PROJECT MANUAL

ADDITION TO DESHLER HIGH SCHOOL

Tuscumbia, Alabama

for

Tuscumbia City Schools, Board of Education

June 10, 2022

FINAL DCM SUBMITTAL

Prepared By



Goodwyn Mills Cawood, LLC. 117 Jefferson St. North Huntsville, AL 35801 T 256.539.3431 www.gmcnetwork.com

GMC PROJECT NUMBER: AHUN210012



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PROJECT DIRECTORY

OWNER:	TUSCUMBIA CITY SCHOOLS, BOARD OF EDUCATION 303 North Commons Street East Tuscumbia, Alabama 35675 Phone: 256.389.2913 Darryl Aikerson, Superintendent Jason Fuller, Facilities Director
ARCHITECT:	GOODWYN, MILLS & CAWOOD, LLC. 117 Jefferson Street North Huntsville, AL 35806 Tel: 256.539.3431 Fax: 256.536.9913 Jay Purkey, Project Architect Walter King, Associate
CIVIL ENGINEER:	GOODWYN, MILLS & CAWOOD, LLC. 117 Jefferson Street North Huntsville, AL 35806 Tel: 256.539.3431 Cole Williams, PE
STRUCTURAL ENGINEER:	TUCKER JONES ENGINEERS ASSOC. P.C. 3300 Cahaba Road, Suite 210 Birmingham, AL 35233 Tel: 205.879.5660 Greg Tucker, PE
ELECTRICAL ENGINEER:	HYDE ENGINEERING 120 Holmes Ave. Suite 122 Huntsville, AL 35801 Tel: 256.270.8013 Morgan Hillis, PE
MECHANICAL ENGINEER:	MW DAVIS DUMAS & ASSOCIATES 4500 Southlake Park, Suite 200 Hoover, AL 35244 Tel: 205.252.0246 Sammy Davis, PE

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Sea	led proposals wil	ll be received by		
(Owner's legal title)		title)		
at the office	of 10	(Name and address of	f Owner's authorized representative)	
until	CST	,	,,	for
(Hou (Description o	urs) of the work to be ir	(Month), nserted here):	(Day),	(Year)
at which tim	e and place they	will be publicly opened	and read.	
A c	ashier's check or	bid bond payable to		
in an amour	nt not less than f	five (5) percent of the	(Owner's legal amount of the hid but in no	title) event more than \$10,000
must accomp the bid docu	pany the bidder's iments will be rea	s proposal. Performanc quired at the signing of t	e and Payment Bonds and evi he Contract.	dence of insurance required in
Dra	wings and specif	fications may be examin	ed at the office of	
		(Owner's re	presentative and address)	
and	nlan rooms: i e	F W Dodge Builders	Exchange Construction Marke	t Data etc.)
	plan rooms, i.e.,	F. W. Douge, Builders		
which will b bid, upon re and sets for above, less o	be refunded in fu turn of documer subcontractors cost of printing,	Il on the firsts nts in good condition w and dealers, may be reproduction, handling,	the Architect (Engineer) upon ets issued to each general conv vithin ten days of bid date. Of obtained with the same dep and distribution.	in deposit of \$ per set tract bidder submitting a bonafide Other sets for general contractors osit, which will be refunded as
(If applicab) criteria estat criteria are a	le) Only general blished by the O vailable for revie	contractors who have be wner will be eligible to w at the office of	een approved to bid pursuant to bid for the Project. Written	o prequalification procedures and prequalification procedures and
			(Owner's or Architect's/Engineer's	representative and address)
Bid bidders bidd must be licc evidence of bidder shall sealed envel proposals ar be promoted	Is must be submiding in amounts ensed under the license before to show such evi- lope in which nd to waive tech	itted on proposal forms exceeding that establi e provisions of Title bidding or bid will not dence by clearly displa the proposal is delive mical errors if, in the O	furnished by the Architect (If ashed by the State Licensing 34, Chapter 8, Code of Al t be received or considered by ying his or her current licens red. The Owner reserves owner's judgement, the best int	Engineer) or copies thereof. All Board for General Contractors abama, 1975, and must show by the Architect (Engineer); the e number on the outside of the the right to reject any or all terests of the Owner will thereby
			(Award	ling Authority/Owner)

(Local Awarding Authority/Local Owner)

(Architect/Engineer)

NOTE: For projects exceeding \$50,000, this notice must be run once a week for three successive weeks in a newspaper of general circulation in the county or counties in which the project, or any part of the project, is to be performed. If the project involves an estimated amount exceeding \$500,000, this notice must also run at least once in three newspapers of general circulation throughout the state. Proof of publication is required.

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1. BID DOCUMENTS:

The Bid Documents consist of the Advertisement for Bids, these Instructions to Bidders, any supplements to these Instructions to Bidders, the Proposal Form and the Accounting of Sales Tax, and the proposed Contract Documents. The proposed Contract Documents consist of the Construction Contract, the Performance Bond and Payment Bond, the Conditions of the Contract (General, Supplemental, and other Conditions), Drawings, Specifications and all addenda issued prior to execution of the Construction Contract. Bid Documents may be obtained or examined as set forth in the Advertisement for Bids.

2. GENERAL CONTRACTOR'S STATE LICENSING REQUIREMENTS:

When the amount bid for a contract exceeds \$50,000, the bidder must be licensed by the State Licensing Board for General Contractors and must show the Architect evidence of license before bidding or the bid will not be received by the Architect or considered by the Awarding Authority. A bid exceeding the bid limit stipulated in the bidder's license, or which is for work outside of the type or types of work stipulated in the bidder's license, will not be considered. In case of a joint venture of two or more contractors, the amount of the bid shall be within the maximum bid limitation as set by the State Licensing Board for General Contractors of the combined limitations of the partners to the joint venture.

3. QUALIFICATIONS of BIDDERS and PREQUALIFICATION PROCEDURES:

a. Any special qualifications required of general contractors, subcontractors, material suppliers, or fabricators are set forth in the Bid Documents.

b. The Awarding Authority may have elected to prequalify bidders. Parties interested in bidding for this contract are directed to the Advertisement for Bids and Supplemental Instructions to Bidders to determine whether bidders must be prequalified and how they may obtain copies of the Awarding Authority's published prequalification procedures and criteria.

c. Release of Bid Documents by the Architect to a prospective bidder will not constitute any determination by the Awarding Authority or Architect that the bidder has been found to be qualified, prequalified, or responsible.

4. **PREFERENCE to RESIDENT CONTRACTORS:**

(If this project is federally funded in whole or in part, this Article shall not apply.)

a. In awarding the Contract, preference will be given to Alabama resident contractors and a nonresident bidder domiciled in a state having laws granting preference to local contractors shall be awarded the Contract only on the same basis as the nonresident bidder's state awards contracts to Alabama contractors bidding under similar circumstances.

b. A nonresident bidder is a contractor which is neither organized and existing under the laws of the State of Alabama, nor maintains its principal place of business in the State of Alabama. A nonresident contractor which has maintained a permanent office within the State of Alabama for at least five continuous years shall not thereafter be deemed to be a non-resident contractor so long as the contractor continues to maintain a branch office within Alabama.

5. EXAMINATION of BID DOCUMENTS and the SITE of the WORK:

Before submitting a bid for the Work, the bidders shall carefully examine the Bid Documents, visit the site, and satisfy themselves as to the nature and location of the Work, and the general and local conditions, including weather, the general character of the site or building, the character and extent of existing work within or adjacent to the site and any other work being performed thereon at the time of submission of their bids. They shall obtain full knowledge as to transportation, disposal, handling, and storage of materials, availability of water, electric power, and all other facilities in the area which will have a bearing on the performance of the Work for which they submit their bids. The submission of a bid shall constitute a representation by the bidder that the bidder has made such examination and visit and has judged for and satisfied himself or herself as to conditions to be encountered regarding the character, difficulties, quality, and quantities of work to be performed and the material and equipment to be furnished, and as to the contract requirements involved.

