900

SECTION 099123
INTERIOR PAINTING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes surface preparation and the application of paint systems on the following interior substrates:

1. Gypsum board.

1.3 ACTION SUBMITTALS

A. Product List: For each product indicated, include the following:

1. Cross-reference to paint system and locations of application areas. Use same designations indicated on Drawings and in schedules.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Delivery and Handling: Deliver products to Project site in an undamaged condition in manufacturer's original sealed containers, complete with labels and instructions for handling, storing, unpacking, protecting, and installing. Packaging shall bear the manufacturer’s label with the following information:

1. Product name and type (description).
2. Batch date.
3. Color number.
4. VOC content.
5. Environmental handling requirements.
6. Surface preparation requirements.
7. Application instructions.

B. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F.

1. Maintain containers in clean condition, free of foreign materials and residue.
2. Remove rags and waste from storage areas daily.

1.5 FIELD CONDITIONS

A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F.

B. Do not apply paints when relative humidity exceeds 85 percent; at temperatures less than 5 deg F above the dew point; or to damp or wet surfaces.

C. Lead Paint: It is not expected that lead paint will be encountered in the Work.

1. If suspected lead paint is encountered, do not disturb; immediately notify Architect and Owner.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Basis-of-Design Product: Subject to compliance with requirements, provide Sherwin-Williams Company (The); products indicated or comparable product from one of the following:

1. Benjamin Moore & Co.
2. PPG Architectural Coatings.
3. Pratt & Lambert.
4. Valspar Corporation - Architectural (Pro).

B. Source Limitations: Obtain paint materials from single source from single listed manufacturer.

1. Manufacturer's designations listed on a separate color schedule are for color reference only and do not indicate prior approval.

2.2 PAINT, GENERAL

A. Material Compatibility:

1. Provide materials for use within each paint system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
2. For each coat in a paint system, provide products recommended in writing by manufacturers of topcoat for use in paint system and on substrate indicated.

2.3 SOURCE QUALITY CONTROL

A. Testing of Paint Materials: Owner reserves the right to invoke the following procedure:

1. Owner will engage the services of a qualified testing agency to sample paint materials. Contractor will be notified in advance and may be present when samples are taken. If paint materials have already been delivered to Project site, samples may be taken at Project site. Samples will be identified, sealed, and certified by testing agency.
2. Testing agency will perform tests for compliance with product requirements.
3. Owner may direct Contractor to stop applying coatings if test results show materials being used do not comply with product requirements. Contractor shall remove noncomplying paint materials from Project site, pay for testing, and repaint surfaces painted with rejected materials. Contractor will be required to remove rejected materials from previously painted surfaces if, on repainting with complying materials, the two paints are incompatible.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers. Where acceptability of substrate conditions is in question, apply samples and perform in-situ testing to verify compatibility, adhesion, and film integrity of new paint application.

1. Report, in writing, conditions that may affect application, appearance, or performance of paint.

B. Substrate Conditions:

1. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:
   a. Gypsum Board: 12 percent.

2. Gypsum Board Substrates: Verify that finishing compound is sanded smooth.

C. Proceed with coating application only after unsatisfactory conditions have been corrected; application of coating indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. Comply with manufacturer's written instructions and recommendations in "MPI Manual" applicable to substrates indicated.

B. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or

weight of item, provide surface-applied protection before surface preparation and painting.

1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.

C. Clean substrates of substances that could impair bond of paints, including dust, dirt, oil, grease, and incompatible paints and encapsulants.

1. Remove incompatible primers and reprime substrate with compatible primers or apply tie coat as required to produce paint systems indicated.
2. After priming, fill holes and imperfections in the finish surfaces with putty or plastic wood filler. Sand smooth when dried.

3.3 APPLICATION

A. Apply paints according to manufacturer's written instructions and to recommendations in "MPI Manual."

1. Use applicators and techniques suited for paint and substrate indicated.
2. Paint surfaces behind movable equipment and furniture same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed equipment or furniture with prime coat only.
3. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
4. Primers specified in painting schedules may be omitted on items that are factory primed or factory finished if acceptable to topcoat manufacturers.

B. Tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of same material are to be applied. Tint undercoats to match color of topcoat, but provide sufficient difference in shade of undercoats to distinguish each separate coat.

C. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.

D. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.

3.4 FIELD QUALITY CONTROL

A. Dry Film Thickness Testing: Owner may engage the services of a qualified testing and inspecting agency to inspect and test paint for dry film thickness.

1. Contractor shall touch up and restore painted surfaces damaged by testing.

2. If test results show that dry film thickness of applied paint does not comply with paint manufacturer's written recommendations, Contractor shall pay for testing and apply additional coats as needed to provide dry film thickness that complies with paint manufacturer's written recommendations.

3.5 CLEANING AND PROTECTION

A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.

B. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.

C. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.

D. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.6 INTERIOR PAINTING SCHEDULE

A. Gypsum Board Substrates:

1. Latex System:

a. Prime Coat: Primer, latex, interior:

1) S-W ProMar 200 Zero VOC Latex Primer, B28W2600, at 4.0 mils wet, 1.0 mils dry.

b. Intermediate Coat: Latex, interior, matching topcoat.

c. Topcoat: Latex, interior, flat:

1) S-W ProMar 200 Zero VOC Latex Flat, B30-2600 Series, at 4.0 mils wet, 1.6 mils dry, per coat.

d. Topcoat: Latex, interior, eggshell:

1) S-W ProMar 200 Zero VOC Latex Eg-Shel, B20-2600 Series, at 4.0 mils wet, 1.7 mils dry, per coat.

END OF SECTION 099123

SECTION 230500 - COMMON WORK RESULTS FOR PLUMBING AND HVAC

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the following:

1. Record Documents, Maintenance Manuals, and General Provisions for mechanical work.
2. Piping materials and installation instructions common to most piping systems.
3. Dielectric fittings.
4. Mechanical demolition.
5. Equipment installation requirements common to equipment sections.
6. Painting.
7. Concrete bases.
8. Supports and anchorages.

1.3 SUBMITTALS

A. Product Data: For the following:

1. Dielectric fittings.

B. Welding certificates.

1.4 QUALITY ASSURANCE

A. Steel Support Welding: Qualify processes and operators according to AWS D1.1, "Structural Welding Code--Steel."

B. Steel Pipe Welding: Qualify processes and operators according to ASME Boiler and Pressure Vessel Code: Section IX, "Welding and Brazing Qualifications."

1. Comply with provisions in ASME B31 Series, "Code for Pressure Piping."
2. Certify that each welder has passed AWS qualification tests for welding processes involved and that certification is current.

C. Electrical Characteristics for Mechanical Equipment: Equipment of higher electrical characteristics may be furnished provided such proposed equipment is approved in writing by the engineer and connecting electrical services, circuit breakers, and conduit sizes are appropriately modified without added cost to Project. If minimum energy ratings or efficiencies are specified, equipment shall comply with requirements.

1.5 COORDINATION

A. Arrange for pipe spaces, chases, slots, and openings in building structure during progress of construction, to allow for mechanical installations.

B. Coordinate installation of required supporting devices and set sleeves in poured-in-place concrete and other structural components as they are constructed.

C. Coordinate requirements for access panels and doors for mechanical items requiring access that are concealed behind finished surfaces. Access panels and doors are specified in Division 08 Section "Access Doors and Frames."

1.6 FEES AND PERMITS

A. Contractor shall apply and pay for all permits, inspections, reviews, etc. required by the authorities having jurisdiction.

1. This shall include the cost of extending the natural gas service from the utility company main line to the building meter, setting the meter and regulator and all related utility company costs.
2. The Contractor shall include in his/her Bid all system development or similarly named fee imposed by the serving utility company or governing entity (City, County, etc.).

1.7 RECORD DOCUMENTS

A. Prepare Record Documents in accordance with the requirements in Division 01 Section "Closeout Procedures." In addition to the requirements specified in Division 01, indicate the following installed conditions:

1. Ductwork mains and branches, size and location, for both exterior and interior; locations of dampers and other control devices; filters, boxes, and terminal units requiring periodic maintenance or repair.
2. Mains and branches of piping systems, with valves and control devices located and numbered, concealed unions located, and with items requiring maintenance located (ie. traps, strainers, tanks, etc.). Refer to Section 230553 "Identification for HVAC Piping and Equipment". Indicate actual inverts and horizontal locations of underground piping.
3. Equipment locations (exposed and concealed) dimensioned from prominent building lines.
4. Approved substitutions, Contract Modifications, and actual equipment and materials installed. Revise equipment schedules.
5. Contract Modifications, actual equipment and materials installed.

1.8 MAINTENANCE MANUALS

A. Prepare maintenance manuals in accordance with Division 01 Section "Closeout Procedures." In addition to the requirements specified in Division 01. Assemble O & M Manuals as follows:

1. Compile two copies of Operating and Maintenance Manuals for the mechanical systems and equipment. The manuals shall be provided to the Architect for approval complete

and at one time, prior to requesting final payment. Partial or separate data will be returned for completion.

2. Manuals shall be assembled in three-ring binders. Binders shall be 3 inches thick or less and more than one binder shall be used for each set of data if required to prevent overfilling of one binder. Binders shall have plastic coating with correct name of the Project permanently attached to the spine. Binders shall be Sparco, #68031. All information shall be arranged in sections and each section shall have a blank buff colored, heavy paper divider with a protruding tab clearly labeled. Sections shall be arranged in the same order that the equipment is listed in the Specification and each Specification Section shall have a separate tab. Shop Drawings which are larger than 8-1/2 inches x 11 inches shall be individually folded so they are 8-1/2 inches x 11 inches or less and inserted behind the appropriate tab.
3. Tabs shall be labeled and arranged as follows:

    a. Index: Furnish under the first tab an index of sections listing name of Section and Specification numbers.
    b. Equipment Manufacturers: Furnish under the second tab a complete typed list of equipment suppliers and manufacturers representative including type of equipment, name, address and phone number. The company listed here should be the one which could furnish replacement parts and offer technical information about the equipment.
    c. Valve Directory: Furnish under this tab a typed copy of the valve chart required.
    d. Product Literature: Each tab, starting with the fourth shall contain the name of a Specification Section. Behind each tab shall be the previously submitted and approved Shop Drawing, factory published operation and maintenance instructions and parts lists.

4. Upon completion and approval of the booklets, one copy shall be given to the Architect, and two to the Owner.
5. Electronic Format: Provide all O&M information in a searchable electronic PDF format on CD for submission to the Owner with the hard copies.

1.9 MECHANICAL EQUIPMENT TRAINING

A. The mechanical contractor shall schedule training with the Owner. Using the O & M Manuals, the mechanical contractor shall explain in detail and instruct the Owner's maintenance personnel in the correct operation and maintenance of the equipment.

1. The mechanical contractor shall develop and create an agenda to be used during Training.
2. The mechanical contractor shall provide a sign in sheet to verify dates and types of training and who attended.

B. Refer to Division 01, section "Demonstration and Training."

C. Refer to specific training and demonstration requirements in the individual specifications.

1.10 GENERAL PROVISIONS FOR MECHANICAL WORK

A. Interferences: Project design took into account potential interferences between trades (e.g. mechanical ductwork with piping or with electrical light fixtures), however, not every interference has been eliminated. It shall be the responsibility of the Bidder and potential

Contractor to field verify all mechanical piping and duct routing, making allowances for existing beams, pipes, ducts, hangers, and other obstructions. Provide HVAC duct offsets and transitions as required maintaining duct aspect ratios within 10 percent of design. The cost associated with interferences shall be included in the Base Bid.

B. Examination of Project Drawings:

1. The Drawings (Plans, elevations, flow schematics, etc.) for the mechanical work are intended to convey Scope of Work and to indicate the general arrangements and locations of end-use equipment, systems, etc., and the approximate sizes thereof.
2. The Contractor shall determine the exact location and mounting heights of equipment, rough-ins, and the exact routing and positioning of piping/ductwork equipment so as to best fit the layout of the job. Scaling of the Drawings will not be sufficient for determining these locations. Where job conditions require reasonable changes in indicated arrangements and locations, such changes shall be made, by the Contractor, at no additional cost to the Client.
3. Because of the scale of the Drawings, certain basic items/materials and quantities thereof, (e.g. fittings, connectors, flanges, unions, pipe wells, couplings, hangers, sleeves, clamps, screws, hooks, inserts, pipe/duct mounted - meters, gauges, sensors, etc.) may not be shown, but where such items are required by other sections of the Specifications or where they are required for proper installation of the Work, such items shall be furnished and installed and the cost thereof, reflected in the Base Bid.
4. The determination of quantities of HVAC and plumbing end-use systems and equipment required shall be made by the Contractor from the Drawings. Interferences and quantities and locations of basic items/materials may not be indicated on the Drawings and will require field verification and determination by the Contractor.
5. The Contractor shall coordinate the location and method of support of the piping/duct systems with that of all installations under other Divisions and Sections of the Specifications.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. In other Part 2 articles where subparagraph titles below introduce lists, the following requirements apply for product selection:
1. Manufacturers: Subject to compliance with requirements, provide products by the manufacturers specified.

2.2 PIPE, TUBE, AND FITTINGS

A. Refer to individual Division 23 piping Sections for pipe, tube, and fitting materials and joining methods.

B. Pipe Threads: ASME B1.20.1 for factory-threaded pipe and pipe fittings.

2.3 JOINING MATERIALS

A. Refer to individual Division 23 piping Sections for special joining materials not listed below.

B. Pipe-Flange Gasket Materials: Suitable for chemical and thermal conditions of piping system contents.

1. ASME B16.21, nonmetallic, flat, asbestos-free, 1/8-inch maximum thickness unless thickness or specific material is indicated.

a. Full-Face Type: For flat-face, Class 125, cast-iron and cast-bronze flanges.
b. Narrow-Face Type: For raised-face, Class 250, cast-iron and steel flanges.

2. AWWA C110, rubber, flat face, 1/8-inch thick, unless otherwise indicated; and full-face or ring type, unless otherwise indicated.

C. Flange Bolts and Nuts: ASME B18.2.1, carbon steel, unless otherwise indicated.

D. Solder Filler Metals: ASTM B 32, lead-free alloys. Include water-flushable flux according to ASTM B 813.

E. Welding Filler Metals: Comply with AWS D10.12 for welding materials appropriate for wall thickness and chemical analysis of steel pipe being welded.

2.4 DIELECTRIC FITTINGS

A. Description: Combination fitting of copper alloy and ferrous materials with threaded, solder-joint, plain, or weld-neck end connections that match piping system materials.

B. Insulating Material: Suitable for system fluid, pressure, and temperature.

C. Dielectric Flanges: Factory-fabricated, companion-flange assembly, for 150 or 300 psig minimum working pressure as required to suit system pressures.

1. Manufacturers:

a. Central Plastics Company.
b. Epco Sales, Inc.
c. Watts Industries, Inc.; Water Products Div.

D. Dielectric-Flange Kits: Companion-flange assembly for field assembly. Include flanges, full-face- or ring-type neoprene or phenolic gasket, phenolic or polyethylene bolt sleeves, phenolic washers, and steel backing washers.

1. Manufacturers:

a. Advance Products & Systems, Inc.
b. Calpico, Inc.
c. Central Plastics Company.
d. Pipeline Seal and Insulator, Inc.

2. Separate companion flanges and steel bolts and nuts shall have 150 or 300 psig minimum working pressure where required to suit system pressures.

E. Dielectric Couplings: Galvanized-steel coupling with inert and noncorrosive, thermoplastic lining; threaded ends; and 300 psig minimum working pressure at 225 deg F.

1. Manufacturers:

    a. Calpico, Inc.
    b. Lochinvar Corp.

F. Dielectric Nipples: Electroplated steel nipple with inert and noncorrosive, thermoplastic lining; plain, threaded, or grooved ends; and 300 psig minimum working pressure at 225 deg F.

1. Manufacturers:

    a. Perfection Corp.
    b. Precision Plumbing Products, Inc.
    c. Sioux Chief Manufacturing Co., Inc.
    d. Victaulic Co. of America.