6. EXPLANATIONS and INTERPRETATIONS:

a. Should any bidder observe any ambiguity, discrepancy, omission, or error in the drawings and specifications, or in any other bid document, or be in doubt as to the intention and meaning of these documents, the bidder should immediately report such to the Architect and request clarification.

b. Clarification will be made only by written Addenda sent to all prospective bidders. Neither the Architect nor the Awarding Authority will be responsible in any manner for verbal answers or instructions regarding intent or meaning of the Bid Documents.

c. In the case of inconsistency between drawings and specifications or within either document, a bidder will be deemed to have included in its bid the better quality or greater quantity of the work involved unless the bidder asked for and obtained the Architect's written clarification of the requirements before submission of a bid.

7. SUBSTITUTIONS:

a. The identification of any product, material, system, item of equipment, or service in the Bid Documents by reference to a trade name, manufacturer's name, model number, etc. (hereinafter referred to as "source"), is intended to establish a required standard of performance, design, and quality and is not intended to limit competition unless the provisions of paragraph "d" below apply.

b. When the Bid Documents identify only one or two sources, or three or more sources followed by "or approved equal" or similar wording, the bidder's proposal may be based on a source not identified but considered by the bidder to be equal to the standard of performance, design and quality as specified; however, such substitutions must ultimately be approved by the Architect. If the bidder elects to bid on a substitution without "Pre-bid Approval" as described below, then it will be understood that proof of compliance with specified requirements is the exclusive responsibility of the bidder.

c. When the Bid Documents identify three or more sources and the list of sources is not followed by "or approved equal" or similar wording, the bidder's proposal shall be based upon one of the identified sources, unless the bidder obtains "Pre-bid Approval" of another source as described below. Under these conditions it will be expressly understood that no product, material, system, item of equipment, or service that is not identified in the Bid Documents or granted "Pre-Bid Approval" will be incorporated into the Work unless such substitution is authorized and agreed upon through a Contract Change Order.

d. If the Bid Documents identify only one source and expressly provide that it is an approved sole source for the product, material, system, item of equipment, or service, the bidder's proposal must be based upon the identified sole source.

Procedures for "Pre-bid Approval". If it is desired that a product, material, system, e. piece of equipment, or service from a source different from those sources identified in the Bid Documents be approved as an acceptable source, application for the approval of such source must reach the hands of the Architect at least ten days prior to the date set for the opening of bids. At the Architect's discretion, this ten day provision may be waived. The application for approval of a proposed source must be accompanied by technical data which the applicant desires to submit in support of the application. The Architect will give consideration to reports from reputable independent testing laboratories, verified experience records showing the reputation of the proposed source with previous users, evidence of reputation of the source for prompt delivery, evidence of reputation of the source for efficiency in servicing its products, or any other pertinent written information. The application to the Architect for approval of a proposed source must be accompanied by a schedule setting forth in which respects the materials or equipment submitted for consideration differ from the materials or equipment designated in the Bid Documents. The burden of proof of the merit of the proposed substitution is upon the proposer. To be approved, a proposed source must also meet or exceed all express requirements of the Bid Documents. Approval, if granted, shall not be effective until published by the Architect in an addendum to the Bid Documents.

8. PREPARATION and DELIVERY of BIDS:

a. DCM Form C-3: Proposal Form:

(1) Bids must be submitted on the Proposal Form as contained in the Bid Documents; only one copy is required to be submitted. A completed DCM Form C-3A: Accounting of Sales Tax must be submitted with the Proposal Form.

(2) All information requested of the bidder on the Proposal Form must be filled in. The form must be completed by typewriter or hand-printed in ink.

(3) Identification of Bidder: On the first page of the Proposal Form the bidder must be fully identified by completing the spaces provided for:

- (a) the legal name of the bidder,
- (b) the state under which laws the bidder's business is organized and existing,
- (c) the city (and state) in which the bidder has its principal offices,
- (d) the bidder's business organization, i.e., corporation, partnership, or individual (to be indicated by marking the applicable box and writing in the type of organization if it is not one of those listed), and
- (e) the partners or officers of the bidder's organization, if the bidder is other than an individual. If the space provided on the Proposal Form is not adequate for this listing, the bidder may insert "See Attachment" in this space and provide the listing on an attachment to the Proposal Form.

(4) Where indicated by the format of the Proposal Form, the bidder must specify lump sum prices in both words and figures. In case of discrepancy between the prices shown in words and in figures, the words will govern.

(5) All bid items requested in the Proposal Form, including alternate bid prices and unit prices for separate items of the Work, must be bid. If a gross sum of bid items is requested in the Proposal Form, the gross sum shall be provided by the bidder.

(6) In the space provided in the Proposal Form under "Bidder's Alabama License", the bidder must insert his or her current general contractor's state license number, current bid limit, and type(s) of work for which bidder is licensed.

- (7) The Proposal Form shall be properly signed by the bidder. If the bidder is:
 - (a) an individual, that individual or his or her "authorized representative" must sign the Proposal Form;
 - (b) a partnership, the Proposal Form must be signed by one of the partners or an "authorized representative" of the Partnership;
 - (c) a corporation, the president, vice-president, secretary, or "authorized representative" of the corporation shall sign and affix the corporate seal to the Proposal Form.

As used in these Instructions to Bidders, "authorized representative" is defined as a person to whom the bidder has granted written authority to conduct business in the bidder's behalf by signing and/or modifying the bid. Such written authority shall be signed by the bidder (the individual proprietor, or a member of the Partnership, or an officer of the Corporation) and shall be attached to the Proposal Form.

(8) Interlineation, alterations or erasures on the Proposal Form must be initialed by the bidder or its "authorized representative".

b. DCM Form C-3A: Accounting of Sales Tax

A completed DCM Form C-3A: Accounting of Sales Tax must be submitted with DCM Form C-3: Proposal Form. Submission of DCM Form C-3A is required, it is not optional. A proposal shall be rendered non-responsive if an Accounting of Sales Tax is not provided.

c. Bid Guaranty

(1) The Proposal Form must be accompanied by a cashier's check, drawn on an Alabama bank, or a Bid Bond, executed by a surety company duly authorized and qualified to make such bonds in the State of Alabama, payable to the Awarding Authority.

(2) If a Bid Bond is provided in lieu of a cashier's check, the bond shall be on the Bid Bond form as stipulated in the Bid Documents.

(3) The amount of the cashier's check or Bid Bond shall not be less than five percent of the contractor's bid, but is not required to be in an amount more than ten thousand dollars.

d. Delivery of Bids:

(1) Bids will be received until the time set, and at the location designated, in the Advertisement for Bids unless notice is given of postponement. Any bid not received prior to the time set for opening bids will be rejected absent extenuating circumstances and such bids shall be rejected in all cases where received after other bids are opened.

(2) Each bid shall be placed, together with the bid guaranty, in a sealed envelope. On the outside of the envelope the bidder shall write in large letters "Proposal", below which the bidder shall identify the Project and the Work bid on, the name of the bidder, and the bidder's current general contractor's state license number.

(3) Bids may be delivered in person, or by mail if ample time is allowed for delivery. When sent by mail, the sealed envelope containing the bid, marked as indicated above, shall be enclosed in another envelope for mailing.

9. WITHDRAWAL or REVISION of BIDS:

a. A bid may be withdrawn prior to the time set for opening of bids, provided a written request, executed by the bidder or the bidder's "authorized representative", is filed with the Architect prior to that time. The bid will then be returned to the bidder unopened.

b. A bid which has been sealed in its delivery envelope may be revised by writing the change in price on the outside of the delivery envelope over the signature of the bidder or the bidder's "authorized representative". In revising the bid in this manner, the bidder must only write the amount of the change in price on the envelope **and must not reveal the bid price.**

c. Written communications, signed by the bidder or its "authorized representative", to revise bids will be accepted if received by the Architect prior to the time set for opening bids. The Architect will record the instructed revision upon opening the bid. Such written communication may be by facsimile if so stipulated in Supplemental Instructions to Bidders. In revising the bid in this manner, the bidder must only write the amount of the change in price **and must not reveal the bid price.**

d. Except as provided in Article 12 of these Instructions to Bidders, no bid shall be withdrawn, modified, or corrected after the time set for opening bids.