PART 3 - EXECUTION

3.1 MECHANICAL DEMOLITION

A. Refer to Division 01 Sections for general demolition requirements and procedures.

B. Disconnect, demolish, and remove mechanical systems, equipment, and components indicated to be removed.

1. Piping to Be Removed: Remove portion of piping indicated to be removed and cap or plug remaining piping with same or compatible piping material.
2. Piping to Be Abandoned in Place: Drain piping and cap or plug piping with same or compatible piping material.
3. Ducts to Be Removed: Remove portion of ducts indicated to be removed and plug remaining ducts with same or compatible ductwork material.
4. Ducts to Be Abandoned in Place: Cap or plug ducts with same or compatible ductwork material.
5. Equipment to Be Removed: Disconnect and cap services and remove equipment.
6. Equipment to Be Removed and Reinstalled: Disconnect and cap services and remove, clean, and store equipment; when appropriate, reinstall, reconnect, and make equipment operational.
7. Equipment to Be Removed and Salvaged: Disconnect and cap services and remove equipment and deliver to Owner.

C. If pipe, insulation, or equipment to remain is damaged in appearance or is unserviceable, remove damaged or unserviceable portions and replace with new products of equal capacity and quality.

3.2 PIPING SYSTEMS - COMMON REQUIREMENTS

A. Drawing Plans, schematics, and diagrams indicate general location and arrangement of piping systems. Indicated locations and arrangements were used to size pipe and calculate friction loss, expansion, pump sizing, and other design considerations. Install piping as indicated unless deviations to layout are approved on Coordination Drawings.

B. Install piping in concealed locations, unless otherwise indicated and except in equipment rooms and service areas.

C. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.

D. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.

E. Install piping to permit valve servicing.

F. Install piping at indicated slopes.

G. Install piping free of sags and bends.

H. Install fittings for changes in direction and branch connections.

I. Install piping to allow application of insulation.

J. Select system components with pressure rating equal to or greater than system operating pressure.

K. Install escutcheons for penetrations of walls, ceilings, and floors according to the following:

1. New Piping:

a. Piping with Fitting or Sleeve Protruding from Wall: One-piece, deep-pattern type.
b. Chrome-Plated Piping: One-piece, cast-brass type with polished chrome-plated finish.
c. Insulated Piping: One-piece, stamped-steel type with spring clips.
d. Bare Piping at Wall and Floor Penetrations in Finished Spaces: One-piece, cast-brass type with polished chrome-plated finish.
e. Bare Piping at Ceiling Penetrations in Finished Spaces: One-piece cast-brass type with polished chrome-plated finish.
f. Bare Piping in Unfinished Service Spaces: Split plate, cast-brass or stamped steel type with polished chrome-plated finish.

L. Fire-Barrier Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at pipe penetrations. Seal pipe penetrations with firestop materials.

3.3 PIPING JOINT CONSTRUCTION

A. Join pipe and fittings according to the following requirements.

B. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.

C. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.

D. Soldered Joints: Apply ASTM B 813, water-flushable flux, unless otherwise indicated, to tube end. Construct joints according to ASTM B 828 or CDA's "Copper Tube Handbook," using lead-free solder alloy complying with ASTM B 32.

E. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:

1. Apply appropriate tape or thread compound to external pipe threads unless dry seal threading is specified.
2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged. Do not use pipe sections that have cracked or open welds.

F. Welded Joints: Construct joints according to AWS D10.12, using qualified processes and welding operators according to Part 1 "Quality Assurance" Article.

G. Flanged Joints: Select appropriate gasket material, size, type, and thickness for service application. Install gasket concentrically positioned. Use suitable lubricants on bolt threads.

3.4 PIPING CONNECTIONS

A. Make connections according to the following, unless otherwise indicated:

1. Install unions, in piping NPS 2 and smaller, adjacent to each valve and at final connection to each piece of equipment.
2. Install flanges, in piping NPS 2-1/2 and larger, adjacent to flanged valves and at final connection to each piece of equipment.
3. Dry Piping Systems: Install dielectric unions and flanges to connect piping materials of dissimilar metals.
4. Wet Piping Systems: Install dielectric coupling and nipple fittings to connect piping materials of dissimilar metals.

3.5 EQUIPMENT INSTALLATION - COMMON REQUIREMENTS

A. Install equipment to allow maximum possible headroom unless specific mounting heights are indicated.

B. Install equipment level and plumb, parallel and perpendicular to other building systems and components in exposed interior spaces, unless otherwise indicated.

C. Install mechanical equipment to facilitate service, maintenance, and repair or replacement of components. Connect equipment for ease of disconnecting, with minimum interference to other installations. Extend grease fittings to accessible locations.

D. Install equipment to allow right of way for piping installed at required slope.

3.6 PAINTING

A. Damage and Touchup: Repair marred and damaged factory-painted finishes with materials and procedures to match original factory finish.

END OF SECTION 230500

SECTION 230549 - SEISMIC CONTROLS FOR PLUMBING AND HVAC

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the following:

1. Seismic snubbers.
2. Restraining braces and cables.
3. Restrained isolators.

B. It is the intent of this section to have the seismic bracing requirements designed by the approved seismic equipment manufacturer and installed by the mechanical contractor. The seismic manufacturer shall be responsible for the structural design of attachment hardware as required to attach snubbers to both the equipment and supporting structure. The manufacturer shall submit seismic shop drawings showing type and location of restraint devices as required to meet the code and performance requirements specified herein. The work under this section shall include all materials and labor necessary for complete execution of installation of seismic restraint assemblies as required per IBC code requirements.

C. The requirements of this seismic restraint section are in addition to other requirements as specified for support and attachment of equipment and mechanical services.

1.3 DEFINITIONS

A. IBC: International Building Code.

1.4 PERFORMANCE REQUIREMENT

A. Seismic-Restraint Loading:

1. Seismic Design Category as Defined in the IBC: See Structural Drawings.
2. Assigned Seismic Use Group or Building Category as Defined in the IBC: See Structural Drawings.

a. Component Importance Factor: (1.0) for all ductwork, equipment and piping, except propane piping which shall be (1.5).
b. Component Response Modification Factor: As required by IBC 2015 and ASCE 7-10 for specific component.

c. Component Amplification Factor: As required by IBC 2015 and ASCE 7-10 for specific component.

3. Design Spectral Response Acceleration at Short Periods (0.2 Second): Sds = 0.571.
4. Design Spectral Response Acceleration at 1-Second Period: Sd1 = 0.268.

1.5 SUBMITTALS

A. Product Data: For the following:

1. Illustrate and indicate style, material, strength, fastening provision, and finish for each type and size of seismic-restraint component used.

   a. Tabulate types and sizes of seismic restraints, complete with report numbers and rated strength in tension and shear.
   b. Annotate to indicate application of each product submitted and compliance with requirements.

2. Interlocking Snubbers: Include ratings for horizontal, vertical, and combined loads.

B. Delegated-Design Submittal: For seismic-restraint details indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1. Design Calculations: Calculate requirements for selecting seismic restraints. Certification documents to be signed and sealed by a qualified Professional Engineer with at least 5 years experience in the design of seismic restraints.
2. Seismic Restraint Details: Detail submittal drawings of seismic restraints and snubbers. Show anchorage details and indicate quantity, diameter, and depth of penetration anchors.
3. Seismic Shop Drawings: Floor Plans indicating seismic bracing locations and spacing for HVAC piping, ductwork and equipment.

1.6 QUALITY ASSURANCE

A. Comply with seismic-restraint requirements in the IBC unless requirements in this Section are more stringent.

B. Welding: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."

C. Seismic restraint products shall be of the same manufacturer.

D. Seismic-restraint devices shall have horizontal and vertical load testing and analysis and shall bear anchorage preapproval OPA number from OSHPD, preapproval by ICC-ES, or preapproval by another agency acceptable to authorities having jurisdiction, showing maximum seismic-restraint ratings. Ratings based on independent testing are preferred to ratings based on calculations. If preapproved ratings are not available, submittals based on independent testing are preferred. Calculations (including combining shear and tensile loads) to support seismic-restraint designs must be signed and sealed by a qualified professional engineer.

E. All piping and ductwork is to be retrained to meet code requirements. The seismic restraint manufacturer will provide documentation on maximum restraint spacing for various cable sizes and anchors. In addition, the seismic restraint manufacturer will provide support documentation containing adequate information to allow the installation contractor to make reasonable field modifications to suit special case conditions.

F. Seismic Restraint Designers/Manufacturers: Subject to compliance with requirements provide seismic design services and products by one of the following:

1. Amber/Booth Co. Inc.
2. Kinetics Noise Control.
3. Mason Industries.
4. Vibro Acoustics

PART 2 - PRODUCTS

2.1 RESTRAINED ISOLATORS

A. Restrained Mounts: All-directional mountings with seismic restraint.

1. Materials: Ductile-iron or welded steel housing containing two separate and opposing, oil-resistant rubber or neoprene elements that prevent central threaded element and attachment hardware from contacting the housing during normal operation.
2. Neoprene: Shock-absorbing materials compounded according to the standard for bridge-bearing neoprene as defined by AASHTO.

B. Restrained Spring Isolators: Freestanding, steel, open-spring isolators with seismic or limit-stop restraint.

1. Housing: Steel with resilient vertical-limit stops to prevent spring extension due to weight being removed; factory-drilled baseplate bonded to 1/4-inch thick, neoprene or rubber isolator pad attached to baseplate underside; and adjustable equipment mounting and leveling bolt that acts as blocking during installation.
2. Restraint: Seismic or limit stop as required for equipment and authorities having jurisdiction.
3. Outside Spring Diameter: Not less than 80 percent of the compressed height of the spring at rated load.
4. Minimum Additional Travel: 50 percent of the required deflection at rated load.
5. Lateral Stiffness: More than 80 percent of rated vertical stiffness.
6. Overload Capacity: Support 200 percent of rated load, fully compressed, without deformation or failure.

2.2 SEISMIC-RESTRAINT DEVICES

A. General Requirements for Restraint Components: Rated strengths, features, and applications shall be as defined in reports by an agency acceptable to authorities having jurisdiction.

1. Structural Safety Factor: Allowable strength in tension, shear, and pullout force of components shall be at least four times the maximum seismic forces to which they will be subjected.

B. Snubbers: Factory fabricated using welded structural-steel shapes and plates, anchor bolts, and replaceable resilient isolation washers and bushings.

1. Anchor bolts for attaching to concrete shall be seismic-rated, drill-in, and stud-wedge or female-wedge type.
2. Resilient Isolation Washers and Bushings: Oil- and water-resistant neoprene.
3. Maximum 1/4-inch air gap, and minimum 1/4-inch thick resilient cushion.

C. Channel Support System: MFMA-3, shop- or field-fabricated support assembly made of slotted steel channels with accessories for attachment to braced component at one end and to building structure at the other end and other matching components and with corrosion-resistant coating; and rated in tension, compression, and torsion forces.

D. Restraint Cables: ASTM A 603 galvanized steel cables pre-stretched with end connections made of steel assemblies with thimbles, brackets, swivel, and bolts designed for restraining cable service; and with a minimum of two clamping bolts for cable engagement.

E. Hanger Rod Stiffener: Steel tube or steel slotted-support-system sleeve with internally bolted connections or reinforcing steel angle clamped to hanger rod.

F. Bushings for Floor-Mounted Equipment Anchor Bolts: Neoprene bushings designed for rigid equipment mountings, and matched to type and size of anchor bolts and studs.

G. Bushing Assemblies for Wall-Mounted Equipment Anchorage: Assemblies of neoprene elements and steel sleeves designed for rigid equipment mountings, and matched to type and size of attachment devices used.

H. Resilient Isolation Washers and Bushings: One-piece, molded, oil- and water-resistant neoprene, with a flat washer face.

I. Mechanical Anchor Bolts: Drilled-in and stud-wedge or female-wedge type in zinc-coated steel for interior applications and stainless steel for exterior applications. Select anchor bolts with strength required for anchor and as tested according to ASTM E 488. Minimum length of eight times diameter.

J. Adhesive Anchor Bolts: Drilled-in and capsule anchor system containing polyvinyl or urethane methacrylate-based resin and accelerator, or injected polymer or hybrid mortar adhesive. Provide anchor bolts and hardware with zinc-coated steel for interior applications and stainless steel for exterior applications. Select anchor bolts with strength required for anchor and as tested according to ASTM E 488.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and equipment to receive seismic control devices for compliance with requirements for installation tolerances and other conditions affecting performance.

B. Examine roughing-in of reinforcement and cast-in-place anchors to verify actual locations before installation.

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

3.2 APPLICATIONS

A. Multiple Pipe Supports: Secure pipes to trapeze member with clamps approved for application by an agency acceptable to authorities having jurisdiction.

B. Hanger Rod Stiffeners: Install hanger rod stiffeners where indicated or scheduled on shop drawings to receive them and where required to prevent buckling of hanger rods due to seismic forces.

C. Strength of Support and Seismic-Restraint Assemblies: Where not indicated, select sizes of components so strength will be adequate to carry present and future static and seismic loads within specified loading limits.

3.3 SEISMIC-RESTRAINT DEVICE INSTALLATION

A. Installation of all seismic restraint materials shall be installed according to the manufacturer's installation instructions and project shop drawings.

B. Equipment Restraints:

1. Install seismic snubbers on HVAC equipment mounted on vibration isolators. Locate snubbers as close as possible to vibration isolators and bolt to equipment base and supporting structure. Snubbers are not needed if restrained isolators are used.
2. Install resilient bolt isolation washers on equipment anchor bolts where clearance between anchor and adjacent surface exceeds 0.125 inch.
3. Install seismic-restraint devices using methods approved by an agency acceptable to authorities having jurisdiction providing required submittals for component.

C. Piping Restraints:

1. Comply with requirements in MSS SP-127.
2. Space lateral supports and longitudinal supports as required for the site spectral response.
3. Brace a change of direction longer than 12 feet.

D. Install cables so they do not bend across edges of adjacent equipment or building structure.

E. Install seismic-restraint devices using methods approved by an agency acceptable to authorities having jurisdiction providing required submittals for component.

F. Install bushing assemblies for anchor bolts for floor-mounted equipment, arranged to provide resilient media between anchor bolt and mounting hole in concrete base.

G. 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.

H. Attachment to Structure: If specific attachment is not indicated, anchor bracing to structure at flanges of beams, at upper truss chords of bar joists, or at concrete members.

I. Drilled-in Anchors:

1. Identify position of reinforcing steel and other embedded items prior to drilling holes for anchors. Do not damage existing reinforcing or embedded items during coring or drilling. Notify the structural engineer if reinforcing steel or other embedded items are encountered during drilling. Locate and avoid prestressed tendons, electrical and telecommunications conduit, and gas lines.
2. Do not drill holes in concrete or masonry until concrete, mortar, or grout has achieved full design strength.
3. Wedge Anchors: Protect threads from damage during anchor installation. Heavy-duty sleeve anchors shall be installed with sleeve fully engaged in the structural element to which anchor is to be fastened.
4. Adhesive Anchors: Clean holes to remove loose material and drilling dust prior to installation of adhesive. Place adhesive in holes proceeding from the bottom of the hole and progressing toward the surface in such a manner as to avoid introduction of air pockets in the adhesive.
5. Set anchors to manufacturer's recommended torque, using a torque wrench.
6. Install zinc-coated steel anchors for interior and stainless-steel anchors for exterior applications.

3.4 ACCOMMODATION OF DIFFERENTIAL SEISMIC MOTION

A. Install flexible connections in piping where they cross seismic joints, where adjacent sections or branches are supported by different structural elements, and where the connections terminate with connection to equipment that is anchored to a different structural element from the one supporting the connections as they approach equipment.

END OF SECTION 230549

SECTION 230593 - TESTING, ADJUSTING, AND BALANCING FOR HVAC

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes TAB to produce design objectives for all air and water systems.

1.3 SUBMITTALS

A. Qualification Data: Within 30 days from Contractor's Notice to Proceed, submit 2 copies of evidence that TAB firm and this Project's TAB team members meet the qualifications specified in "Quality Assurance" Article.

B. Contract Documents Examination Report: Within 45 days from Contractor's Notice to Proceed, submit 2 copies of the Contract Documents review report as specified in Part 3.

C. Sample Report Forms: Submit two sets of sample TAB report forms.

1.4 QUALITY ASSURANCE

A. TAB Firm Qualifications: Engage a TAB firm certified by either AABC or NEBB.

B. The Test and Balance Contractor shall be an independent consultant. The firm shall be independent of all Contractors including the Mechanical and Temperature Controls Contractor.

C. Certification of TAB Reports: Certify TAB field data reports. This certification includes the following:

1. Review field data reports to validate accuracy of data and to prepare certified TAB reports.
2. Certify that TAB team complied with approved TAB plan and the procedures specified and referenced in this Specification.

D. TAB Report Forms: Use standard forms from NEBB's "Procedural Standards for Testing, Adjusting, and Balancing of Environmental Systems." Or from SMACNA's "HVAC Systems - Testing, Adjusting, and Balancing."

E. Instrumentation Calibration: Calibrate instruments at least every six months or more frequently if required by instrument manufacturer.

1. Keep an updated record of instrument calibration that indicates date of calibration and the name of party performing instrument calibration.

1.5 COORDINATION

A. Coordinate the efforts of factory-authorized service representatives for systems and equipment, HVAC controls installers, and other mechanics to operate HVAC systems and equipment to support and assist TAB activities.

B. Notice: Provide seven days' advance notice for each test. Include scheduled test dates and times.

C. Perform TAB after leakage and pressure tests on air and water distribution systems have been satisfactorily completed.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine the Contract Documents to become familiar with Project requirements and to discover conditions in systems' designs that may preclude proper TAB of systems and equipment.

1. Verify that balancing devices, such as test ports, gage cocks, thermometer wells, flow-control devices, balancing valves and fittings, and manual volume dampers, are required by the Contract Documents. Verify that quantities and locations of these balancing devices are accessible and appropriate for effective balancing and for efficient system and equipment operation.

B. Examine system and equipment installations to verify that they are complete and that testing, cleaning, adjusting, and commissioning specified in individual Sections have been performed.

C. Examine HVAC system and equipment installations to verify that indicated balancing devices, such as test ports, gage cocks, thermometer wells, flow-control devices, balancing valves and fittings, and manual volume dampers, are properly installed, and that their locations are accessible and appropriate for effective balancing and for efficient system and equipment operation.

D. Examine systems for functional deficiencies that cannot be corrected by adjusting and balancing.

E. Examine HVAC equipment to ensure that clean filters have been installed, bearings are greased, belts are aligned and tight, and equipment with functioning controls is ready for operation.

F. Examine strainers for clean screens and proper perforations.

G. Examine three-way valves for proper installation for their intended function of diverting or mixing fluid flows.

H. Examine heat-transfer coils for correct piping connections and for clean and straight fins.

I. Examine system pumps to ensure absence of entrained air in the suction piping.

J. Examine equipment for installation and for properly operating safety interlocks and controls.

K. Report deficiencies discovered before and during performance of TAB procedures. Observe and record system reactions to changes in conditions. Record default set points if different from indicated values.

3.2 PREPARATION

A. Complete system readiness checks and submit a system readiness report to the Project Engineer. Verify the following:

1. Permanent electrical power wiring is complete.
2. Hydronic systems are filled, clean, and free of air.
3. Hydronic systems specified to contain antifreeze have the correct percentage.
4. Automatic temperature-control systems are operational.
5. Equipment and duct access doors are securely closed.
6. Isolating and balancing valves are open and control valves are operational.

3.3 GENERAL PROCEDURES FOR TESTING AND BALANCING

A. Perform testing and balancing procedures on each system according to the procedures contained in NEBB's "Procedural Standards for Testing, Adjusting, and Balancing of Environmental Systems" or SMACNA's "HVAC Systems - Testing, Adjusting, and Balancing" and this Section.

B. Cut insulation, ducts, pipes, and equipment cabinets for installation of test probes to the minimum extent necessary to allow adequate performance of procedures. After testing and balancing, close probe holes and patch insulation with new materials identical to those removed. Restore vapor barrier and finish according to insulation Specifications for this Project.

C. Mark equipment and balancing device settings with paint or other suitable, permanent identification material, including damper-control positions, valve position indicators, fan-speed-control levers, and similar controls and devices, to show final settings.

3.4 GENERAL PROCEDURES FOR HYDRONIC SYSTEMS

A. Prepare test reports with pertinent design data and number in sequence starting at pump to end of system. Check the sum of branch-circuit flows against approved pump flow rate. Correct variations that exceed plus or minus 5 percent.

B. Prepare hydronic systems for testing and balancing according to the following, in addition to the general preparation procedures specified above:

1. Open all manual valves for maximum flow.
2. Check expansion tank liquid level and system pressurization.
3. Check flow-control valves for specified sequence of operation and set at indicated flow.

4. Set differential-pressure control valves at the specified differential pressure. Do not set at fully closed position when pump is positive-displacement type unless several terminal valves are kept open.
5. For hydronic systems containing antifreeze, note the product used and measure the actual concentration. Record final results on the TAB report.
6. Set system controls so automatic valves are wide open to heat exchangers.
7. Check pump-motor load. If motor is overloaded, throttle main flow-balancing device so motor nameplate rating is not exceeded.
8. Check air vents for a forceful liquid flow exiting from vents when manually operated.

3.5 TOLERANCES

A. Set HVAC system airflow and water flow rates within the following tolerances:
   1. Heating-Water Flow Rate: 0 to minus 10 percent.

3.6 FINAL REPORT

A. General: Typewritten, or computer printout in letter-quality font, on standard bond paper, in three-ring binder, tabulated and divided into sections by tested and balanced systems.

B. Include a certification sheet in front of binder signed by the testing and balancing engineer.
   1. Include a list of instruments used for procedures, along with proof of calibration.

C. General Report Data: In addition to form titles and entries, include the following data in the final report, as applicable:

   1. Title page.
   2. Name and address of TAB firm.
   3. Project name.
   4. Project location.
   5. Architect's/Engineer's name and address.
   6. Contractor's name and address.
   7. Report date.
   8. Signature of TAB firm who certifies the report.
   9. Table of Contents with the total number of pages defined for each section of the report. Number each page in the report.
   10. Summary of contents including the following:

      a. Indicated versus final performance.
      b. Notable characteristics of systems.
      c. Description of system operation sequence if it varies from the Contract Documents.

   11. Notes to explain why certain final data in the body of reports varies from indicated values.
   12. Test conditions for pump performance.

END OF SECTION 230593

SECTION 235100 - BREECHINGS, CHIMNEYS, AND STACKS

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Listed double-wall vents.

1.2 SUBMITTALS

A. Product Data: Manufacturers literature with material gages, product listing and furnished accessories.

B. Shop Drawings: For vents, breechings, chimneys, and stacks. Include plans, elevations, sections, details, and attachments to other work.

1. Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, methods of field assembly, components, hangers and seismic restraints, and location and size of each field connection.

1.3 QUALITY ASSURANCE

A. Source Limitations: Obtain listed system components through one source from a single manufacturer.

B. Certified Sizing Calculations: Manufacturer shall certify venting system sizing calculations.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. In other Part 2 Articles where titles below introduce lists, the following requirements apply to product selection:
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Cleaver-Brooks; Div. of Aqua-Chem Inc.
b. Hart & Cooley, Inc.
c. Heat-Fab, Inc.
d. Metal-Fab, Inc.
e. Schebler Co. (The).
f. Selkirk Inc.; Selkirk Metalbestos and Air Mate.
g. Simpson Dura-Vent Co., Inc.; Subsidiary of Simpson Manufacturing Co.

2.2 LISTED TYPE B AND BW VENTS

A. Description: Double-wall metal vents tested according to UL 441 and rated for 480 deg F continuously for Type B, or 550 deg F continuously for Type BW; with neutral or negative flue pressure complying with NFPA 211.

B. Construction: Inner shell and outer jacket separated by at least a 1/4-inch airspace.

C. Inner Shell: Aluminum alloy or stainless steel.

D. Outer Jacket: Galvanized or aluminized steel.

E. Accessories: Tees, elbows, increasers, draft-hood connectors, terminations, adjustable roof flashings, storm collars, support assemblies, thimbles, firestop spacers, and fasteners; fabricated from similar materials and designs as vent-pipe straight sections; all listed for same assembly.

1. Termination: Round chimney top designed to exclude minimum 98 percent of rainfall.
2. Termination: Antibackdraft.

2.3 LISTED BUILDING-HEATING-APPLIANCE CHIMNEYS

A. Description: Double-wall metal vents tested according to UL 103 and rated for 1000 deg F continuously, or 1700 deg F for 10 minutes; with neutral or negative flue pressure complying with NFPA 211.

B. Construction: Inner shell and outer jacket separated by at least a 1 inch annular space filled with high-temperature, ceramic-fiber insulation.

C. Inner Shell: ASTM A 666, Type 304 stainless steel.

D. Inner Shell: ASTM A 666, Type 304 stainless steel.

E. Outer Jacket: Galvanized or aluminized steel.

F. Accessories: Tees, elbows, increasers, draft-hood connectors, terminations, adjustable roof flashings, storm collars, support assemblies, thimbles, firestop spacers, and fasteners; fabricated from similar materials and designs as vent-pipe straight sections; all listed for same assembly.

1. Termination: Round chimney top designed to exclude 98 percent of rainfall.

2.4 GUYING AND BRACING MATERIALS

A. Cable: Three galvanized, stranded wires of a size determined by the manufacturer.

PART 3 - EXECUTION

3.1 INSTALLATION OF LISTED VENTS AND CHIMNEYS

A. Locate to comply with minimum clearances from combustibles and minimum termination heights according to product listing or NFPA 211, whichever is most stringent.

B. Support vents at intervals recommended by manufacturer to support weight of vents and all accessories, without exceeding appliance loading.

3.2 CLEANING

A. After completing system installation, including outlet fittings and devices, inspect exposed finish. Remove burrs, dirt, and construction debris and repair damaged finishes.

B. Provide temporary closures at ends of breechings, chimneys, and stacks that are not completed or connected to equipment.

END OF SECTION 235100

SECTION 235416 - OIL-FIRED FURNACES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Oil-fired furnaces.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include rated capacities, operating characteristics, furnished specialties, and accessories.

B. Shop Drawings:

1. Include details of equipment assemblies. Indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
2. Include diagrams for power, signal, and control wiring.

1.3 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For each furnace to include in emergency, operation, and maintenance manuals.

PART 2 - PRODUCTS

2.1 OIL-FIRED FURNACES

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

1. Arcoaire; Carrier Global Corporation.
2. Carrier Global Corporation.
3. Comfort-Aire; a division of Heat Controller, Inc.
4. Comfortmaker; Carrier Global Corporation.
5. Heil; Carrier Global Corporation.
6. Lennox Industries, Inc.; Lennox International.
7. Ruud Air Conditioning Division.
8. Trane, Inc.
9. YORK; brand of Johnson Controls International plc, Building Solutions North America.

2.2 ASSEMBLY DESCRIPTION

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a qualified testing agency, and marked for intended location and application.

B. Manufactured Units: Factory assembled, piped, wired, and tested; complying with UL 727 and with NFPA 31.

2.3 FURNACES

A. Cabinet: Steel.

1. Cabinet interior around heat exchanger shall be factory-installed insulation.
2. Lift-out panels shall expose burners and all other items requiring access for maintenance.
3. Factory paint external cabinets in manufacturer's standard color.

B. Fan: Centrifugal, factory balanced, resilient mounted, direct drive.

C. Heat Exchanger: Welded steel with ceramic-fiber liner or refractory insert at the burner in the combustion chamber. Minimum 2-inch- diameter access ports in heat exchanger to permit access for cleaning.

D. Burner: High-pressure atomizing type, with rubber-mounted, adjustable, combustion-air blower; integrated fuel pump; hinged, flame-inspection port; cadmium-sulfide flame sensor; electrodes; ignition transformer; and oil nozzle.

1. Time-Delay Relay: Limits time for establishing main flame.
2. Flame Sensor: Monitors flame and stops burner on flame failure.
3. Limit Control: Fixed stop at maximum permissible setting; de-energizes burner on excessive bonnet temperature; automatic reset.

E. Furnace Controls: Solid-state board integrates ignition, heat, cooling, and fan speeds; and adjustable fan-on and fan-off timing; terminals for connection to accessories.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Examine factory-installed insulation before furnace installation. Reject units that are wet, moisture damaged, or mold damaged.

C. Examine roughing-in for oil piping systems to verify actual locations of piping connections before equipment installation.

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

3.2 INSTALLATION

A. Install oil-fired furnaces and associated fuel and vent piping according to NFPA 31.

B. Base-Mounted Units: Secure units to substrate. Provide optional bottom closure base if required by installation conditions.

3.3 CONNECTIONS

A. Install piping adjacent to equipment to allow service and maintenance.

B. Connect ducts to furnace with flexible connector.

3.4 STARTUP SERVICE

A. Complete installation and startup checks according to manufacturer's written instructions and perform the following:

1. Inspect for physical damage to unit casings.
2. Verify that access doors move freely and are weathertight.
3. Clean units and inspect for construction debris.
4. Verify that all bolts and screws are tight.
5. Adjust vibration isolation and flexible connections.
6. Verify that controls are connected and operational.

B. Start unit according to manufacturer's written instructions and complete manufacturer's operational checklist.

3.5 DEMONSTRATION

A. Train Owner's maintenance personnel to adjust, operate, and maintain condensing units. Refer to Section 017900 "Demonstration and Training."

END OF SECTION

SECTION 237223 - PACKAGED INDOOR FIXED PLATE ENERGY RECOVERY UNITS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Packaged, indoor, fixed-plate, total energy-recovery units.

1.2 ACTION SUBMITTALS

A. Product Data:

1. For each type of product.

B. Shop Drawings: For packaged, indoor, fixed-plate, energy-recovery units.

1. Include plans, elevations, sections, details, and mounting details.
2. Include details of equipment assemblies. Indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
3. Include diagrams for power, signal, and control wiring.

1.3 CLOSEOUT SUBMITTALS

A. Operation and maintenance data.

1.4 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace components of packaged, indoor, fixed-plate, energy-recovery units that fail in materials or workmanship within specified warranty period.

1. Warranty Period for Packaged Energy-Recovery Units: Two years.
2. Warranty Period for Fixed-Plate Total Heat Exchangers: 10 years.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. NFPA Compliance: Comply with NFPA 90A for design, fabrication, and installation of air-handling units and components.

B. UL Compliance:

1. Packaged heat-recovery ventilators shall comply with requirements in UL 1812 or UL 1815.
2. Electric coils shall comply with requirements in UL 1995.

C. Comply with UL 723.

2.2 PACKAGED, INDOOR, FIXED-PLATE TOTAL ENERGY-RECOVERY UNITS

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

1. Aldes Ventilation Corporation
2. Greenheck Fan Corporation.
3. RenewAire LLC.
4. Venmar; a brand of Nortek Air Solutions.

B. Surfaces in contact with the airstream shall comply with requirements in ASHRAE 62.1.

C. Housing: Manufacturer's standard construction with corrosion-protection coating and exterior finish, gasketed, hinged access doors with neoprene gaskets for inspection and access to internal parts, minimum 1-inch inch- thick, R 4.3 thermal insulation, knockouts for electrical connections, exterior drain connection, and lifting lugs.

D. Fixed-Plate Total Heat Exchanger:

1. Casing: Galvanized steel.
2. Plates: Evenly spaced and sealed and arranged for counter- flow.

    a. Plate Material: Chemically treated paper or polymer membrane with selective hydroscopicity and moisture permeability, and gas barrier properties.

E. Supply and Exhaust Fans: backward-inclined fan.

1. Motor and Drive: Direct driven.
2. Motor Sizes: Minimum size as indicated. If not indicated, large enough so driven load will not require motor to operate in service factor range above 1.0.

F. Motorized Dampers: Provide motorized dampers on supply air stream and exhaust air stream. Dampers shall open when unit operates and shall close when unit is off.

G. Filters:

1. Description: 2" Pleated factory-fabricated, self-supported, disposable air filters with holding frames, MERV 8 rated.
2. UL Compliance: Comply with UL 900.
3. Filter Mounting Frames: Arranged with access doors or panels on both sides of unit. Filters shall be removable from one side or lift out from access plenum.

a. Filters shall be provided on the outside air and the exhaust air, upstream of the core.