10. OPENING of BIDS:

a. Bids will be opened and read publicly at the time and place indicated in the Advertisement for Bids. Bidders or their authorized representatives are invited to be present.

b. A list of all proposed major subcontractors and suppliers will be submitted by Bidders to the Architect at a time subsequent to the receipt of bids as established by the Architect in the Bid Documents but in no event shall this time exceed twenty-four (24) hours after receipt of bids. If the list includes a fire alarm contractor and/or fire sprinkler contractor, Bidders will also submit a copy of the fire alarm contractor's and/or fire sprinkler contractor's permits from the State of Alabama Fire Marshal's Office.

11. INCOMPLETE and IRREGULAR BIDS:

A bid that is not accompanied by data required by the Bid Documents, or a bid which is in any way incomplete, may be rejected. Any bid which contains any uninitialed alterations or erasures, or any bid which contains any additions, alternate bids, or conditions not called for, or any other irregularities of any kind, will be subject to rejection.

12. BID ERRORS:

a. Errors and Discrepancies in the Proposal Form. In case of error in the extension of prices in bids, the unit price will govern. In case of discrepancy between the prices shown in the figures and in words, the words will govern.

b. Mistakes within the Bid. If the low bidder discovers a mistake in its bid, the low bidder may seek withdrawal of its bid without forfeiture of its bid guaranty under the following conditions:

(1) <u>**Timely Notice:**</u> The low bidder must notify the Awarding Authority and Architect in writing, within three working days after the opening of bids, that a mistake was made. This notice must be given within this time frame whether or not award has been made.

(2) <u>Substantial Mistake</u>: The mistake must be of such significance as to render the bid price substantially out of proportion to the other bid prices.

(3) <u>Type of Mistake</u>: The mistake must be due to calculation or clerical error, an inadvertent omission, or a typographical error which results in an erroneous sum. A mistake of law, judgment, or opinion shall not constitute a valid ground for withdrawal without forfeiture.

(4) <u>Documentary Evidence</u>: Clear and convincing documentary evidence of the mistake must be presented to the Awarding Authority and the Architect as soon as possible, but no later than three working days after the opening of bids.

The Awarding Authority's decision regarding a low bidder's request to withdraw its bid without penalty shall be made within 10 days after receipt of the bidder's evidence or by the next regular meeting of the Awarding Authority. Upon withdrawal of bid without penalty, the low bidder shall be prohibited from (1) doing work on the project as a subcontractor or in any other capacity and (2) bidding on the same project if it is re-bid.

13. DISQUALIFICATION of BIDDERS:

Any bidder(s) may be disqualified from consideration for contract award for the following reasons:

a. Collusion. Any agreement or collusion among bidders or prospective bidders in restraint of freedom of competition to bid at a fixed price or to refrain from bidding or otherwise shall render the bids void and shall cause the bidders or prospective bidders participating in such agreement or collusion to be disqualified from submitting further bids to the Awarding Authority on future lettings. (See § 39-2-6, Code of Alabama 1975, for possible criminal sanctions.)

b. Advance Disclosure. Any disclosure in advance of the terms of a bid submitted in response to an Advertisement for Bids shall render the proceedings void and require readvertisement and rebid.

c. Failure to Settle Other Contracts. The Awarding Authority may reject a bid from a bidder who has not paid, or satisfactorily settled, all bills due for labor and material on other contracts in force at the time of letting.

14. CONSIDERATION of BIDS:

a. After the bids are opened and read publicly, the bid prices will be compared and the results of this comparison will be available to the public. Until the final award of the contract, however, the Awarding Authority shall have the right to reject any or all bids, and it shall have the right to waive technical errors and irregularities if, in its judgment, the bidder will not have obtained a competitive advantage and the best interests of the Awarding Authority will be promoted.

b. If the Bid Documents request bids for projects or parts of projects in combination or separately, the Bid Documents must include supplements to, these Instructions to Bidders setting forth applicable bid procedures. Award or awards will be made to the lowest responsible and responsive bidder or bidders in accordance with such bid procedures.

15. DETERMINATION of LOW BIDDER by USE of ALTERNATES:

a. The Awarding Authority may request alternate bid prices (alternates) to facilitate either reducing the base bid to an amount within the funds available for the project or adding items to the base bid within the funds available for the project. Alternates, if any, are listed in the

Proposal Form in the order in which they shall cumulatively deduct from or add to the base bid for determining the lowest bidder.

b. If alternates are included in the Proposal Form, the Awarding Authority shall determine the dollar amount of funds available and immediately prior to the opening of bids shall announce publicly the funds available for the project. The dollar amount of such funds shall be used to determine the lowest bidder as provided herein below, notwithstanding that the actual funds available for the project may subsequently be determined to be more or less than the expected funds available as determined immediately prior to the time of the opening of bids.

c. If the base bid of the lowest bidder exceeds the funds available and alternate bid prices will reduce the base bids to an amount that is within the funds available, the lowest bidder will be determined by considering, in order, the fewest number of the alternates that produces a price within the funds available. If the base bid of the lowest bidder is within the funds available and alternate bid prices will permit adding items to the base bid, the lowest bidder will be determined by considering, in order, the greatest number of the alternates that produces a price within the funds available.

d. After the lowest bidder has been determined as set forth above, the Awarding Authority may award that bidder any combination of alternates, provided said bidder is also the low bidder when only the Base Bid and such combination of alternates are considered.

16. UNIT PRICES:

a. Work Bid on a Unit Price Basis. Where all, or part(s), of the planned Work is bid on a unit price basis, both the unit prices and the extensions of the unit prices constitute a basis of determining the lowest responsible and responsive bidder. In cases of error in the extension of prices of bids, the unit price will govern. A bid may be rejected if any of the unit prices are obviously unbalanced or non-competitive.

b. Unit Prices for Application to Change Orders. As a means of predetermining unit costs for changes in certain elements of the Work, the Bid Documents may require that the bidders furnish unit prices for those items in the Proposal Form. Unit prices for application to changes in the work are not a basis for determining the lowest bidder. Non-competitive unit prices proposed by the successful bidder may be rejected and competitive prices negotiated by the Awarding Authority prior to contract award. Unit prices for application to changes in the work are not effective unless specifically included and agreed upon in the Construction Contract.

17. AWARD of CONTRACT:

a. The contract shall be awarded to the lowest responsible and responsive bidder unless the Awarding Authority finds that all the bids are unreasonable or that it is not in the best interest of the Awarding Authority to accept any of the bids. A responsible bidder is one who, among other qualities determined necessary for performance, is competent, experienced, and financially able to perform the contract. A responsive bidder is one who submits a bid that complies with the terms and conditions of the Advertisement for Bids and the Bid Documents. Minor irregularities in the bid shall not defeat responsiveness.

b. A bidder to whom award is made will be notified by telegram, confirmed facsimile, or letter to the address shown on the Proposal Form at the earliest possible date. Unless other

time frames are stipulated in Supplemental Instructions to Bidders, the maximum time frames allowed for each step of the process between the opening of bids and the issuance of an order to proceed with the work shall be as follows:

(1)	Award of contract by Awarding Authority	30 calendar days after the opening of bids
(2)	Contractor's return of the fully executed contract, with bonds and evidence of insurance, to the Awarding Authority	15 calendar days after the contract has been presented to the contractor for signature (from the Lead Design Professional)
(3)	Awarding Authority's approval of the contractor's bonds and evidence of insurance and completion of contract execution	20 calendar days after the contractor presents complete and acceptable documents to the Architect
(4)	Notice To Proceed issued to the contractor along with distribution of the fully executed construction contract to all parties.	15 calendar days after final execution of contract by the Awarding Authority, by various State Agencies if required and by the Governor if his or her signature on the contract is required by law