H. Wiring: Fabricate units with space within housing for electrical conduits. Wire motors and controls, so only external connections are required during installation.

1. Indoor Enclosure: NEMA 250, Type 12 enclosure contains relays, starters, and terminal strip.
2. Include nonfused disconnect switches.

I. Controls:

1. Control Board: Provide low voltage control board with contactors and wiring terminal strip to allow the unit to operate and turn on with an external signal.
2. Low-Voltage Transformer: Integral transformer to provide control voltage to unit from primary incoming electrical service.
3. Timeclock: Digital Time Clock, wall mount with up to 8 on/off cycles per day or 50 per week, 24VAC power, with battery backup protection.

2.3 SOURCE QUALITY CONTROL

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by an NRTL, and marked for intended location and application.

B. AHRI Compliance: Capacity ratings for air-to-air energy-recovery equipment certified as complying with AHRI 1060.

C. Fan Performance Rating: Comply with AMCA 211 and label fans with AMCA-certified rating seal. Factory test fan performance for airflow, pressure, power, air density, rotation speed, and efficiency according to AMCA 210/ASHRAE 51.

D. Fan Sound Ratings: Comply with AMCA 301 or AHRI 260 (IP). Air-handling unit fan sound ratings shall comply with AMCA 301 or AHRI 260 (IP).

E. UL Compliance:

1. Packaged fixed plate energy recovery units shall comply with requirements in UL 1812; or UL 1815.
2. Electric Coils: Comply with UL 1995.

PART 3 - EXECUTION

3.1 INSTALLATION OF PACKAGED, INDOOR, FIXED-PLATE ENERGY-RECOVERY UNITS

A. Examine casing insulation materials and filter media before packaged, indoor, fixed-plate, energy-recovery unit installation. Replace with new insulation materials and filter media that are wet, moisture damaged, or mold damaged.

B. Install packaged, indoor, fixed-plate, energy-recovery units, on mechanical mezzanine per manufacturer's installation instructions.

C. Install units with clearances for service and maintenance.

D. Do not operate fan system until filters (temporary or permanent) are in place. Replace temporary filters used during construction and testing with new, clean filters.

3.2 DUCTWORK CONNECTIONS

A. Comply with requirements for ductwork according to Section 233113 "Metal Ducts."

B. Connect duct to units with flexible connections. Comply with requirements in Section 233300 "Air Duct Accessories."

3.3 PIPING CONNECTIONS

A. Where installing piping adjacent to unit, allow for service and maintenance.

B. Condensate Drain Piping: . Pipe drains from drain pans to nearest floor drain, same size as condensate drain connection.

1. Construct deep trap at connection to drain pan, and install cleanouts at changes in direction.

3.4 ELECTRICAL CONNECTIONS

A. Install electrical devices furnished with units but not factory mounted.

B. Connect wiring according to Section 260519 "Low-Voltage Electrical Power Conductors and Cables."

C. Ground equipment according to Section 260526 "Grounding and Bonding for Electrical Systems."

D. Install electrical devices furnished by manufacturer, but not factory mounted, according to NFPA 70 and NECA 1.

E. Install nameplate for each electrical connection, indicating electrical equipment designation and circuit number feeding connection.

1. Nameplate shall be laminated acrylic or melamine plastic signs, as specified in Section 260553 "Identification for Electrical Systems."

3.5 CONTROL CONNECTIONS

A. Install control and electrical power wiring to field-mounted control devices.

3.6 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: Engage a factory-authorized service representative to test and inspect components, assemblies, and equipment installations, including connections.

B. Perform tests and inspections with the assistance of a factory-authorized service representative.

C. Tests and Inspections:

1. Operational Test: After electrical circuitry has been energized, start units to confirm proper motor rotation and unit operation.
2. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

D. Packaged, indoor, fixed-plate, energy-recovery units will be considered defective if it does not pass tests and inspections.

E. Prepare test and inspection reports.

3.7 DEMONSTRATION

A. Train Owner's maintenance personnel to adjust, operate, and maintain air-to-air energy-recovery units.

END OF SECTION 237223.19

SECTION 23 85 00 - WOOD SHOP EXHAUST COLLECTOR

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Dust Collector
2. Dust Collector Fan
3. Dust Collection Spark Detection/Suppression
4. Deflagration Isolation
5. Dust Collector Accessories

1.2 SUBMITTALS

A. Product Data: For each dust collection unit and respective accessory indicated.

1. Unit dimensions (include unit base anchor bolt pattern) and weight.
2. Cabinet material, metal thickness, finishes, and accessories.
3. Fans:
    a. Certified fan-performance curves, at project specific site altitude, with system operating conditions indicated.
    b. Certified fan-sound power ratings.
    c. Fan construction and accessories.
    d. Motor ratings, electrical characteristics, and motor accessories.
4. Filters with performance characteristics.
5. Electrical wiring diagrams.

B. Operation and maintenance data.

C. Duct system and spark detection and extinguishing system design and shop drawings.

1. Provide deflagration isolation on the clean and dirty air side of the collector. Secondary safety monitoring filters, spark detection and duct mounted suppression system design and layout in the project shop drawings. Show all required piping connections, electrical connections, ductwork, wiring, etc. Locate spark detectors and suppression heads for proper operation.

1.3 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

B. NFPA Compliance: Comply with NFPA 654 and NFPA 664 for design, fabrication, and installation of dust collection systems in wood working facilities. Comply with NFPA 69 Standard on Explosion Protection Systems and NFPA 68 Standard on Explosion Protection by Deflagration Venting.

C. ASHRAE Compliance: Applicable requirements in ASHRAE 62.1-2004, Section 5 - "Systems and Equipment" and Section 7 - "Construction and Startup.

D. Comply with NFPA 70 and NFPA 496.

1.4 WARRANTY

A. 12-year for the collector unit.

B. Manufacture’s standard warranty for the Explosion Isolation Valve.

1.5 PREFABRICATED ELEMENTS

A. The characteristics described in the technical binders are those that are defined during tests made by the manufacturer, or in his name by an independent laboratory, stating the respect for existing rules and regulations.

1.6 PURPOSE

A. Vertical cartridge dust collector with over-bags must be designed to collect, filter and store dust coming from wood working equipment. Manufacturer of collector must be certified to make, assemble, and distribute industrial air purification equipment. Dust collector must be made in accordance with safety rules and regulations. Written verification that collector and all safety components used in conjunction with have been tested as such, and follow NFPA standards, to be provided by manufacturer.

PART 2 - PRODUCT

2.1 MANUFACTURERS

A. Manufacturers: Must be compliant with requirements, provide products by the following:

1. Dust Collector:
   a. Camfil APC
   b. AQC
   c. AAF Flanders
      b. All other manufacturers MUST submit for alternate approval prior to bid, in accordance with bid documents "Substitution Request". In addition, the following documentation shall be REQUIRED for consideration as an alternate dust collection manufacture.
         i. Shop drawing of exact proposed equipment substitution, including dimensions and drafted duct connections/arrangement to demonstrate complete function within project conditions. General Literature is unacceptable.
         ii. Documentation from 3rd party NOTIFIED body of testing and compliance of proposed equipment with ALL applicable NFPA deflagration isolation requirements.
         iii. Verification that proposed substitution MEETS or EXCEEDS sq. ft. of media within the SAME size or SMALLER footprint as basis of design. Fan documentation verifying performance at given location required.
         iv. Verification that proposed cartridge dust collection unit will be provided with over bags.
         v. Written documentation for the substitution of the applicable Back Draft Damper, Detect and Suppress System, Rotary Airlock, Fast Acting Valve, Pinch Valve, Broken Bag Detection System, and Secondary Filtering System is complete and is provided with 3rd party certification for compliance with applicable NFPA standards, shown on computer drafted drawings, appropriately positioned for correct application with proposed alternate equipment. If additional life safety devices are deemed necessary, at the sole discretion of the ENGINEER, in conjunction with alternative equipment manufacture and, are not required by the basis of design, maintenance of such additional equipment shall be guaranteed to the OWNER, materials and labor,

for the life of the proposed substitution, and such guarantee shall be provided in writing and accompany the substitution request.

vii. Incomplete substitution requests will be rejected WITHOUT review as INCOMPLETE.

2. Dust Collector Fan
   a. New York Blower; -Baldor Super Premium E Motor, VFD Compatible
   b. Twin City Fan, VFD Compatible
   c. Other Qualified fabricator subject to compliance with requirements.
3. Spark Detection and Suppression System
   a. FLAMEX
   b. Other Qualified fabricator subject to compliance with requirements.
4. Inlet Isolation Device
   a. Camfil APC
   b. Other Qualified fabricator subject to compliance with requirements.

2.2 GENERAL DESCRIPTION

A. Furnish a completely packaged, fully assembled, pre-wired, inclusive remote mounted control package, dust collector complying with the performance conditions listed in the mechanical drawings and schedules.

2.3 DUST COLLECTOR

A. Job installation and units will conform to NFPA 664, 654, 69.

B. Collector:

1. The collector shall be vertical cartridge type, designed for continuous operation and automatic reverse-pulse cleaning. Construction shall be 10-gauge steel and heavier. Major sections shall be modular, bolted construction for maximum installation flexibility. Collector shall consist of:
   a. Filter module with inlet baffle, one hopper, 16" drum cover assembly, two 55-gallon drums (1 active, 1 storage) and legs.
   b. Custom Electrical Panel with VFD and static controls, dust collector cleaning controls and solenoid heaters.
   c. Fan
   d. INTEGRATED Riga-Flo Flame-Front Arrestor and Safety Monitoring Filter Module.

C. Filter Module and Hopper Section:

1. Filter module section shall contain cartridge elements, cartridge access doors, reverse-pulse cleaning components, cartridge sealing hardware, dirty-air inlet, support frame and side walls. Filter module and hopper section shall maintain integrity to +/- 25" w.g.
2. Cartridge access door shall incorporate "truck door" type operating hardware and require no tools when accessing cartridges. Door shall have "lock-out, tag-out" capability.
3. Filter Module shall have a dirty air inlet on one side. Air inlet shall be a low velocity (1,000fpm or less) and include a staggered-channel baffle to prevent large particles from impinging directly on the filters.
4. Pulse cleaning components shall include blow pipes, internal piping, compressed air header, solenoid valves and diaphragm valves. The solenoid housing shall be fitted with a thermostatically controlled, 1-amp heater (115V/1-phase) to prevent freeze-ups during cold weather.

5. Collector shall have a single hopper with discharge. Hopper wall angle shall be 60- degrees. Hopper outlets shall have drum-cover assemblies (DCA's) with latches for NFPA-compliance and 55-gallon drums. Support legs will allow a clearance to accommodate DCA's and drums.
6. Collector shall be supplied with explosion venting suitable for dusts with KST values of up to 200.
7. The collector parts shall be individually electrostatic powder painted and, once all parts are painted, the unit is fully assembled. There shall be no bare metal surfaces underneath any component. Color to be custom selected by architect.
8. Filter cartridges shall be self-positioning and each row shall be locked and sealed in place by means of cam locking bars with handles at the door end to easily lock and unlock cartridges into place. Cam bars to be supported by heavy-duty cast-iron support clips.
9. Cartridges will utilize a hot-melt bead between the pleats on clean-side of filter to maintain pleat spacing. Hot-melt beads will be spaced every inch along the entire height of cartridge. Each cartridge will have a minimum of 375 sq. ft. of filter media. Media shall be a blend of cellulose and 20% polyester and have an efficiency of at least 99.99% on 0.5 micron and larger particles. Filter media to be Extreme Polytech laminate. The cartridges shall seal to filter module tube sheet by means of double gaskets of a continuous, seamless design.

D. Cartridge over-bags shall be provided to act as a pre-filter to the primary cartridge protecting it from larger materials that tend to pack in pleated cartridges. Over-bag to be 7-micron nylon mesh.

E. Sawdust Collection System Control Box (Integrated Cleaning Controls with VFD and Static blower control):

1. VFD provides complete control of the blower during and after start-up. This method uses a set of points and feedback from sensor to automatically determine the speed at which it needs to operate.
2. The FDC Photohelic Controls with adjustments for pulse timing and duration, pulse pressure differential settings, auto fan-shutdown pulsing (with delay) and low and high static alarms. Display shall have digital and LED-analog displays of pressure differential, and LED display of differential cleaning set points as well as high and low alarm set points. Controls shall have a three-position switch for "OFF", "ON DEMAND", and CONTINUOUS cleaning. FDC controller shall be suitable for 115V/1-phase/60-Hz operation.
3. Fan Motor shall be premium-efficiency TEFC. Fan wheel shall be backward-inclined. Design performance: rated at 23 ft. elevation.

F. INTEGRATED Flame-Front Arrestor and Safety Monitoring Filter Module (Deflagration Isolation device and Secondary Filters):

1. Provide an integrated Riga-Flo safety filter factory-mounted to the top of the dust collector. The safety filter shall match the unit capacity. Unit will include filter access doors directly above the cartridge access doors with the same "truck door" type latching hardware. Riga- Flo filters shall utilize the same cam-bar locking system as the filter cartridges. Module shall meet NFPA standards 68, 654 and 664 to prevent both unintentional return of contaminated air to the facility and prevent transmission of energy from a fire or explosion to the building. Provide NFPA compliant testing information to meet the NFPA codes listed above. REMOTE Mounted Safety Monitoring Filters WILL NOT be accepted unless they are rated to performing both functions.

G. Interconnections:

1. Installer shall locate the custom electrical control boxes inside the wood shop as indicated and supply it with 120V/1-ph/60hz power sufficient to operate cleaning controls and 208V/3-ph/60Hz suitable for powering the fan motor via dust collector control panel. The interconnections required between the custom control box (located inside) and the collector (located outside) will include:
2. Two (2) wire (in conduit) from the GSX Touchscreen controller to the collector RPB solenoid box. (by E.C.)
3. Four (4) ¼" plastic UV resistant tubes. One (1) to the tap provided on the collector clean air plenum and one (1) to the tap provided on the collector dirty air plenum (static pressure reading across one filter bank). One (1) to the tap provided on dirty air side of Integrated HEPA and one (1) to the tap provided on the clean air side of the Integrated HEPA. (by M.C.)
4. Wiring (in separate conduit) as required by electrical code suitable for operating the 3-phase fan motor.
5. The piping contractor will be responsible for running 1" compressed air piping to collector air header (compressed air to be delivered at 15 SCFM at 90 psig).
6. Wire Flamex spark detection/suppression system to fire alarm system, if applicable (by E.C.).
7. Wire Flamex spark detection control panel to spark detectors (see plans for location). (by E.C.)
8. Wire from Flamex water nozzle solenoid to Flamex control panel. (by E.C)
9. Provide 120 Volt power to "Flamex" fire suppression spark detection panel.
10. Wire from Inlet Isolation Device to collector control panel (by E.C.).
11. Wire from explosion vent to dust collector control panel, if applicable. (by E.C.)
12. Pipe water from fire suppression system to duct suppression system (17 gpm at 44 psi residual required). (by M.C.)
13. All other wiring and piping require for proper operation or recommended by the manufacturer.

2.4 DUST COLLECTOR FAN

A. GENERAL DESCRIPTION

1. The fans shall be capable of operating over the entire range in accordance with the equipment schedule and as defined in AMCA Standard 99-2408. Fan wheels shall utilize non-overloading flat, single thickness blades in all sizes. Unless otherwise directed, fans shall be in compliance with the layout shown on the drawings.

B. PERFORMANCE

1. Fan ratings shall be based on tests made in accordance with AMCA Standard 210 and licensed to bear the AMCA certified ratings seal for air performance. Fans not licensed to bear the AMCA seal for performance shall be tested, at supplier's expense, in an accredited AMCA laboratory. (Option: Only AMCA certified fans will be accepted.) Fans shall have a sharply rising pressure characteristic extending throughout the operating range to assure quiet and stable operation. Fan brake horsepower shall be equal to or more than 11.