The time frames stated above, or as otherwise specified in the Bid Documents, may be extended by written agreement between the parties. Failure by the Awarding Authority to comply with the time frames stated above or stipulated in Supplemental Instructions to Bidders, or agreed extensions thereof, shall be just cause for the withdrawal of the contractor's bid and contract without forfeiture of bid security.

c. Should the successful bidder or bidders to whom the contract is awarded fail to execute the Construction Contract and furnish acceptable Performance and Payment Bonds and satisfactory evidence of insurance within the specified period, the Awarding Authority shall retain from the bid guaranty, if it is a cashier's check, or recover from the principal or the sureties, if the guaranty is a bid bond, the difference between the amount of the contract as awarded and the amount of the bid of the next lowest responsible and responsive bidder, but not more than \$10,000. If no other bids are received, the full amount of the bid guaranty shall be so retained or recovered as liquidated damages for such default. Any sums so retained or recovered shall be the property of the Awarding Authority.

d. All bid guaranties, except those of the three lowest bona fide bidders, will be returned immediately after bids have been checked, tabulated, and the relation of the bids established. The bid guaranties of the three lowest bidders will be returned as soon as the contract bonds and the contract of the successful bidder have been properly executed and approved. When the award is deferred for a period of time longer than 15 days after the opening of the bids, all bid guaranties, except those of the potentially successful bidders, shall be returned. If no award is made within the specified period, as it may by agreement be extended, all bids will be rejected, and all guaranties returned. If any potentially successful bidder agrees in writing to a stipulated extension in time for consideration of its bid and its bid was guaranteed with a cashier's check, the Awarding Authority may permit the potentially successful bidder to substitute a satisfactory bid bond for the cashier's check.

END of INSTRUCTIONS TO BIDDERS

SUPPLEMENTARY INSTRUCTIONS TO BIDDERS [Additions to Standard DCM Form C2, dated March 2020]

- 1. <u>UNIT PRICES</u>: Bidders are requested to bid on all Unit Price Items indicated. Where a Unit Price does not involve a change in price, insert the words "No Change." Bidders not desiring to bid a certain Unit Price should so indicate by the words "No Bid." Bidders failing to bid all Unit Prices risk disqualification of their bid. See "Attachment A To Proposal Form" and Section 01 2200 "Unit Prices", for additional information and requirements.
- 2. <u>PREPARATION OF BID</u>: Enclose bid and other required Bid Date Submittals in a sealed envelope bearing the name of the work and of the bidder, and the bidder's State License Number for General Contracting. Prepare bid on forms bound in Project Manual or otherwise furnished by the Architect. Only one (1) copy is required.

After the bid has been sealed, minor adjustments may be made to the Bid over the signature of the person who signed the proposal form, or by their authorized representative, subject to verification. All outside adjustments shall be initialed and dated.

- 3. <u>QUESTIONS DURING BIDDING</u>: All questions during bidding must be submitted through an approved General Contractor bidder via email to the persons designated in Section 01 3000 Administrative Requirements, Part 3.02. All questions must be typed. Questions will only be reviewed if submitted in this format. Explanations and interpretations will be issued via addendum only.
- 4. <u>PROPOSAL GUARANTY</u>: Bid Bond shall be on standard Division of Construction Management bond form. The bid security shall insure that the Bidder will enter into a contract with the Awarding Authority, and will furnish the specified 100% Performance and Payment Bonds, and General Contractor's insurance certificates with the Contract forms, provided such presentation is made within sixty (60) days of the receipt of the bids, rather than thirty (30) days originally indicated in "Instructions To Bidders".
- 5. <u>PRE-BID CONFERENCE</u>: A pre-bid conference will be held at the location, time and date indicated on the "Advertisement for Bids." Any contractual determinations or changes made at this conference will be verified by written Addendum; only explanations so verified will be considered part of the contract terms or conditions. <u>Attendance is not mandatory but recommended for General</u> <u>Contractor Bidders</u> intending to submit a Proposal, and is also highly recommended for Subcontractors.
- 6. <u>MODIFICATION AND WITHDRAWAL</u>: After the bid opening, bids may be withdrawn or modified only after the expiration of sixty (60) days, rather than thirty (30) days originally indicated in "Instructions To Bidders".
- 7. <u>LIST OF SUBCONTRACTORS AND SUPPLIERS</u>: In accordance with regulations of the Alabama Division of Construction Management, each bid shall have attached a list of major subcontractors and suppliers proposed for the principal parts of the work, which is to be turned in with a copy of the Proposal Form on Bid Date, <u>or at Contractors' option, turned in to the Owner within 24-hours after receipt of Bids, with a copy to the Architect</u>. Bidders failing to submit such list, as indicated, will be considered non-responsive and will be rejected; Bidders failing to submit a complete list may be rejected.

Pursuant to the Code of Alabama, Section 34-33A-11(b), the General Contractor shall provide a copy of the fire alarm contractor's State Fire Marshal's Permit at the time the list of subcontractors for the contract is submitted.

Subcontractors listed and thereafter approved may not be changed without approval of the Owner and/or Director. The list of subcontractors will not constitute a qualification of the bid, and acceptance of a bid with such list will not constitute a waiver of any pre-approval requirement or other requirement of qualification or experience as applies to subcontractors.

Bidders should base their lists on the assumption that all Alternates will be accepted. As soon as possible after the bid opening, bidders will be advised which alternates, if any, should be considered in completion of the list. If the actual accepted alternates change, the successful bidder will be given an opportunity to justify modification or modify their list.

8. <u>SUBSTITUTIONS, PRE-BID QUALIFICATIONS, AND PRE-QUALIFIED SUBCONTRACTORS</u> <u>AND SUPPLIERS</u>:

Refer to Instructions to Bidders, 7.e. and revise the first sentence to read:

"If it is desired that a product, material, system, piece of equipment, or service from a source different from those sources identified in the Bid Documents be approved as an acceptable source, application for the approval of such source must reach the hands of the Architect at least <u>five</u> days prior to the date set for the opening of bids."

Refer to Instructions to Bidders, 7. Add f.

"f. Requests for Substitutions will occur only during the bidding process and will be reviewed up to five (5) calendar days prior to the bid date. The full substitution package, including completed Substitution Request form, shall be submitted to one of the approved General Contractor bidders for consideration. The General Contractor will forward to the Architect for further consideration. If the supplier or subcontractor does not submit the full package, including Substitution Request form, the General Contractor will reject the request. Notice of approved suppliers, manufacturers, and/or products will be issued in an Addendum subject to compliance with requirements of the Bid and Contract Documents, including single source coordination. Substitutions will not be considered during the construction process unless requested by the Owner, or the specified item is unavailable or becomes unsuitable due to additions or deletions to the work."

- 9. <u>BIDDER QUALIFICATION</u>: Qualifications for Subcontractors and Suppliers are stated at various locations throughout the Project Manual and Bid Documents. In the event a General Contractor desires to perform "qualified" Subcontractor work with their own forces, they shall be required to provide documentation and comply with all of the same criteria and qualifications as the comparable Subcontractor(s).
- 10. <u>STATE FIRE MARSHAL'S PERMIT TO BE FURNISHED AT PRE-CONSTRUCTION</u> <u>CONFERENCE</u>: In accordance with the Code of Alabama, Section 34-33A-9, the General Contractor shall furnish a copy of the fire alarm contractor's State Fire Marshal's Permit to the Building Commission Inspector at the Pre-Construction Conference. Fire alarm contractors that cannot provide a copy of the required State Fire Marshal's Permit will be rejected.
- 11. <u>RECIPROCITY</u>: Under Section 39-3-5, Code of Alabama, 1975, non-resident general contractor bidders must accompany any written bid documents with a written opinion of an attorney licensed to practice law in such nonresident prime contractor bidder's state of domicile as to the preferences, if any or none, granted by the law of the state to its own business entities whose principal place of business are in that state in the letting of any or all public contracts. Resident general contractors in Alabama, as defined in Section 39-2-12, are granted preference over nonresident general contractors in awarding of contracts in the same manner and to the same extent as provided by the laws of the state of domicile of the nonresident.
- 12. <u>DIVISION OF CONSTRUCTION MANAGEMENT FEES</u>: Permit Fee and other DCM User Fees are addressed in Section 01 0150 Special Conditions, and in the attachment to Section 01 0150 Special Conditions, entitled DCM User Fees Guidelines.