C. SOUND

1. Fan manufacturers shall provide sound power level ratings for fans tested and rated in accordance with AMCA Standards 300 and 301. Tests shall be performed in an accredited AMCA laboratory. Sound power ratings shall be in decibels (reference 10-12

watts) in eight octave bands. Sound power levels will be corrected for installation by the specifying engineer…dBA levels only are not acceptable.

D. CONSTRUCTION

1. Fan housings are to be heavy gauge, continuously welded construction. Housings with lock seams or partially welded construction are not acceptable. Housings are to be reinforced with rigid bracing to increase structural integrity and prevent vibration. Housing inlet cones shall be aerodynamically designed and spun providing a minimum separation of air flow. Wheel diameters and outlet areas shall be in accordance with the standard dimensions adopted by AMCA for centrifugal fans. Designs not in accordance with AMCA Standard 99-240 1 are not acceptable.

E. BEARINGS

1. Bearings are to be heavy duty, grease lubricated, precision anti- friction ball or spherical roller, self-aligning, pillow block design. Bearings shall be designed for a minimum L-10 life of 40,000 hours (200,000-hour L-50 life) when rated at the fan's maximum cataloged operating speed. (Optional: bearings to have mini- mum L-10 life of 250,000 hours.)

F. SHAFT

1. Shaft is to be ASTM A-108 steel, grade 1040/1045, precision turned, ground and polished. Grade 1018 steel is not acceptable. The shaft's first critical speed shall be at least 125% of the fan's maximum operating speed. The drive end of the fan shaft shall be counter-sunk for tachometer readings.

G. MOTOR

1. All motors furnished shall be designed, manufactured, and tested in accordance with the latest applicable standards of NEMA, ANSI, IEEE, and ASTM. As a minimum requirement, all motors shall conform to the latest applicable sections of NEMA Standard No. MG-1. Motors must meet or exceed CEE Premium Efficiency™ full load efficiencies. The Consortium for Energy Efficiency (CEE).
2. Motors shall be premium efficiency severe duty type, NEMA Design B.
3. Motor shall be TEFC, NEMA T frame, NEMA F1 assembly for horizontal applications and designed for the environment where the motor will be used.
4. Enclosures shall be rolled steel band or cast-iron construction depending on horsepower. End brackets shall be die cast aluminum with steel bearing inserts or cast-iron construction. Conduit box shall be die cast aluminum or cast-iron construction.
5. Motors shall have drain openings suitably located for the type of assembly being provided.
6. For frames 215 and above, shouldered lifting eyebolts or cast provisions within the frame shall be furnished for handling convenience.
7. Motor enclosures shall have a bi-directional, spark-proof, abrasion and corrosive resistant fan made of a material that is strong and durable. Fan will be keyed to shaft on frames 254 and above.
8. Motor nameplate shall be mounted on enclosure with stainless steel fastening pins. Nameplate shall have, as a minimum, all information as described in NEMA Standard MG-1-20.60.
9. Motor bearing numbers shall be included on nameplate. Motor connection diagram shall be attached to motor and easily readable.

H. PAINT

1. All fan surfaces are to be thoroughly prepared prior to painting using a combination of washing and hand and power tool cleaning as required. After cleaning, all surfaces are to be coated with an industrial grade alkyd enamel. Surfaces of bolted components not accessible after assembly shall be coated and allowed to dry prior to final assembly. Primer only will not be accepted.

I. FINAL INSPECTION

1. All fans shall receive a final inspection by a qualified inspector prior to shipment. Inspection to include fan description and accessories, balance, welding, dimensions, bearings, duct and base connection points, paint finish and overall workmanship.

2.5 DUST COLLECTION SPARK DETECTION

A. Furnish and install a spark detection and suppression system with to serve the dust collector exhaust system. The spark detection shall be a micro-processor based system designed to detect sparks. System must be Factory Mutual Approved, and approval report number must be listed.

B. CONTROL CABINET (basis-of-design):

1. Control Panel shall be the FLAMEX FMZ 5000 Console with capacity for two detection inputs and one extinguishing output. Incoming Power requirement shall be 110/60/1. The panel shall include a 24V DC 3 Amp power supply and Two (2)- 12V 2.5H Batteries to provide emergency back-up power for a minimum of 24 Hours to the panel in the event of loss of incoming power. The panel shall feature programmable shutdown capability for the interlocking or fans and associated equipment. The Panel shall be housed in an IP 66 (NEMA 12) enclosure and must be installed in a dry heated area.
2. Provide Two (2) YMX 5000 FUX OS Infrared Spark Detectors with automatic self-monitoring of detector lens capability. Detectors to be connected to One (1) YMX 5000 Control Unit to provide external LED indications of fire and fault. Detector Lens must be field removable and wear resistant. Detectors must be suitable for outdoor use in temperatures ranging from –40 Degrees F to 221 Degrees F.
3. Provide One (1) 1" Extinguishing Assembly complete with 21 VDC Solenoid Valve, Brass Y strainer with Stainless Steel Screen, and Ball Valve with Locking Strap, Lock and Key. The solenoid Valve shall be the slow closing type to eliminate water hammer. A Stainless-Steel Directional Spray Nozzle shall be provided as part of this Assembly which will produce a 180-degree Fan Shaped Spray Pattern. Stainless Steel mounting hardware for Nozzle shall also be provided. The Extinguishing Assembly must be capable of flowing a minimum of 17GPM at 44 PSI flowing pressure at the solenoid Valve. The extinguishing assembly will come equipped with an inline flow monitor capable of detecting a minimum water flow through the unit of 3L/minute.
4. The System shall be Factory Mutual Approved.
5. The control cabinet shall be programmed to allow the extinguishing system to function without interrupting production.
6. The control cabinet shall provide a constant visual readout of extinguishments during a specific period of time. A battery back-up emergency power supply will be provided to assure continued operation upon main power failure.
7. The control cabinet shall provide powered terminals for an external horn or light device, summation alarm and trouble dry contacts, trouble contacts for system disabled.
8. The system is to be installed consistent with the Manufacturers recommendations.

2.6 OTHER REQUIRED ACCESSORIES

A. Two (2), 55-gallon drums with 16" DRUM COVERS shall be provided with the dust collector.

B. Factory installed magnehelic gage to read the pressure across the main filter cartridge.

C. Explosion Isolation Valve to be installed on the dirty air inlet:

1. Camfil Stinger Explosion Isolation Valve.
   a. NFPA 69-2014, 654 and 664 continuous dust compliant.
   b. Written documentation from a NOTIFIED 3rd PARTY verifying NPFA compliance.
   c. Documentation indicating minimum and maximum distance valve must be installed from collector for proper operation.
   d. 12-gauge duct with flanged or welded connections required between Explosion Isolation Valve and Dust Collector.
   2. Purpose: Explosion Isolation Valves are designed to prevent flame front from propagating back through the ductwork to the occupied space in the event of a deflagration in the dust collector.

D. Refer to schedules on mechanical drawings for any additional information and accessories.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Assembly dust collection unit per the manufacture's installation guidelines.

B. Install in accordance with manufacturer's Installation & Maintenance instructions.

C. Use all factory provided lifting lugs to rig the units or modules. Ensure that spreader bars are used to prevent damaging the cabinets.

D. Lift modules in an upright position.

E. Level unit horizontally and vertically, using steel shims under legs where required. Shims shall have a corrosion resistant coating.

F. Support collector silencer and transition independently from the dust collector.

G. Contractor shall protect the dust collector inlet and outlet during construction to prevent construction debris from entering the collector prior to making duct connection to the unit. Do not operate fan system until filters are in place.

H. Connect exhaust and return ducts to dust collection unit, flexible connections shall not be used.

I. Perform preliminary start-up unit check per the dust collector manufacture's installation guidelines.

J. Check fan motors for rotation and amp draw for each phase. Record information on the start-up data sheets.

3.2 COMMISSIONING OF DUST COLLECTION SYSTEM

A. DESCRIPTION:

1. Purpose
   a. Verify operation and functional performance of the dust collector, accessories and controls for compliance with "Design Intent", as defined by the Contract Documents.
   b. Document system test and inspections
   c. Provide indirect support of the training of personnel for operation and maintenance of Dust Collection System and associated accessories and controls.

2. General
   a. Furnish labor to accomplish complete dust collection system commissioning as specified herein.
   b. Job Conditions: The commissioning contractor shall become familiar with the contract documents all Addenda and change orders issued for this project prior commencing the commissioning work.

B. QUALITY ASSURANCE:

1. Reference: ASHRAE Guideline 1P, "Guideline for Commissioning of HVAC System."
2. Qualifications: The "Commissioning Authority" shall be defined as a company or agency of experienced personnel, qualified to plan & carry out the overall commissioning progress.

C. DOCUMENTATION:

1. The Commissioning Authority shall obtain the following:

   a. Project plans and specification (contract documents), authorized revisions, shop drawings and submittals.

C. RESPONSIBILITIES OF OTHERS:

1. General Contractor

   a. General Contractor shall verify completeness of the building envelope, perimeter and interior items which effect proper operation and control of equipment and systems.
   b. The General Contractor will assure participation and cooperation of specialty contractors (electrical, building automation system, etc.) under his jurisdiction as required for the commissioning process.

2. Contractors Specialty

   a. Individual sub-contractors for the appropriate mechanical and electrical divisions – will be responsible for providing labor, material, equipment, etc., required within the scope of commissioning to facilitate the commissioning process when requested by the Commissioning Authority and directed by the General Contractor.

3. Owner/Operator

   a. Owner/Operator may schedule personnel to participate in commissioning process.

b. Owner/Operator will advise the Commissioning Authority regarding changes in building occupancy, usage, or functional requirements.

D. INSTRUMENTATION:

a. Instrumentation will be provided by the agency performing prior tests. Instruments will be operated by individual agency requested by the Commissioning Authority, as specified elsewhere herein.

E. ELECTRICAL SYSTEMS COMMISSIONING:

1. General Scope:

   a. Perform studies, field tests, and operational checks to assure that all electrical equipment is operational within industry and manufacturer's tolerances and is installed in accordance with design specifications.
   b. The tests and operational check shall determine the suitability for energization.
   c. Witness tests performed by the contractor to verify proper procedures are followed.

2. Test Report: Submit electronic copy of the completed report no later than fifteen (5) days after completion of test unless directed otherwise. The test report shall be bound and its contents certified.

   The test report shall include the following:

   1. Summary of project.
   2. Description of equipment tested.
   3. Description of test.
   4. Test results.
   5. Conclusions and recommendations.

3. Failure to Meet Test:

   1. Any system material or workmanship which is found defective on the basis of performance tests shall be reported directly to the Architect.
   2. Contractor shall replace the defective material or equipment and have test repeated until test proves satisfactory without additional cost to the Owner.

END OF SECTION 235100

SECTION 23 85 23 - DUST COLLECTOR DUCTS

PART 1 - GENERAL

1.1 SUMMARY

A. Refer to Division 23 Section “Metal Ducts” for duct requirements not related to dust collector ductwork requirements.

B. Section Includes:
1. Rectangular ducts and fittings.
2. Round ducts and fittings.
3. Sheet metal materials.
4. Sealants and gaskets.
5. Hangers and supports.

C. Related Sections:
1. Division 23 Section "Testing, Adjusting, and Balancing" for testing, adjusting, and balancing requirements for metal ducts.

1.2 PERFORMANCE REQUIREMENTS

A. Delegated Duct Design: Duct construction, including sheet metal thicknesses, seam and joint construction, reinforcements, and hangers and supports, shall comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible", NFPA 664 “Processes Operations and Special Systems”, NFPA 654 “Standard for the Prevention of Fire and Dust Explosions from the Manufacturing, Processing, and Handling of Combustible Particle Solids,” and performance requirements and design criteria indicated in "Duct Schedule" Article.

B. Structural Performance: Duct hangers and supports for horizontal ductwork serving the dust collection system shall meet NFPA 664 requirements for supporting the weight of the duct system plus the weight of the duct half filled with water or material being conveyed, whichever has the high density. Duct hangers and supports shall withstand the effects of gravity loads (duct weight plus water weight for horizontal dust collector ductwork) and stresses within limits and under conditions described in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible".

C. Airstream Surfaces: Surfaces in contact with the airstream shall comply with requirements in ASHRAE 62.1-2004.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings: Detailed shop drawings for dust collector exhaust air and return air (clean air back to the woodshop) ductwork.

1.4 QUALITY ASSURANCE

A. ASHRAE Compliance: Applicable requirements in ASHRAE 62.1-2004, Section 5 - "Systems and Equipment" and Section 7 - "Construction and System Start-Up."

B. ASHRAE/IESNA Compliance: Applicable requirements in ASHRAE/IESNA 90.1-2004, Section 6.4.4 - "HVAC System Construction and Insulation."

PART 2 - PRODUCTS

2.1 CLAMP-TOGETHER ROUND DUCTS AND FITTINGS

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

1. US Duct
2. Nordfab Ducting
3. KB Duct

B. General Fabrication Requirements:

1. Ductwork shall be of a clamp- together design using a die-formed, rolled edge which is then joined together by a single lever clamp of similar material unless otherwise noted. All clamp together ducting shall be of continuous laser welded construction along the longitudinal seam of the rolled form duct. All connections shall have PVC seal in clamp for standard installs.
2. Clamp together ductwork shall use flanged duct connections with gasket seals where noted in the duct schedule.
3. All clamp together ductwork shall maintain electrical continuity through the respective clamp together joint and shall not require the use of grounding each section of duct on each side of the respective joint.
4. Duct material sheet blanks shall be five feet long, which is then rolled and fused together with a laser weld process along the longitudinal seam.
5. The ends of the duct shall be pressed in a die to form a rolled bead on each end of the duct. This rolled end is used for clamping components together as well as reinforcement every 5 feet.
6. Straight duct and other connecting components to be constructed of galvanized sheets produced by the continuous galvanizing process which conforms to ASTM-A-527, and commercial quality ASTM A-527. Galvanized sheeting shall be produced with a minimum spangle.
7. Ducting constructed of stainless steel to be 304 2B finish (2B finish is annealed, pickled and bright cold rolled).

2.2 DUST COLLECTION FLOOR SWEEPS

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

1. Nordfab Ducting, Part Number 3248
2. US Duct
3. KB Duct
4. Other qualified fabricator subject to compliance with requirements

B. Galvanized sheet metal construction with closing door.

2.3 DIVERTER VALVES

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

1. Nordfab Ducting
2. US Duct
3. KB Duct
4. Other qualified fabricator subject to compliance with requirements

B. Electrical/pneumatic automatic diverter valve.
C. Electrical: 120 volt
D. Pneumatic: 75 psi minimum.

2.4 MANUAL BLAST GATES

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

1. Nordfab Ducting
2. US Duct
3. KB Duct
4. Other qualified fabricator subject to compliance with requirements

B. Manual blast gate with handle and no set screw shall be used to serve floor sweeps and bench sweeps. All other manual blast gates shall have a set screw.

2.5 FLEXIBLE RUBBER HOSE WITH STEEL COIL

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

1. Nordfab Ducting , RFH Hose
2. US Duct
3. KB Duct
4. Other qualified fabricator subject to compliance with requirements

B. Constructed of thermoplastic rubber and reinforced with wire helix.

C. Provide hose end adapters as specified on the mechanical drawings.

2.6 VIBRATION ISOLATOR

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

1. Nordfab Ducting, Part Number 3206
2. US Duct
3. KB Duct
4. Other qualified fabricator subject to compliance with requirements

2.7 RECTANGULAR DUCTS AND FITTINGS

A. General Fabrication Requirements: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" based on indicated static-pressure class unless otherwise indicated.

B. Transverse Joints: Select joint types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 1-4, "Transverse (Girth) Joints," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

C. Longitudinal Seams: Select seam types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 1-5, "Longitudinal Seams - Rectangular Ducts," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

D. Elbows, Transitions, Offsets, Branch Connections, and Other Duct Construction: Select types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Chapter 2, "Fittings and Other Construction," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

2.8 NON-CLAMP-TOGETHER ROUND DUCT & FITTINGS

A. General Fabrication Requirements: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Chapter 3, "Round, Oval, and Flexible Duct," based on indicated static-pressure class unless otherwise indicated.

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

a. Lindab Inc.
b. McGill AirFlow LLC.
c. SEMCO Incorporated.
d. Sheet Metal Connectors, Inc.
e. Spiral Manufacturing Co., Inc.
f. Other qualified fabricator subject to compliance with requirements.

B. Transverse Joints: Select joint types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-2, "Transverse Joints - Round Duct," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

C. Longitudinal Seams: Select seam types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-1, "Seams - Round Duct and Fittings," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

D. Tees and Laterals: Select types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-4, "90 Degree Tees and Laterals," and Figure 3-5, "Conical Tees," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

2.9 SHEET METAL MATERIALS FOR RECTANGULAR AND NON-CLAMP-TOGETHER ROUND DUCT & FITTINGS

A. General Material Requirements: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for acceptable materials, material thicknesses, and duct construction methods unless otherwise indicated. Sheet metal materials shall be free of pitting, seam marks, roller marks, stains, discolorations, and other imperfections.

B. Galvanized Sheet Steel: Comply with ASTM A 653/A 653M.

1. Galvanized Coating Designation: G90.
2. Finishes for Surfaces Exposed to View: Mill phosphatized.

C. Carbon-Steel Sheets: Comply with ASTM A 1008/A 1008M, with oiled, matte finish for exposed ducts.

D. Reinforcement Shapes and Plates: ASTM A 36/A 36M, steel plates, shapes, and bars; black and galvanized.

1. Where black- and galvanized-steel shapes and plates are used to reinforce aluminum ducts, isolate the different metals with butyl rubber, neoprene, or EPDM gasket materials.

E. Tie Rods: Galvanized steel, 1/4-inch minimum diameter for lengths 36 inches or less; 3/8-inch minimum diameter for lengths longer than 36 inches.

2.10 SEALANT AND GASKETS FOR RECTANGULAR AND NON-CLAMP-TOGETHER ROUND DUCT & FITTINGS

A. General Sealant and Gasket Requirements: Surface-burning characteristics for sealants and gaskets shall be a maximum flame-spread index of 25 and a maximum smoke-developed index of 50 when tested according to UL 723; certified by an NRTL.

B. Water-Based Joint and Seam Sealant:

1. Application Method: Brush on.
2. Solids Content: Minimum 65 percent.
3. Shore A Hardness: Minimum 20.
4. Water resistant.
5. Mold and mildew resistant.
6. VOC: Maximum 75 g/L (less water).
7. Maximum Static-Pressure Class: 10-inch wg, positive and negative.
8. Service: Indoor or outdoor.
9. Substrate: Compatible with galvanized sheet steel (both PVC coated and bare), stainless steel, or aluminum sheets.

C. Flanged Joint Sealant: Comply with ASTM C 920.

1. General: Single-component, acid-curing, silicone, elastomeric.
2. Type: S.
3. Grade: NS.
4. Class: 25.
5. Use: O.
6. For indoor applications, use sealant that has a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

D. Flange Gaskets: Butyl rubber, neoprene, or EPDM polymer with polyisobutylene plasticizer.

E. Round Duct Joint O-Ring Seals:

1. Seal shall provide maximum leakage class of 3 cfm/100 sq. ft. at 1-inch wg and shall be rated for 10-inch wg static-pressure class, positive or negative.
2. EPDM O-ring to seal in concave bead in coupling or fitting spigot.
3. Double-lipped, EPDM O-ring seal, mechanically fastened to factory-fabricated couplings and fitting spigots.

2.12 STEEL PIPE AND FITTINGS

A. Steel Pipe: ASTM A 53/A 53M, Type E or S, Grade A or B, Schedule 40, galvanized. Include ends matching joining method.

1. Drainage Fittings: ASME B16.12, galvanized, threaded, cast-iron drainage pattern.
2. Pressure Fittings:

a. Steel Pipe Nipples: ASTM A 733, made of ASTM A 53/A 53M or ASTM A 106, Schedule 40, galvanized, seamless steel pipe. Include ends matching joining method.
b. Malleable-Iron Unions: ASME B16.39; Class 150; hexagonal-stock body with ball-and-socket, metal-to-metal, bronze seating surface; and female threaded ends.
c. Gray-Iron, Threaded Fittings: ASME B16.4, Class 125, galvanized, standard pattern.
d. Cast-Iron Flanges: ASME B16.1, Class 125.

B. Cast-Iron, Flanged Fittings: ASME B16.1, Class 125, galvanized.

2.13 DUCT LINER

A. Fibrous-Glass Duct Liner: Comply with ASTM C 1071, NFPA 90A, or NFPA 90B; and with NAIMA AH124, "Fibrous Glass Duct Liner Standard."

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

    a. CertainTeed Corporation; Insulation Group.
    b. Johns Manville.
    c. Knauf Insulation.
    d. Owens Corning.
    e. Lewis and Lambert.

2. Maximum Thermal Conductivity:

    a. Type I, Flexible: 0.27 Btu x in./h x sq. ft. x deg F at 75 deg F mean temperature.
    b. Type II, Rigid: 0.23 Btu x in./h x sq. ft. x deg F at 75 deg F mean temperature.

3. Antimicrobial Erosion-Resistant Coating: Apply to the surface of the liner that will form the interior surface of the duct to act as a moisture repellent and erosion-resistant coating. Antimicrobial compound shall be tested for efficacy by an NRTL and registered by the EPA for use in HVAC systems.
4. Water-Based Liner Adhesive: Comply with NFPA 90A or NFPA 90B and with ASTM C 916.

    a. For indoor applications, use adhesive that has a VOC content of 80 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

B. Insulation Pins and Washers:

1. Cupped-Head, Capacitor-Discharge-Weld Pins: Copper- or zinc-coated steel pin, fully annealed for capacitor-discharge welding, 0.106-inch- diameter shank, length to suit depth of insulation indicated with integral 1-1/2-inch galvanized carbon-steel washer.
2. Insulation-Retaining Washers: Self-locking washers formed from 0.016-inch- thick galvanized steel; with beveled edge sized as required to hold insulation securely in place but not less than 1-1/2 inches in diameter.

C. Shop Application of Duct Liner: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 2-19, "Flexible Duct Liner Installation."

1. Adhere a single layer of indicated thickness of duct liner with at least 90 percent adhesive coverage at liner contact surface area. Attaining indicated thickness with multiple layers of duct liner is prohibited.
2. Apply adhesive to transverse edges of liner facing upstream that do not receive metal nosing.
3. Butt transverse joints without gaps, and coat joint with adhesive.
4. Fold and compress liner in corners of rectangular ducts or cut and fit to ensure butted-edge overlapping.
5. Do not apply liner in rectangular ducts with longitudinal joints, except at corners of ducts, unless duct size and dimensions of standard liner make longitudinal joints necessary.

6. Apply adhesive coating on longitudinal seams in ducts with air velocity of 2500 fpm.
7. Secure liner with mechanical fasteners 4 inches from corners and at intervals not exceeding 12 inches transversely; at 3 inches from transverse joints and at intervals not exceeding 18 inches longitudinally.
8. Secure transversely oriented liner edges facing the airstream with metal nosing's that have either channel or "Z" profiles or are integrally formed from duct wall. Fabricate edge facings at the following locations:

    a. Fan discharges.
    b. Intervals of lined duct preceding unlined duct.
    c. Upstream edges of transverse joints in ducts where air velocities are higher than 2500 fpm or where indicated.

9. Secure insulation between perforated sheet metal inner ducts of same thickness as specified for outer shell. Use mechanical fasteners that maintain inner duct at uniform distance from outer shell without compressing insulation.

    a. Sheet Metal Inner Duct Perforations: 3/32-inch diameter, with an overall open area of 23 percent.

10. Terminate inner ducts with buildouts attached to fire-damper sleeves, dampers, turning vane assemblies, or other devices. Fabricated buildouts (metal hat sections) or other buildout means are optional; when used, secure buildouts to duct walls with bolts, screws, rivets, or welds.

2.14 HANGERS AND SUPPORTS

A. All hangers and supports for serving the dust collection exhaust air ductwork shall be sized to support the weight of the ductwork plus the weight of water to fill the duct half full with water. Refer to the mechanical drawings for schedule of water weight per linear foot of duct.

B. Hanger Rods for Noncorrosive Environments: Galvanized or zinc-plated steel rods and nuts.

D. Strap and Rod Sizes: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible,"

E. Duct Attachments: Sheet metal screws, blind rivets, or self-tapping metal screws; compatible with duct materials.

F. Trapeze and Riser Supports:

1. Supports for Galvanized-Steel Ducts: Galvanized-steel shapes and plates.
2. Supports for Stainless-Steel Ducts: Stainless-steel shapes and plates.
3. Supports for Aluminum Ducts: Aluminum or galvanized steel coated with zinc chromate.

PART 3 - EXECUTION

3.1 DUCT INSTALLATION

A. Drawing plans, schematics, and diagrams indicate general location and arrangement of duct system. Indicated duct locations, configurations, and arrangements were used to size ducts and calculate friction loss for air-handling equipment sizing and for other design

considerations. Install duct systems as indicated unless deviations to layout are approved on Shop Drawings and Coordination Drawings.

B. Install explosion isolation valve not less than 7’ and no more than 32’ upstream of the dust collector inlet. Install explosion isolation valve per the manufacture’s installation guidelines.

C. Install ducts according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" unless otherwise indicated.

D. Install vibration isolator at each equipment connection as noted on the mechanical drawings.

E. Install diverter valves where indicated on the drawings per the manufacturers installation guidelines.

F. Install round ducts in maximum practical lengths.

G. Install ducts with fewest possible joints.

H. Install clamp together ductwork per the clamp together ductwork manufacturer’s guidelines.

I. Install factory- or shop-fabricated fittings for changes in direction, size, and shape and for branch connections.

J. Unless otherwise indicated, install ducts vertically and horizontally, and parallel and perpendicular to building lines.

K. Install ducts close to walls, overhead construction, columns, and other structural and permanent enclosure elements of building.

L. Install ducts with a clearance of 1 inch.

M. Where ducts pass through non-fire-rated interior partitions and exterior walls and are exposed to view, cover the opening between the partition and duct or duct insulation with sheet metal flanges of same metal thickness as the duct. Overlap openings on four sides by at least 1-1/2 inches.

N. Protect duct interiors from moisture, construction debris and dust, and other foreign materials. Comply with SMACNA's "Duct Cleanliness for New Construction Guidelines."

O. Install an electrical ground across each section of conductive duct where joint between ducts is non-conductive. Coordinate installation with the electrical contractor.

P. Support all ductwork.

3.2 INSTALLATION OF EXPOSED DUCTWORK

A. Protect ducts exposed in finished spaces from being dented, scratched, or damaged.

B. Trim duct sealants flush with metal. Create a smooth and uniform exposed bead. Do not use two-part tape sealing system.

C. Grind welds to provide smooth surface free of burrs, sharp edges, and weld splatter. When welding stainless steel with a No. 3 or 4 finish, grind the welds flush, polish the exposed welds, and treat the welds to remove discoloration caused by welding.

D. Maintain consistency, symmetry, and uniformity in the arrangement and fabrication of fittings, hangers and supports, duct accessories, and air outlets.

E. Repair or replace damaged sections and finished work that does not comply with these

requirements.

F. All exposed round duct shall be spiral seamed unless noted to be clamp together ductwork.
G. Support all ductwork.

3.3 DUCT SEALING

A. Seal ducts for duct static-pressure, seal classes, and leakage classes specified in "Duct Schedule" Article according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

3.4 HANGER AND SUPPORT INSTALLATION

A. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Chapter 4, "Hangers and Supports."

B. Building Attachments: Concrete inserts, powder-actuated fasteners, or structural-steel fasteners appropriate for construction materials to which hangers are being attached.

1. Where practical, install concrete inserts before placing concrete.
2. Install powder-actuated concrete fasteners after concrete is placed and completely cured.
3. Use powder-actuated concrete fasteners for standard-weight aggregate concretes or for slabs more than 4 inches thick.
4. Do not use powder-actuated concrete fasteners for lightweight-aggregate concretes or for slabs less than 4 inches thick.
5. Do not use powder-actuated concrete fasteners for seismic restraints.

C. Hanger Spacing: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Table 4-1, "Rectangular Duct Hangers Minimum Size," and Table 4-2, "Minimum Hanger Sizes for Round Duct," for maximum hanger spacing; install hangers and supports within 24 inches of each elbow and within 48 inches of each branch intersection.

D. Hangers Exposed to View: Threaded rod and angle or channel supports.

E. Support vertical ducts with steel angles or channel secured to the sides of the duct with welds, bolts, sheet metal screws, or blind rivets; support at each floor and at a maximum intervals of 16 feet.

F. Install upper attachments to structures. Select and size upper attachments with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.

3.5 START UP

A. Air Balance: Comply with requirements in Division 23 Section "Testing, Adjusting, and Balancing for HVAC."

3.6 DUCT SCHEDULE

A. Fabricate ducts with galvanized sheet steel except as otherwise indicated and as follows:
B. Exhaust Ducts:
1. Exhaust Air Ducts Connected to Dust Collector:

a. Round ductwork shall be clamp-together round duct and fittings. Flanged connections with gasket seals shall be used for all exterior exhaust air ductwork.
b. 30^{O} takeoffs shall be used in the dust collector exhaust ductwork.
c. Pressure Class: Negative 15-inch wg.
d. Minimum SMACNA Seal Class: C.
e. 12 ga.vanstone flange or welded duct required between Inlet Isolation Device and dust collector rated for 15 psi.

C. Return Ducts:

1. Return Air (Clean Air) Ducts Connected to Dust Collector:

a. Round ductwork shall be clamp-together round duct and fittings between dust collector and interior space. Flanged duct connections with gasket seals shall be used for all exterior return air ductwork.
b. Round and oval ductwork shall be spiral seam construction. Flanged duct connections with gasket seals shall be used for all return air ductwork.
c. Pressure Class: Positive 3-inch wg.
d. Minimum SMACNA Seal Class: C.

D. Intermediate Reinforcement:

1. Galvanized-Steel Ducts: Galvanized steel.

F. Transfer Ducts: Fibrous glass, Type I, 1 inch thick

G. Elbow Configuration:

1. Turning vanes shall not be used in exhaust air ductwork connected to the dust collector. Radius elbows shall be used for all rectangular elbows in exhaust air ductwork connected to the dust collector.
2. Rectangular Duct: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 2-2, "Rectangular Elbows."

a. Velocity 1000 fpm or Lower:
   1) Radius Type RE 1 with minimum 0.5 radius-to-diameter ratio.
   2) Mitered Type RE 4 without vanes.
b. Velocity 1000 to 1500 fpm:
   1) Radius Type RE 1 with minimum 1.0 radius-to-diameter ratio.
   2) Radius Type RE 3 with minimum 0.5 radius-to-diameter ratio and two vanes.
   3) Mitered Type RE 2 with vanes complying with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible, “Figure 2-3, "Vanes and Vane Runners," and Figure 2-4, "Vane Support in Elbows."
c. Velocity 1500 fpm or Higher:
   1) Radius Type RE 1 with minimum 1.5 radius-to-diameter ratio.
   2) Radius Type RE 3 with minimum 1.0 radius-to-diameter ratio and two vanes.
   3) Mitered Type RE 2 with vanes complying with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible,” Figure 2-3, “Vanes and Vane Runners," and Figure 2-4, "Vane Support in Elbows."

3. Rectangular Duct: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 2-2, "Rectangular Elbows."

a. Radius Type RE 1 with minimum 1.5 radius-to-diameter ratio.
b. Radius Type RE 3 with minimum 1.0 radius-to-diameter ratio and two vanes.

c. Mitered Type RE 2 with vanes complying with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 2-3, "Vanes and Vane Runners," and Figure 2-4, "Vane Support in Elbows."

4. Round Duct: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-3, "Round Duct Elbows."

a. Minimum Radius-to-Diameter Ratio and Elbow Segments: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Table 3-1, "Mitered Elbows." Elbows with less than 90-degree change of direction have proportionately fewer segments.