13. <u>DIVISION OF CONSTRUCTION MANAGEMENT INSPECTIONS</u>: Scheduling of Inspections, and Minimum Requirements for Required Inspections are addressed in Section 01 3000 – Administrative Requirements.

END OF SUPPLEMENTARY INSTRUCTIONS TO BIDDERS

DCM Form C-3 (must be submitted with DCM Form C-3A) August 2021

PROPOSAL FORM

То:	Date:
(Awarding Authority) In compliance with the Advertisement for Bids and subject to a	ll the conditions thereof the undersigned
in compliance with the recention for Dias and subject to a	in the conditions increasi, the undersigned
(Legal Name of Bidder)	
hereby proposes to furnish all labor and materials and perform a	all work required for the construction of
WORK	
in accordance with Drawings and Specifications, dated	, prepared by
	, Architect/Engineer.
The Bidder, which is organized and existing under the laws of the	he State of,
having its principal offices in the City of	,
is: 🔲 a Corporation 🔲 a Partnership 🔲 an Individual	((other)
addresses; if Bidder is a Corporation, list the names, titles, and b	business addresses of its officers:
BIDDER'S REPRESENTATION: The Bidder declares that having become fully informed regarding all pertinent condition and Specifications (including all Addenda received) for the Documents relative thereto, and that it has satisfied itself relative	t it has examined the site of the Work, ns, and that it has examined the Drawings Work and the other Bid and Contract re to the Work to be performed.
ADDENDA: The Bidder acknowledges receipt of Addenda Nos	s through inclusively.
BASE BID : For construction complete as shown and specified,	the sum of
	Dollars (\$)
ALTERNATES: If alternates as set forth in the Bid Document are to be made to the Base Bid:	ts are accepted, the following adjustments
For Alternate No. 1 (_(deduct) \$
For Alternate No. 2 ((deduct) \$
For Alternate No. 3 () [add)	(deduct) \$
For Alternate No. 4 ((deduct) \$
For Alternate No. 5 ((deduct) \$
For Alternate No. 6 ((deduct) \$

UNIT PRICES - (Attach to this Proposal Form the unit prices, if any, on a separate sheet.)

BID SECURITY: The undersigned agrees to enter into a Construction Contract and furnish the prescribed Performance and Payment Bonds and evidence of insurance within fifteen calendar days, or such other period stated in the Bid Documents, after the contract forms have been presented for signature, provided such presentation is made within 30 calendar days after the opening of bids, or such other period stated in the Bid Documents. As security for this condition, the undersigned further agrees that the funds represented by the Bid Bond (or cashier's check) attached hereto may be called and paid into the account of the Awarding Authority as liquidated damages for failure to so comply.

Attached hereto is a: (Mark the appropriate box and provide the applicable information.)

O Bid Bond, executed by		as Surety,
• a cashier's check on the	Bank of	,
for the sum of		
Dollars (\$) made payable to the Awarding Authority.	

BIDDER'S ALABAMA LICENSE:

State License for General Contracting:

License Number Bid Lir

Bid Limit Type(s) of Work

CERTIFICATIONS: The undersigned certifies that he or she is authorized to execute contracts on behalf of the Bidder as legally named, that this proposal is submitted in good faith without fraud or collusion with any other bidder, that the information indicated in this document is true and complete, and that the bid is made in full accord with State law. Notice of acceptance may be sent to the undersigned at the address set forth below.

The Bidder also declares that a list of all proposed major subcontractors and suppliers will be submitted at a time subsequent to the receipt of bids as established by the Architect in the Bid Documents but in no event shall this time exceed twenty-four (24) hours after receipt of bids.

Legal Name of Bidder	
Mailing Address	
* By (Legal Signature)	
* Name & Title (print)	(Seal)
Telephone Number	
Email Address	

* If other than the individual proprietor, or an above named member of the Partnership, or the above named president, vice-president, or secretary of the Corporation, attach written authority to bind the Bidder. Any modification to a bid shall be over the initials of the person signing the bid, or of an authorized representative.

Note: A completed DCM Form C-3A: Accounting of Sales Tax must be submitted with DCM Form C-3: Proposal Form. Submission of DCM Form C-3A is required, it is not optional. A proposal shall be rendered non-responsive if an Accounting of Sales Tax is not provided.

ESTIMATED SALES TAX AMOUNT

ACCOUNTING OF SALES TAX Attachment to DCM Form C-3: Proposal Form

То:		Date:	
	(Awarding Authority)		
NAME OF PROJECT			

SALES TAX ACCOUNTING

Pursuant to Act 2013-205, Section 1(g) the Contractor accounts for the sales tax NOT included in the bid proposal form as follows:

Failure to provide an accounting of sales tax shall render the bid non-responsive. Other than determining responsiveness, sales tax accounting shall not affect the bid pricing nor be considered in the determination of the lowest responsible and responsive bidder.

Legal Name of Bidder	
Mailing Address	
*By (Legal Signature)	
*Name (type or print)	(Seal)
*Title	
Telephone Number	
Email Address	

Note: A completed DCM Form C-3A: Accounting of Sales Tax must be submitted with DCM Form C-3: Proposal Form. Submission of DCM Form C-3A with DCM Form C-3 is required, it is not optional. A proposal shall be rendered non-responsive if an Accounting of Sales Tax is not provided.



STATE OF ALABAMA BUILDING COMMISSION

770 WASHINGTON AVE SUITE 444 Montgomery, Alabama 36130-1150 Telephone: (334) 242-4082 Fax: (334) 242-4182

ROBERT BENTLEY Governor Katherine Lynn Director

October 28, 2013

TO: STATE AGENCIES, K-12 SUPERINTENDENTS, COMMUNITY COLLEGES, UNIVERSITIES

FROM: KATHERINE LYNN, DIRECTOR ALABAMA BUILDING COMMISSION

SUBJECT: ACT 2013-205, CERTIFICATE OF EXEMPTION FROM SALES AND USE TAX FOR GOVERNMENTAL ENTITIES

Act 2013-205 was signed into law on May 9, 2013, granting the Alabama Department of Revenue (ADOR) the authority to issue certificates of exemption from sales and use taxes for construction projects for certain governmental agencies.

Summary

The full text of Act 2013-205 is available on the Building Commission's website at <u>www.bc.alabama.gov</u>. A brief summary of the Act is provided below:

- ADOR shall issue certificates of exemption from sales and use tax to governmental entities for <u>each</u> tax exempt project. Both the governmental entity and the contractor shall apply for certificates of exemption.
- Certificates of exemption shall only be issued for contracts entered into (awarded) on or after Jan. 1, 2014.
- Certificates shall only be issued to contractors licensed by the State Licensing Board for General Contractors or any subcontractor working under the same contract.
- Items eligible for exemption from sales and use tax are building materials, construction materials and supplies and other tangible personal property that become part of the structure per the written construction contract.
- ADOR will handle the administration of certificates of exemption and the accounting of exempt purchases. ADOR will have the ability to levy fines and may bar the issuance or use of certificates of exemption upon determination of willful misuse by the contractor or a subcontractor.
- The contractor shall account for the tax savings on the bid form.

Bidding of Projects Before Jan. 1, 2014

Projects bid before Jan 1, 2014 but awarded on or after Jan. 1, 2014 are still eligible for sales tax exemption regardless of whether the project was bid with or without sales tax. For projects bid before Jan. 1, 2014, the bid documents must specify if the contractor's bid shall or shall not include sales tax.

For projects bid before Jan. 1, 2014, if the project is bid with sales tax and the contractor and subcontractors purchase the materials tax exempt, prior to project closeout the contractor shall submit to the governmental entity a copy of the report filed with the Alabama Department of Revenue showing all exempt purchases. The actual sales tax savings indicated on the report shall be deducted from the final contract amount.

For projects bid after Jan. 1, 2014, the bid shall not include sales tax but the sales tax for the base bid and all bid items must be included on the contractor's bid proposal form. ABC Form C-3A indicates how the sales tax shall be accounted for on the bid proposal form and shall be modified by the project architect or engineer as appropriate for the bid items for each project. Failure of the contractor to complete the attachment to the bid proposal form indicating the sales tax as required by Act 2013-205, Section 1 (g) shall render the bid non-responsive.

Proposed Changes to Administrative Rules

Pursuant to Act 2013-205, the ADOR has proposed changes to the following administrative rules:

Rule 810-6-146	Contractor's Liability
Rule 810-6-146.01	Bleacher Systems, Lockers, Backstops, and Other Fixtures Installed in Gymnasiums
Rule 810-6-377	Exemption for Certain Purchases by Contractors and Subcontractors in Conjunction with Construction Contracts with Certain Governmental Entities

A link to the proposed rules and information about the public hearings can be found on ADOR's website at <u>http://www.revenue.alabama.gov/analysis/upcoming-rule-hearings.cfm</u>. All interested parties may present their views in writing to the Secretary of the Alabama Department of **Revenue, Room 4131, Gordon Persons Building, 50 N Ripley Street, Montgomery, Alabama 36132** at any time during the thirty-five (35) day period following publication of the notice or by appearing at the hearing.

If you have any questions, please feel free to contact Katherine Lynn at the Alabama Building Commission at (334) 242-4082 or the Alabama Department of Revenue at (334) 242-1170.

cc: Ms. Julie Magee, Commissioner, Alabama Department of Revenue Mr. Ben Albritton, Assistant Attorney General

BID BOND

The **PRINCIPAL** (*Bidder's company name and address*) Name: Address:

The **SURETY** (*Company name and primary place of business*) Name: Address:

The **OWNER** (*Entity name and address*) Name: Address:

The **PROJECT** for which the Principal's Bid is submitted: (*Project name as it appears in the Bid Documents*)

KNOW ALL MEN BY THESE PRESENTS, that we, the undersigned Principal and Surety, jointly and severally, hereby bind ourselves, our heirs, executors, administrators, successors, and assigns to the Owner in the PENAL SUM of five percent (5%) of the amount of the Principal's bid, but in no event more than Ten-thousand Dollars (\$10,000.00).

THE CONDITION OF THIS OBLIGATION is that the Principal has submitted to the Owner the attached bid, which is incorporated herein by reference, for the Project identified above.

NOW, THEREFORE, if, within the terms of the Bid Documents, the Owner accepts the Principal's bid and the Principal thereafter either:

- (a) executes and delivers a Construction Contract with the required Performance and Payment Bonds (each in the form contained in the Bid Documents and properly completed in accordance with the bid) and delivers evidence of insurance as prescribed in the Bid Documents, or
- (b) fails to execute and deliver such Construction Contract with such Bonds and evidence of insurance, but pays the Owner the difference, not to exceed the Penal Sum of this Bond, between the amount of the Principal's Bid and the larger amount for which the Owner may award a Construction Contract for the same Work to another bidder,
 then this obligation shall be null and void otherwise it shall remain in full force and effect

then, this obligation shall be null and void, otherwise it shall remain in full force and effect.

The Surety, for value received, hereby stipulates and agrees that the obligation of the Surety under this Bond shall not in any manner be impaired or affected by any extension of the time within which the Owner may accept the Principal's bid, and the Surety does hereby waive notice of any such extension.

SIGNED AND SEALED this	day of	<u> </u>
ATTEST:		PRINCIPAL:
		By
		Name and Title SURETY:
ATTEST:		
		By

Name and Title

Note: Do not staple this form; use clips. Purpose: quickly and efficiently scan thousands of documents into DCM's database.

You may use your own form provided <u>all information</u> requested below, including the "I certify..." statement, and signatures, are on your form. Do not use colored print or shaded cells.

SAMPLE CERTIFIED TABULATION OF BIDS

Project:

DCM Project No.:

Time:

PSCA Project No. (if applicable):

Amount of Available Funds:

As ta	bulated	below,	bids	were	received:
-------	---------	--------	------	------	-----------

Date:

Place:

Contractor:				
Surety:				
All Addenda Acknowledged:				
Base Bid on Proposal:				
Base Bid Envelope Adjustment:				
Total Base Bid:	\$ -	\$ -	\$ -	\$ -
Bid Alternate #1 on Proposal:				
Bid Alt. #1 Envelope Adjustment:				
Total Alternate #1:	\$ -	\$ -	\$ -	\$-
Bid Alternate #2 on Proposal:				
Bid Alt. #2 Envelope Adjustment:				
Total Alternate #2:	\$ -	\$ -	\$ -	\$ -
Remarks:				

I certify that the above bids were advertised, were received sealed, were publicly opened, and read aloud at the time and place indicated and that this is a true and correct tabulation of all bids received for this project.

Architectural / Engineering Firm Name

Sworn to and subscribed before me this _____day of _____(Month, Year).

By:

Signature

Notary Public Signature Seal: My Commission Expires

Print Name and Title of Architect / Engineer

PREPARATION AND APPROVAL OF CONSTRUCTION CONTRACTS and BONDS SUBMITTED ON PAPER

CHECKLIST Use with DCM Forms C-5, C-6, & C-7 and DCM Forms 9-A, 9-B, & 9-C

Six c numb Scho	CONSTRUCTION CONTRACT - DCM Form C-5 or DCM Form 9-A (PSCA Projects) opies of documents with original signatures required. The numbers in the left column below correspond to bers in the left margin of the Contract form. If the project is funded partially or fully by the Alabama Public ol and College Authority (PSCA), use DCM Form 9-A instead of DCM Form C-5.
(1)	 PROJECT NUMBER(S): Insert the DCM (BC) Project Number in the block provided. On DCM Form 9-A, also insert the PSCA Project Number in the block provided.
(2)	DATE: Insert the date upon which the Contractor will sign the contract.
(3)	 OWNER: Insert the full, legal name, address, email, and telephone number of the Owner (Awarding Authority). On DCM Form 9-A, insert the name, address, email, and telephone number of the Local Owner (city or county school board, college, university, etc.) after "Alabama Public School and College Authority"
(4)	 CONTRACTOR: Insert the Contractor's full, legal company name, correct mailing address, email, and telephone number. For State Agency projects, the Contractor Company name and address must match the name and address registered in the State of Alabama Accounting and Resource System (STAARS) used by the State to pay Vendors. The Contractor Company name and address must be consistent across all documents in the same contract package, in order to avoid STAARS rejection. On DCM Form 9-A: The Contractor Company name and address must match the name and address registered in STAARS used by the State to pay Vendors. The Contractor Company name and address must match the name and address registered in STAARS used by the State to pay Vendors. The Contractor Company name and address must be consistent
	across all documents in the same contract package, in order to avoid STAARS rejection.
(5)	The WORK: Insert the complete name of the Project; same as in the Bid Documents.
(6)	CONTRACT DOCUMENTS: Insert the date of the Bid Documents
(7)	ADDENDA: Identify, by number and date, all pre-bid Addenda that were issued to the Bid Documents. If none were issued, insert "None". All Addenda shall be submitted to DCM for review prior to contract issuance.
(8)	ARCHITECT: Insert the full, legal name, address, email, and telephone number of the Project Architectural or Engineering firm.
(9)	CONTRACT SUM: The Contract Sum is the total of the Contract's Base Bid and accepted Bid Alternate Prices, if any. Insert the Contract Sum in words and figures, verifying that this amount corresponds with the CERTIFIED TABULATION OF BIDS.
(10)	BID ALTERNATE PRICES : Identify which, if any, Bid Alternate Prices are accepted and included in the Contract Sum by inserting either (a) "No Alternate Prices Requested in Bid", (b) "No Alternate Prices Accepted", or (c) a listing of the accepted Alternates by number and dollar amount.
(11)	The CONTRACT TIME: State the Contract Time in words and in figures.
(12)	LIQUIDATED DAMAGES: If the Owner has computed a daily rate for liquidated damages, insert the amount in both words and figures in the spaces provided.
(13)	 SPECIAL PROVISIONS: This space may be used to incorporate Special Provisions into the Contract, such as unit prices, compliance with enacted provisions, and value engineering. If the solicitation for bids required Unit Prices, insert a statement of which Unit Prices, if any, are accepted and incorporated into the Contract. If more space is needed, Special Provisions may be stated on an attachment that is cited in the Special Provisions section. DCM Form 9-A is published bearing Special Provision "A. Severable Payments", which is where the portions of the Contract Sum to be paid by the PSCA and the Local Owner are to be stated. Obtain these amounts from Local Owner and insert them in the spaces provided. Other Special Provisions, such as disposition of Unit Prices, may be inserted below this provision. STATE GENERAL CONTRACTOR'S LICENSE: Insert the Contractor's current state general
(14)	contracting license number, bid limit, and classification in the spaces provided.