1) Velocity 1000 fpm or Lower: 0.5 radius-to-diameter ratio and three segments for 90-degree elbow.
2) Velocity 1000 to 1500 fpm: 1.0 radius-to-diameter ratio and four segments for 90-degree elbow.
3) Velocity 1500 fpm or Higher: 1.5 radius-to-diameter ratio and five segments for 90-degree elbow.
4) Radius-to Diameter Ratio: 1.5.

b. Round Elbows, 12 Inches and Smaller in Diameter: Stamped or pleated.
c. Round Elbows, 14 Inches and Larger in Diameter: Standing seam or Welded.

END OF SECTION 238523

DIVISION 26 - ELECTRICAL

SCOPE

The provisions, terms and requirements of Division 1 and 2, the applicable Drawings and Technical Specifications herein shall apply to work under this Division.

This Work consists of, but is not necessarily limited to, the furnishing of all labor, equipment, appliances and materials and the performance of all operations in connection with the installation of all electrical work completed, in strict accordance with Specifications and/or Drawings, applicable codes, including incidental materials necessary and required for their completion.

"PROVIDE" = Furnished and installed complete. "OR EQUAL" = Or equal as approved to quote by Engineer, 10 days prior to Bid.

260000 - COMMON WORK RESULTS

A. Intent of Drawings: Drawings are partly diagrammatic and do not show exact location of conduit unless specifically dimensioned.

B. Workmanship:

1. Work shall be accomplished by workmen skilled in particular trade, in conformance with best practices and accepted standards.
2. Work shall contribute to efficiency of operation, accessibility, maintenance and appearance. No part of installation shall interfere with operation of any other system or part of building.
3. Non-satisfactory work shall be corrected at no additional expense to Owner.

C. Responsibility:

1. The Electrical Contractor is responsible for installation of satisfactory and complete work in accordance with the intent of Drawings and Specifications. Provide, at no extra cost, incidental items required for completion of work even though not specifically mentioned or indicated in Specifications or on Drawings.
2. If, at any time, and in any case, change in location of conduit, outlets, fixtures, switches, panels, electrical equipment or associated components, etc., becomes necessary due to obstacles or installation of other trades, such required changes shall be made by Contractor at no extra cost.
3. Conflicts discovered during construction shall be immediately called to the attention of the Engineer for decision. Do not proceed with installation in area of question until conflict has been fully resolved.
4. Coordinate all electrical work with other trades to prevent unnecessary delays in the construction schedule.
5. Excavation and backfill required by electrical installations shall be accomplished in accordance with Division 2 by this Contractor.
6. Provide temporary electrical power and lighting for all trades that require service during the course of this Project. Provide temporary service and distribution as required. Comply with the NFPA 70 and OSHA requirements. (Energy costs by General Contractor.)

D. Guarantee-Warranty: This Contractor shall and hereby does warrant and guarantee:

1. That all work executed under this Section will be free from defects of materials and workmanship for a period of one year from the date of final acceptance of this work.
2. The Contractor agrees to, at the Contractor's own expense, repair and replace all such defective materials and work and all other work damaged thereby which becomes defective during the term of warranty. Agreement does not include damages done by Owner.

E. Permits, Tests, Codes and Standards:

1. Electrical Contractor to pay for all permits and fees in connection with this work.
2. WORK SHALL BE IN ACCORDANCE WITH THE MOST RECENT EDITIONS OF ADOPTED LOCAL, STATE AND NATIONAL CODES AND ORDINANCES, THE STATE FIRE MARSHAL, AND UTILITY COMPANY REGULATIONS.
3. Electrical work shall conform to National Electrical Codes, latest editions, as a minimum requirement.
4. All material to conform with applicable standards.

F. Discrepancies: Prior to submitting Bid, Contractor shall refer any apparent discrepancies or omissions to engineer for clarification.

G. Prior Approvals: All proposed substitutions shall be received by the Engineer **10 days prior to Bid. Priors received after 3 p.m. of the 10th day will be rejected**. Supply technical data, photometrics and dimensional Drawings showing that substitutes are equal to product specified.

H. Shop Drawing Submittals:

1. In addition to distribution requirements for submittals specified in Division 1 Section "Submittals," submit Electronic Drawings in pdf format for final and official approval through the General Contractor as listed below.

   Additional copies may be required by individual Sections of these Specifications. Copies of price list sheets are not acceptable. Manufacturer's name and address must appear on each sheet. All copies shall be legible.

   Shop Drawings shall include a completed specification sheet of all equipment along with fabrication, installation drawings, setting diagrams, schedules, patterns, templates and similar Drawings.

I. Project Close-Out Record Documents:

1. Provide three full size sets, unless more are called for under Division 1 (one for Engineer and one for Owner). In addition to requirements called for under Division 1, indicate the following installed conditions:

   a. Actual location of all electrical service gear/feeders, panel/motor/special equipment feeders, all major underground or underslab conduits, all conduit stubs for future use, any change in branch circuitry from Drawings, key junction boxes and pull boxes not indicated on Drawings, any control locations or indicator lights not shown on Drawings.

b. Addendum items, change order items and all changes made to Drawings from Bidding phase through to Project completion.
c. Actual equipment and materials installed. Where manufacturer and catalog number are indicated on Drawings, generally or in fixture or equipment schedules, change to reflect actual products installed.
d. Change service panel and branch panel breaker locations and schedules to reflect actual installed conditions.

J. Project Close-out Maintenance Manuals:

1. Prepare 3 copies, unless more are called for under Division 1 (one for Engineer, two for Owner). In addition to requirements under Division 1, provide heavy duty, durable 3-ring vinyl covered loose-leaf binder for each manual sized to receive 8.5 inch by 11 inch paper. Provide a clear plastic sleeve on the spine to hold labels and pockets in the cover to receive folded sheets. In manual, include all Shop Drawings, installation/operation/maintenance data furnished with electrical equipment, voice/data test reports, and letters from manufacturer's representatives that the fire alarm, has been completed and tested to satisfy requirements/codes. List project name, date, and Contractor's name, address and telephone number. Include index sheet for each Specification Section indicating equipment, with supplier and supplier's telephone number. Provide tabbed dividers indicating major groupings of equipment.
2. Turn over to Owner all spare equipment and devices specified and shown.

K. Supporting Equipment:

1. Unless otherwise indicated, fasten electrical items and their supporting hardware securely to the building structure, including conduits, raceways, cables, cable trays, busways, cabinets, panelboards, transformers, boxes, disconnect switches, and control components. Fasten by means of wood screws or screw-type nails on wood, toggle bolts on hollow masonry units, concrete inserts or expansion bolts on concrete or solid masonry, and machine screws, welded threaded studs, or spring-tension clamps on steel. Threaded studs driven by a power charge and provided with lock washers and nuts may be used instead of expansion bolts and machine or wood screws. Do not weld conduit, pipe straps, or items other than threaded studs to steel structures. In partitions of light steel construction, use sheet metal screws. All device boxes in sheetrock walls will be tight before, during and after installation of sheetrock.
2. Provide supports for electrical items in accordance with NFPA 70 and all other applicable codes.
3. Contractor responsible for providing watertight conduit penetrations at all watertight walls, floors roofs and membranes. Contractor also responsible to maintain fire rating of walls, floors, roofs and membranes penetrated.
4. When applicable, center within insulation any electrical conduit routed in attic space. Provide sealing as per NFPA 70 300-7 for all conduits exposed to different temperatures.

L. Electrical Identification:

1. Apply circuit/control/item designation labels of engraved plastic laminate for disconnect switches, breakers, pushbuttons, pilot lights, motor starters, panelboards and main control panel and similar systems.
2. Identify all 120 VAC and 208 VAC power receptacle cover plates with panel and circuit number utilizing a clear label with black designations. Designation example: L1-38.

3. Identify underground exterior electrical circuits by installation of continuous underground plastic marker, 6 - 8 inches below grade.

260300 - REMODEL WORK

A. The Contractor shall carefully examine the Drawings and Specifications, visit the project site, and make note of all existing conditions, dimensions and limitations prior to Bid and make allowances thereto.

B. No Change Orders will be issued for Contractor's failure to visit site, remodel work necessary for a complete installation of systems shown, and due to Contractor's lack of understanding of amount or difficulty of work involved.

C. The Contractor shall also notify all corporations, companies, individuals or local authorities owning, or having jurisdiction over existing utilities and services which interfere in any manner with the execution of the work under this Contract, and shall remove, relocate or protect such utilities or equipment as required by the parties having jurisdiction over same.

D. If existing active or nonactive services (which may not be shown on plans) are encountered that require relocation or disconnecting, the Electrical Contractor shall make written request for decision on proper handling of the services. The Electrical Contractor shall not proceed with the work until so authorized by the Architect.

E. When areas of the existing buildings are adjacent to the area of construction in which work is going on and are occupied, then this Contractor shall arrange the work so as to reduce to a minimum the periods of interruption or outages in the various services.

F. Not less than one week before any system is to be put out of service, the Contractor shall notify and coordinate with other trades and the Owner of such necessity including the extent of the work to be done during the outage, possible length of time required for that phase of the work, and the desired time at which the outage is to begin.

G. Balance additional loads to existing circuitry between phases. Furnish a revised, typed panel directory on existing panelboards where loads have been added or changed on this project.

H. Carefully lay out all work in advance to minimize cutting, channeling or drilling. Where necessary, all cutting and patching shall be done in a manner approved by the Architect. Do not endanger the stability of the structure. Restore any damaged surfaces to original conditions. Contractor at fault to assume all costs.

I. Remove or relocate existing conduits, wires, equipment, devices or fixtures indicated on Drawings and as required by remodel operations. Where the reuse of existing conduits, wires, devices, or fixture is permitted, verify that wiring is continuous. Existing outlets or junction boxes shall not be rendered inaccessible by structural changes made to the building.

J. Where existing walls are being furred out or refinished, extend existing outlets and devices to new surface as required.

K. Existing equipment which is indicated as being removed and not indicated for re-use shall be disposed of unless stated otherwise. Light fixture ballasts may contain PCB's and shall be disposed of according to environmental regulations.

260519 - CONDUCTORS AND CABLES

A. Submit Shop Drawings in accordance with the "Common Work Results" Section.

B. Feeders: Copper THHN-THWN. Solid for No. 10 AWG and smaller; stranded for No. 8 AWG and larger.

C. Branch Circuits: Copper THHN-THWN. Solid for No. 10 AWG and smaller; stranded for No. 8 AWG and larger.

D. Multiconductor Cable: Copper Type AC and Type MC with separate insulated ground wire.

E. Aluminum conductors are not acceptable.

F. Conductor Insulation: Comply with NEMA WC 70 for types THHN-THWN. Utilize other types of insulation only where specifically noted or required by code for the installed condition.

G. Tighten electrical connectors and terminals, including screws and bolts, in accordance with manufacturer's published torque tightening valves or as specified in UL Codes.

H. Color code secondary service, feeder, and branch circuit conductors with factory applied color as follows:

208y/120 Volts	Phase
Black	A
Red	B
Blue	C
White	Neutral
Green	Ground

260526 - GROUNDING AND BONDING

A. Submit Shop Drawings in accordance with the "Common Work Results" Section.

B. Install separate insulated equipment grounding conductors for feeder and branch circuits in compliance with NFPA 70 Article 250.

C. additional grounding requirements and comply with NFPA 70 and all other applicable codes/standards.

260533 - RACEWAYS AND BOXES

A. Submit Shop Drawings in accordance with the "Common Work Results" section.

B. Conduit Raceway:

1. Indoors, use the following, unless otherwise stated:

    a. Concealed: EMT or MC cable.
    b. Exposed: EMT, IMC or RMC.
    c. Connection to vibrating equipment: Flexible metal conduit.

2. Outdoors, use the following, unless otherwise stated:

    a. Concealed: RMC or IMC.
    b. Exposed: RMC or IMC.
    c. Underground: Schedule 40 PVC with Schedule 80 PVC fittings.
    d. Connection to Vibrating Equipment: Liquid tight flexible metal conduit.

3. **ENT IS NOT ALLOWED**.
4. Conceal conduit and cable, unless otherwise noted; conduit is permitted to be exposed in equipment rooms. All conduits shall have insulated ground wire installed. Do not install conduit embedded in slabs. EMT fittings shall be steel, compression or set screw type. All raceways shall be installed and supported in accordance with NFPA 70 and applicable codes.

C. Outlet Boxes:

1. Conform to UL 514A, "Metallic Boxes, Electrical," and UL 514B, "Fittings for Conduit and Outlet Boxes." Outlet boxes shall be metallic and installed flush in all areas, except mechanical rooms, above lay-in ceilings, or as otherwise indicated. Minimum size to be 4 inches square by 2-1/8 inches deep. Boxes shall be of type, shape, size and depth to suit each location and application. All fittings shall be steel.

D. Pull and Junction Boxes:

1. Comply with UL 50, "Electrical Cabinets and Boxes," for boxes over 100 cubic inches volume. Boxes shall have screwed or bolt-on covers, shall be suitable for the intended application and shall be labeled.

E. All materials shall be UL listed, appropriate for intended application. Entire raceway system shall be in accordance with NFPA 70, ANSI, NEMA, UL, and all other applicable codes.

262716 - SERVICE ENTRANCE

A. Submit Shop Drawings in accordance with the "Common Work Results" Section.

B. Install service-entrance equipment as indicated, in accordance with equipment manufacturer's written instructions, and with recognized industry practices, to ensure that service-entrance equipment fulfills requirements. Comply with applicable installation requirements of NFPA 70, UL, ANSI, IEEE, and NEMA standards.

C. Tighten electrical connectors and terminals, including screws and bolts, in accordance with equipment manufacturer's published torque tightening values for equipment connectors. Where manufacturer's torquing requirements are not indicated, tighten connectors and terminals to comply with tightening torques specified in UL Standards 486A, and the NFPA 70.

262416 - PANELBOARDS

A. Submit Shop Drawings in accordance with the "Common Work Results" Section.

B. Manufacturer: Siemens, Square-D, GE or Cutler Hammer.

C. Load centers are not acceptable unless specifically noted.

D. Branch Panelboards shall have aluminum bus including neutral and ground bars. Breakers shall be bolt on type. All 3-pole breakers 50 amp and larger shall have minimum feature of a thermal magnetic adjustment. Features: Provide hinged front cover and hinged door (door in door) and feed through lugs. If indicated on the Panel Schedule, provide internal SPD with a 120 kA per phase surge rating and protect L-N, L-G and N-G modes; include status indicator.

E. Distribution Panelboards shall have aluminum bus including neutral and ground bars. Breakers shall be bolt on type for 125A and smaller. Breakers larger than 125A shall be bolt-on circuit breakers; plug-in circuit breakers where individual positive-locking device requires mechanical release for removal. All 3-pole breakers 50 amp and larger shall have minimum feature of a thermal magnetic adjustment. Breakers with 1200 amp frame or larger shall be equipment with an Arc Flash Energy-reducing maintenance switching with local status indicator. Provide hinged front cover and hinged door (door in door). If indicated on the Panel Schedule, provide internal SPD with a 120 kA per phase surge rating and protect L-N, L-G and N-G modes; include status indicator.

F. Provide typed circuit schedules for existing panelboards where loads have changed and framed, typed circuit schedules for all new panelboards with identification of items controlled by each individual breaker. Indicate room numbers of items controlled or room name where appropriate for Owner's convenience.

262726 - WIRING DEVICES

A. Submit Shop Drawings in accordance with the "Common Work Results" Section.

B. Acceptable Manufacturers: Pass & Seymore, Bryant, GE, Hubbell, Leviton.

C. Devices:

1. General light switches shall be 20 amp, 120/277 volt AC rated and **Industrial Grade**.
2. General receptacles shall be self grounding 5-20R and **Industrial Grade**. GFCI receptacles shall be 20 amp feed through type with two utilization points. Do not connect downstream devices to load side of GFCI.
3. General device color shall be **white**.

D. Device Plates:

1. Device plates shall have opening for device intended and shall be **Lexan**. General device color shall be **white**.
2. All device plates shall have a clear label with the panel and circuit number designation in black.

3. Weatherproof receptacle covers shall be a corrosion resistant die cast metal, minimum 3 inch deep, flip cover with latch and with pad locking provisions.