(15)	SIGNATURES - APPROVING and CONTRACTING PARTIES			
	Signature spaces vary for different Owner types and funding sources. Download the appropriate document			
	signatures will not be accented			
	signatures will not be accepted.			
	PERFORMANCE BOND, DCM Form C-6 or DCM Form 9-B (PSCA Projects), and			
	PAYMENT BOND, DCM Form C-7 or DCM Form 9-C (PSCA Projects)			
Before	e forwarding the Construction Contract and Bonds to the Owner, verify that the Surety has accurately provided			
all inf	ormation in the spaces provided. The information should be the same on both Bonds.			
(1)	SURETY'S BOND NUMBER should be inserted in the block provided.			
(2)	PRINCIPAL: Contractor's name and address is to be the same as appears in the Construction Contract.			
(3)	SURETY: The full, legal name and address of the bonding company.			
(4)	OWNER: The Owner's name and address is to be the same as appears in the Construction Contract.			
(5)	PENAL SUM: The Penal Sum of each Bond is to be the Contract Sum of the Construction Contract and			
	is to be inserted in both words and figures.			
(6)	The Date of the Construction Contract: The date that appears on the Construction Contract.			
(7)	The PROJECT : The same name or description as appears in the Construction Contract.			
(8)	DATE: After "SIGNED AND SEALED" is to appear the date upon which Contractor and Surety sign the			
	Bond. THIS DATE CANNOT PRECEDE THE DATE OF THE CONSTRUCTION CONTRACT.			
(9)	CONTRACTOR'S SIGNATURE: The Contractor's name must appear beneath "CONTRACTOR", under			
	which the signature of a member or officer of the firm must appear with the name and title of the signing			
	party appearing LEGIBLY beneath the signature.			
(10)	SURETY'S SIGNATURE: The full, legal name of the bonding company must appear under "SURETY",			
	under which the signature of an individual having power of attorney for the bonding company must appear			
	with the individual's name and title appearing LEGIBLY beneath the signature.			
(11)	ATTACHED POWER OF ATTORNEY: Clipped to each copy of the Bonds must be a Power of Attorney,			
	signed by an officer of the bonding company, for the individual signing the bond on behalf of the bonding			
	company. The date of the Power of Attorney must not precede the date of the bond.			
ATTACHMENTS				

The following documents must be attached to each of the six Construction Contract copies:

- Insurance Certificate (attach copy): It is the responsibility of the design professional to ensure all insurance requirements are discussed with bidders prior to a bid and that Contractor has provided the requirements to their insurance provider. Contractor must obtain <u>all</u> insurance coverage specified in Article 37 of the General Conditions of the Contract required per Section 39-2-8 of the Code of Alabama.
- Performance Bond: required for contracts of \$50,000.0 or more, attach original with surety's power-of-attorney original required per Section 39-2-8 of the Code of Alabama.
- Payment Bond: required for contracts of \$50,000.0 or more, attach original with surety's power-of-attorney original required per Section 39-2-8 of the Code of Alabama.
- Certified Tabulation of Bids (attach copy): required for all projects including those with informal bids required per Section 39-2-6 of the Code of Alabama.
- DCM Form C-3: Proposal Form (attach copy)
- DCM Form C-3A: Accounting of Sales Tax (attach copy): copy must be of the executed C-3A from the bid required per Section 40-9-14.1 of the Code of Alabama.
- E-Verify Memorandum of Understanding (attach copy): entire document required required per Section 31-13-25(b) of the Code of Alabama.
- Alabama Disclosure Statement (attach original) required per Section 41-16-82 of the Code of Alabama.

FORWARDING CONTRACT and ATTACHMENTS

After determining that the Construction Contract (signed by the Contractor) and attachments are in order, the design professional shall forward all six (6) copies of these documents (with original signatures) to the Owner for signature. The Owner shall then forward the documents per the Review/Signature Flow instructions specified on the contract form underneath the signature block.

SUBMITTAL TO DCM:

- All contract documents and attachments must be single-sided on letter-sized paper without staples; use clips. Purpose: quickly and efficiently scan thousands of documents into DCM's database. Scanners compatible with the database do not scan double-sided nor legal-sized paper.
- Contracts with double-sided printing will not be accepted.
- The Contract Document Administration Fee-CC and the Permit Fee must be paid by the time a Construction Contract for a state agency project, Alabama Community College System (ACCS) project or PSCA-funded project is submitted to DCM for review, or when a fully locally-funded project Construction Contract is converted to PSCA. Contract reviews can begin once the fees have been paid.
- The Permit Fee must be paid by the time a copy of a fully locally-funded K-12 school project's executed Construction Contract is received at DCM's office from the State Department of Education (SDE).

Basic Contract Document Administration (CDA) Fee: This fee covers review of the Agreement Between Owner and Architect (O/A Agreement) and Construction Contract for state agency projects, ACCS projects and partially or fully PSCA-funded projects of K-12 public schools and universities and the related amendments, change orders, service invoices and pay requests. This fee does not apply to fully locally- funded K-12 public school projects or fully locally-funded university projects. The Basic CDA Fee covers review of the original submitted document and one revision. The total basic CDA fee is 1/2 of 1% of the total construction cost, due in two parts: 1/4 of 1% (.25%) of the Project Budget for administration of the O/ A Agreement. 1/4 of 1% (.25%) of the Construction Contract Amount for administration of the Construction Contract.

<u>Additional Revised Contract Document Fee</u>: When more than one revision of a Construction Contract is required, an additional fee of \$200.00 will be charged to the design professional for each additional submittal until the document is executed.

<u>Basic Permit Fee</u>: This fee covers required project inspections. The Permit Fee is due when a construction contract or self-performance letter is received by DCM, and must be paid before a Pre-Construction Conference is scheduled with DCM Inspectors for any type of project. Note: although DCM does not review the construction contracts of non-ACCS public higher education institutions such as two and four-year universities, the permit fee must be paid before a required Pre-Construction Conference is scheduled with DCM Inspectors for such projects.

<u>Fees may be paid</u> online at www.dcm.alabama.gov or paid with a physical check. Make check payable to: "Finance - Construction Management", include the DCM (BC) Project #, if assigned, on the check and attach the CDA Fees Calculation Worksheet (also available on www.dcm.alabama.gov). Mail payment to: Finance -Construction Management, P.O. Box 301150, Montgomery, AL 36130-1150. For payments using Public School and College Authority (PSCA) funds and for state agency inter-fund transfers: contact Jennie Jones at 334-242-4808 or jennie.jones@realproperty.alabama.gov. (1) Do not staple this form and/or attachments; use clips. Print single-sided; do not submit double side printed documents

double-side printed documents.

Numbers in margin correspond to "Checklist", DCM Form B-7

DCM (BC) Project No.