262813 - OVER CURRENT PROTECTION DEVICES

A. Submit Shop Drawings in accordance with the "Common Work Results" Section.

B. Fuses:

1. Motor or combination motor/branch circuit: UL listed RK-5.
2. Feeder Loads: UL listed RK-1.
3. Plug fuses shall be dual element Type S with adapter.
4. Manufacturer: Bussman, Gould, Littlefuse or Brush.

262816 - CIRCUIT AND MOTOR DISCONNECTS

A. Submit Shop Drawings in accordance with the "Common Work Results for Electrical" Section.

B. Manufacturer: Same as panelboard manufacturer.

C. Disconnects shall be heavy duty type with Class R rejection feature when required to be fusible. Voltage rating shall be at or greater than the application voltage. Provide NEMA 3R enclosure for exterior locations. Service switches shall be UL listed for use as service equipment.

262913 - MOTOR CONTROLLERS

A. Submit Shop Drawings in accordance with the "Common Work Results" Section.

B. Manufacturer: Same as panelboard manufacturer.

C. Unless scheduled otherwise, 3/4 horsepower or less single-phase motors shall have 1 HP rated manual toggle starters with thermal overload protection sized for the motor in accordance with NFPA 70. Provide pilot light for manual starters not in sight from motor. Units located at the exterior of the building shall be NEMA 3R rated.

D. Starters shall be across-the-line magnetic type, combination starter/disconnect, FVNR, and HP rated, unless otherwise scheduled. Starter shall have solid state adjustable and resetable overload protection on all phases, constructed of one-piece Class 20 construction. Provide 120 volt control, H-O-A and interlocks where indicated on schedules. Provide two N/O auxiliary contacts. Units located at the building exterior shall be NEMA 3R rated.

E. All motor controllers shall be UL listed and installed in accordance with NFPA 70, NEMA, and manufacturer's recommendations.

265100 - LIGHTING

A. Submit Shop Drawings in accordance with the "Common Work Results" Section.

B. Manufacturer, model, style, color, size, etc., as scheduled. If no color has been selected, provide fixture with the standard finish as published by the manufacturer. All fixtures to be supplied as complete, housing, sockets, lamp holders, internal working, wire guards, lens guards, diffusing materials or lenses, pendants, hangers, canopies, aligners, end caps, ballasts and emergency battery packs, plaster frames, recessing boxes, hold down clips, anchor bolts, etc. Install plumb and true, free of light leaks, warps, dents and other irregularities.

C. Support for Suspended Fixtures: Brace pendants and rods over 48 inches long to limit swinging. Support stem-mounted, single-unit, suspended fluorescent fixtures with twin-stem hangers. For continuous rows, use tubing or stem for wiring at one point and tubing or rod for suspension for each unit length of chassis, including one at each end.

D. Surface-mounted light fixtures attached to a ceiling grid shall be attached with positive clamping devices that completely surround the supporting members. Safety wires shall be attached between the clamping device and the adjacent ceiling hanger or to the structure above.

E. LED Modules:

1. Comply with ANSI C78.377, UL 8750, IES LM-79 and IES LM-80.
2. CRI minimum of 80 or as scheduled.
3. Efficiency: 100 Lumens per watt minimum for downlights and 90 lumens minimum per watt minimum for other fixture types or as schedule on the drawings.
4. Rated life of minimum 50,000 hours minimum or as scheduled.
5. Fully serviceable and upgradable Light Engine.
6. Warranty: 3-year minimum for all fixture components.

F. LED Drivers:

1. LED Driver/Power Supply: Integral high efficiency driver with power supply of 120V-277v input 60HZ. Power factor greater than 0.9 at full load. Drive current at 1000ma maximum. Class 2 power supply. Dimming utilizing 0-10V dimming control. Provide continuous flicker free dimming from 100 percent to 10 percent. The driver shall be capable of being serviced through the aperature for downlight applications.
2. Warranty: 3-year minimum for all fixture components.

SECTION 310000
EARTHWORK

PART 1 - GENERAL

1.2 GENERAL REQUIREMENTS

A. This section describes general requirements for all types of earthwork and is applicable to all earthworks required on the project.

1.3 CLASSIFICATION

A. All excavation is unclassified. The terms earthwork or excavation include all materials excavated or removed regardless of material characteristics. The Contractor shall make his own estimate of the kind and extent of materials, which will be encountered in the excavation.

1.4 QUALITY CONTROL ASSURANCE

A. Soils and Backfill: Moisture density standard ASTM D1557 or AASHTO T-180 Method "D", unless otherwise specifically approved.
B. In-place Density Determination: Sandcone method ASTM D1556 or Nuclear Method ASTM D2922.
C. Classification of Soils ASTM D2487.
D. Quality assurance monitoring of subgrade backfill and embankment materials shall be paid for by the Owner.
E. Minimum frequency for testing is indicated below. Additional testing may be necessary depending on circumstances and failure rate.

1. Mechanical Analysis on Imported Material
   a. One sample for approval, prior to use of the following, plus regular checks as shown:

Material	Frequency
Backfill gravel	One per 2000 tons
Foundation gravel	One per 600 L.F.
Bedding, all types	One per 600 L.F.
Crushed Top Course	One per 1000 tons

2. Mechanical Analysis on Native Soils
   a. Street Improvements - minimum one per 600 feet on in place material prior to compaction.
3. Density - Trench Backfill
   a. Dedicated Rights of Way - 3 per 300 L.F. of trench @ spring line, mid trench and surface.

b. Easements, one at spring line per 300 L.F.

4. Density - Street and Road Construction
   a. One test per 400 L.F. on each lift of classified fill and backfill.
   b. One test per 400 L.F. on completed subgrade prior to approval of concrete pour, or placement of leveling course.

1.5 SUBMITTALS

A. Import backfill gradation and moisture density compaction curve test reports.
B. Embankment and native backfill materials gradations and moisture density standards curve test reports.
C. Certification of gradation and compliance with referenced standards, and moisture density standards test reports from qualified testing laboratory.
D. Density test results in approved format.
E. If at any time the Contractor changes the source and/or stockpile from which materials are obtained, certificates of gradation for these new sources will also be required. The Contractor shall make allowances in his unit prices bid for these items to cover expenses incurred in having this certification made and no additional compensation will be allowed.
F. During construction, the Owner may elect to have further gradation testing completed on the materials being furnished by the Contractor. This testing will be at the expense of the Owner, however, the Contractor shall provide material samples as may be necessary to complete this testing and these material samples will be furnished from material available on the job site or from the Contractor's source and/or supplier.

PART 2 - PRODUCTS

2.1 BACKFILL MATERIALS

A. These materials shall be native materials and as described in this section.

2.2 GRAVEL BEDDING MATERIAL

A. Bedding material shall be a locally available clean natural occurring or crushed sand/gravel mixture free from organic matter and conforming to the following gradation when tested in accordance with ASTM D422.

U.S. Standard Sieve Size	Percent Passing, by Weight
3/4"	100
3/8"	70 - 100
No. 4	55 - 100
No. 10	35 - 95
No. 20	20 - 80

No. 40	10 - 55
No. 100	0 - 10
No. 200	0 - 3

B. Aggregate material conforming to "Standard Specifications for Highway Construction", latest edition of the Alaska Department of Transportation and Public Facilities, untreated base classification D-1, will be acceptable in lieu of the gradations specified in paragraph 2.2A.

2.3 BACKFILL GRAVEL

A. Backfill gravel shall be naturally occurring screened or crushed gravel. It shall be free from muck, frozen material, roots, sod or other extraneous or objectionable materials. It shall have such characteristics of size and shape that it will compact readily. It shall have a plasticity index not greater than six (6).

B. All material shall have maximum size of four (4) inches and not more than ten (10) percent shall pass a No. 200 sieve. The percent of minus 200 will be determined on minus three (3) inch material.

C. Tallying for pay quantities shall be as established by the Contractor and Engineer prior to construction.

2.4 CRUSHED AGGREGATE BASE COURSE

A. Aggregate shall be crushed stone or crushed gravel, and shall consist of sound, tough, durable pebbles or rock fragments of uniform quality. All material shall be free from clay balls, vegetable matter or other deleterious matters. In addition, aggregate shall meet the following requirements:

Percent of Wear	AASHTO T-96	50 max.
Degradation Value	ATM T-13	45 min.
Percent Fracture	ATM T-4	70 min.

B. Crushed aggregate base course shall meet the requirements of the State of Alaska "Standard Specifications for Highway Construction", latest edition, section 703-2.03. Gradation shall conform to the requirements of grading D-1 unless otherwise specified.

C. A special gradation, E-1, for gravel road applications only shall meet all the requirements for grading D-1 except the percent passing the No. 200 sieve shall be between 6-10%.

2.5 SHOT ROCK EMBANKMENT

A. Shot rock embankment shall be naturally appearing blasted rock from a quarry. It shall generally be 6” minus in size except that the top 6 inches of the embankment shall be 3 inch minus.

2.6 RIPRAP

A. Riprap shall consist of broken stone, concrete in sacks, or concrete slabs placed on shoulders, slopes or such other places as may be indicated in the Plans or as directed by the Engineer.

B. The stone for loose riprap shall be hard, sound and durable. It shall be free from segregation, seams, cracks, and other defects tending to destroy its resistance to weather.

C. Spalls are defined as broken rock in sizes ranging from 3" to 1/3 cubic foot. Loose riprap shall be free of rock fines, soil or other extraneous material.

D. Should the riprap contain insufficient spalls within the definition and gradation requirement listed above, the Contractor shall furnish and place supplementary spall material from a source approved by the Engineer, at the Contractor's expense.

E. The grading of the riprap shall be determined by the Engineer by visual inspection of the load before it is dumped into place, or, if so ordered by the Engineer, by dumping individual loads on a flat surface and sorting and measuring the individual rocks contained in the load.

F. Stone shall be hard angular quarry and have a percentage of wear of not more than 50 at 500 revolutions as determined by ASTM C-535. The least dimension of any piece of stone shall be not lee than 160 pounds per dry cubic foot. Rock shall have an absorption rate greater than 2.5% as determined by ASTM C 97-83.

G. The riprap stone shall form a smooth gradation curve without a large spread between median and maximum sizes and shall have the following gradation limits.

1. CLASS I – No more than 10% of the stones by total weight shall weigh more than 400 pounds per piece and o more than 15% by weight of the stones shall weigh less than 50 pounds per piece. The stones shall be evenly graded and a minimum of 50% by weight of the stones shall weigh 200 pounds or more per piece.

2. CLASS II – The following gradation is required:

Specific Stone Size Stone Wt. (lbs)	Percent Smaller By Weight %
300	100
150	50 - 80
75	20 - 50
50	0 - 20

3. CLASS III – No more than 10% by total weight of the stones shall weigh more than 140 lbs each, and not more than 50% by total weight of the stones shall weigh less than 70 lbs each.

PART 3 - EXECUTION

3.1 BEDDING MATERIALS

A. Bedding materials shall be placed in accordance with the requirements for the utility being installed. Refer to appropriate utility specification section.

3.2 CRUSHED AGGREGATE BASE COURSE

A. Conform to Section 301 of the AKDOT&PF, SSHC except as follows for placement requirements.

1. Density requirement shall be 95% of the maximum density as determined by WAQTC FOP for AASHTO T180 or ATM 212.

3.3 SHOT ROCK EMBANKMENT

A. Embankment shall be placed in lifts whose loose thickness does not exceed 2 feet. Material shall be dumped on the existing fill and dozed into place. In addition to mechanical compaction, it shall be compacted by routing the hauling and placing equipment over the entire area prior to placing the next lift.

3.4 RIPRAP

A. A footing trench shall be excavated along the toe of the slope when shown on the plans. The stones shall be handled or dumped into place so as to secure a stone mass of the thickness, height, and length shown on the plans, or as staked with a minimum of voids.
Undesirable voids shall be filled in with small stones or spalls. The rock shall be manipulated sufficiently by means of a bulldozer, rock tongs, or other suitable equipment to secure a reasonably regular surface and mass stability.

B. Riprap protection shall be placed to its full course thickness at one operation and in such a manner as to avoid displacing the underlying material. Placing of riprap protection in layers or by dumping into chutes or by similar methods likely to cause segregation will not be permitted.

All material going into riprap protection shall be so placed and distributed that there will be no large accumulation or area composed largely of either the larger or smaller sizes of stone.

C. Unless otherwise authorized, the riprap protection shall be placed in conjunction with the construction of the embankment with only sufficient lag in construction of the riprap protection as may be necessary to prevent mixture of embankment and riprap material.

D. The Contractor shall provide a level compact area of sufficient size to dump and sort typical loads of riprap at approved locations(s). He shall further dump loads specified in the area and assist the Engineer as needed to sort and measure the stones in the load for the purpose of determining if the riprap is within specifications. Mechanical equipment as needed to assist in the sorting shall be provided by the Contractor at not additional cost to the Owner.

END OF SECTION 310000

SECTION 312500
EROSION AND SEDIMENTATION CONTROL

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes

1. Furnishing, installing, and maintaining temporary erosion controls and temporary sedimentation controls.

B. Related Sections

1. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this section.

2. Section 31 00 00 -Earthwork.

1.2 REFERENCES

A. EPA, "Storm Water Management for Construction Activities, Developing Pollution Prevention Plans and Best Management Practices."

B. State of Alaska Standard Specifications for Road, Bridge, and Municipal Construction.

C. Alaska State Department of Ecology - Stormwater Management Manual for Western Alaska.

1.3 DEFINITIONS

A. Temporary erosion controls shall include grassing, mulching, watering, and reseeding on-site sloped surfaces, providing berms at the top of the slopes and providing interceptor ditches at the ends of berms and at those locations which will ensure that erosion during construction will be either eliminated or minimized.

B. Temporary sedimentation controls shall include silt dams, traps, barriers, and appurtenances to control soil erosion.

C. Notice of Intent (NOI) – Application for Alaska Pollution Discharge Elimination System (APDES) permit.

D. Storm Water Pollution Prevention Plan (SWPPP) – Construction document for erosion control measures to be implemented on site.

1.4 SUBMITTALS

A. General: Submit the following in accordance with conditions of contract and general conditions sections:

1. Product data for silt barriers and netting.
2. The Contractor has the option to submit additional control measures in the form of shop drawings.
3. The Contractor shall apply for the APDES permit on the owners behalf. Provide a copy of the NOI to both the owner and project architect.
4. The Contractor shall prepare and submit for review two copies of the SWPPP to the owner and project architect.

1.5 QUALITY ASSURANCE

A. Provide erosion control methods in accordance with methods as indicated on the erosion control plan and/or requirements of authorities having jurisdiction. The Contractor shall comply with all National Pollutant Discharge Elimination System (APDES) rules and regulations in terms of both installation and maintenance during construction.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver products to the site under provisions of general conditions.

B. Store and protect products under provisions of general conditions.

PART 2 - PRODUCTS

2.1 SILT-BARRIER PRODUCTS

A. Filter stone shall be crushed one (1)-inch stone without excessive fines or dust.

B. Silt barrier shall be Mirafi 140N or approved equal which provides a water flow capacity of 40 gallons per minute per square foot.

PART 3 - EXECUTION

3.1 GENERAL

A. Comply with erosion control measures as mandated by Metlakatla Indian Community and/or the State of Alaska. At a minimum, comply with standards as set forth in Alaska State Standard Specifications for Road, Bridge, and Municipal Construction in the absence of more stringent local regulations.

B. Silt dams, traps, barriers, and appurtenances shall be installed and shall be maintained in place for duration of construction. This is done by periodically replacing silted structures or removing the silt from the up gradient side of it.

C. Erosion and sedimentation controls shall be maintained in a condition which will retain unfiltered water.

D. The Contractor shall be solely responsible for ensuring that no silt or debris leaves the immediate construction site. Any silt or debris that does leave the immediate site shall be cleaned up, and the area disturbed shall be returned to its natural state as directed by the Owner's Representative at the Contractor's expense.

E. The Contractor shall be responsible to clean-up all silt debris built up on the site and for the removal of all erosion control measures at the appropriate times as directed by the Owner's Representative.

F. The Contractor shall be required to maintain temporary construction entrances and remove all mud and debris from public roads on a daily basis, or more often if needed.

END OF SECTION 312500