CONSTRUCTION CONTRACT

(2) (3)	This Construction Contract is entered into this between the OWNER , Entity Name: Address: Email & Phone #:	day of	in the ye	ear of
(4)	and the CONTRACTOR , Company Name: Address: Email & Phone #:			
(5)	for the WORK of the Project, identified as:			
(6) (7)	The CONTRACT DOCUMENTS are dated ADDENDA		and have	been amended by
(8)	The ARCHITECT is Firm Name: Address: Email & Phone #:			
(9)	The CONTRACT SUM is			
(10)	Dollars (\$) and is the sum of the BID ALTERNATE PRICES:	Contractor's Base Bid for	the Work	and the following
(11)	The CONTRACT TIME is		() calendar days.
	THE OWNER AND THE CONTRACTOR AGR	EE AS FOLLOWS: The	e Contract	Documents, as

defined in the General Conditions of the Contract (DCM Form C-8), are incorporated herein by reference. The Contractor shall perform the Work in accordance with the Contract Documents. The Owner will pay and the Contractor will accept as full compensation for such performance of the Work, the Contract Sum subject to additions and deductions (including liquidated damages) as provided in the Contract Documents. The Work shall commence on a date to be specified in a Notice to Proceed issued by the Owner or the Director, Alabama Division of Construction Management, and shall then be substantially completed within the Contract Time.

(12) LIQUIDATED DAMAGES for which the Contractor and its Surety (if any) shall be liable and may be required to pay the Owner in accordance with the Contract Documents shall be equal to six percent interest per annum on the total Contract Sum unless a dollar amount is stipulated in the following space, in which case liquidated damages shall be determined at ______ dollars (\$_____) per calendar day.

(13) **SPECIAL PROVISIONS** (Special Provisions may be inserted here, such as acceptance or rejection of unit prices. *If Special Provisions are continued in an attachment, identify the attachment below*):

(14)	STATE GENERAL CONTRACTOR'S LIC Contractor is currently licensed by the Alabama and that the certificate for such license bears the followi	ENSE: The Contractor does hereby certify that a State Licensing Board for General Contractors ng:		
	License No.: Classification	n(s):		
	Bid Limit:			
	The Owner and Contractor have entered into this Construction Contract as of the date first written abo and have executed this Construction Contract in sufficient counterparts to enable each contracti- party to have an originally executed Construction Contract each of which shall, without proof or accounti- for the other counterparts, be deemed an original thereof. The Owner does hereby certify that this Construction Contract was let in accordance with t provisions of Title 39, Code of Alabama 1975, as amended, and all other applicable provisions of law, and the the terms and commitments of this Construction Contract do not constitute a debt of the State of Alabama violation of Article 11, Section 213 of the Constitution of Alabama, 1901, as amended Amendment Number 26.			
(15)	APPROVAL	CONTRACTING PARTIES		
	ALABAMA STATE DEPARTMENT OF EDUCATION (SDE) (Required for locally-funded, SDE projects.)	Contractor Company		
	ByDate: State Superintendent of Education	BySignature		
		Owner Entity		
		BySignature		

Numbers in margin correspond to "Checklist", DCM Form B-7

Review/Signature flow: Architect/Engineer (prepare documents) > Contractor (review and sign) > Architect/Engineer (review) > Owner (review and sign) > SDE (review, sign and distribute the fully executed Contract to all parties, and forward a copy to the Alabama Division of Construction Management [DCM]). Note: DCM does not sign fully locally-funded SDE project contract documents.

(1)	PERFORMANCE BOND	SURETY'S BOND NUMBER	
	Do not staple this form; use clips.		
(2)	The PRINCIPAL (<i>Company name and address of Contractor as appears in th</i> Name: Address:	e Construction Contract)	
(3)	The SURETY (<i>Company name and primary place of business</i>) Name: Address:		
(4)	The OWNER (<i>Entity name and address, same as appears in the Construction C</i> Name: Address:	ontract)	
(5)	The PENAL SUM of this Bond (the Contract Sum)	Dollars (\$).	
(6)	DATE of the Construction Contract :		
(7)	The PROJECT : (Same as appears in the Construction Contract)		
	1. WE, THE PRINCIPAL (hereinafter "Contractor") AND TH hereby bind ourselves, our heirs, executors, administrators, succe the Penal Sum stated above for the performance of the Contract accord with the requirements of the Contract Documents, which a If the Contractor performs the Contract, and Contract Chang Contract Documents, then this obligation shall be null and void force and effect.	E SURETY , jointly and severally essors, and assigns to the Owner in t, and Contract Change Orders, in re incorporated herein by reference e Orders, in accordance with th t; otherwise it shall remain in ful	, n n : e 1

2. The Penal Sum shall remain equal to the Contract Sum as the Contract Sum is adjusted by Contract Change Orders. All Contract Change Orders involving an increase in the Contract Sum will require consent of Surety by endorsement of the Contract Change Order form. The Surety waives notification of any Contract Change Orders involving only extension of the Contract Time.
- 3. Whenever the Architect gives the Contractor and the Surety, at their addresses stated above, a written Notice to Cure a condition for which the Contract may be terminated in accordance with the Contract Documents, the Surety may, within the time stated in the notice, cure or provide the Architect with written verification that satisfactory positive action is in process to cure the condition.
- **4.** The Surety's obligation under this Bond becomes effective after the Contractor fails to satisfy a Notice to Cure and the Owner:
 - (a) gives the Contractor and the Surety, at their addresses stated above, a written Notice of Termination declaring the Contractor to be in default under the Contract and stating that the Contractor's right to complete the Work, or a designated portion of the Work, shall terminate seven days after the Contractor's receipt of the notice; and
 - (b) gives the Surety a written demand that, upon the effective date of the Notice of Termination, the Surety promptly fulfill its obligation under this Bond.
- 5. In the presence of the conditions described in Paragraph 4, the Surety shall, at its expense:
 - (a) On the effective date of the Notice of Termination, take charge of the Work and be responsible for the safety, security, and protection of the Work, including materials and equipment stored on and off the Project site, and
 - (b) Within twenty-one days after the effective date of the Notice of Termination, proceed, or provide the Owner with written verification that satisfactory positive action is in process to facilitate proceeding promptly, to complete the Work in accordance with the Contract Documents, either with the Surety's resources or through a contract between the Surety and a qualified contractor to whom the Owner has no reasonable objection.
- 6. As conditions precedent to taking charge of and completing the Work pursuant to Paragraph 5, the Surety shall neither require, nor be entitled to, any agreements or conditions other than those of this Bond and the Contract Documents. In taking charge of and completing the Work, the Surety shall assume all rights and obligations of the Contractor under the Contract Documents; however, the Surety shall also have the right to assert "Surety Claims" to the Owner in accordance with the Contract Documents. The presence or possibility of a Surety Claim shall not be just cause for the Surety to fail or refuse to promptly take charge of and complete the Work or for the Owner to fail or refuse to continue to make payments in accordance with the Contract Documents.
- **7.** By accepting this Bond as a condition of executing the Construction Contract, and by taking the actions described in Paragraph 4, the Owner agrees that:
 - (a) the Owner shall promptly advise the Surety of the unpaid balance of the Contract Sum and, upon request, shall make available or furnish to the Surety, at the cost of reproduction, any portions of the Project Record, and
 - (b) as the Surety completes the Work, or has it completed by a qualified contractor, the Owner shall pay the Surety, in accordance with terms of payment of the Contract Documents, the unpaid balance of the Contract Sum, less any amounts that may be or become due the Owner from the Contractor under the Construction Contract or from the Contractor or the Surety under this Bond.
- 8. In the presence of the conditions described in Paragraph 4, the Surety's obligation includes responsibility for the correction of Defective Work, liquidated damages, and reimbursement of any reasonable expenses incurred by the Owner as a result of the Contractor's default under the Contract, including architectural, engineering, administrative, and legal services.

- **9.** Nothing contained in this Bond shall be construed to mean that the Surety shall be liable to the Owner for an amount exceeding the Penal Sum of this Bond, except in the event that the Surety should be in default under the Bond by failing or refusing to take charge of and complete the Work pursuant to Paragraph 5. If the Surety should fail or refuse to take charge of and complete the Work, the Owner shall have the authority to take charge of and complete the Work, or have it completed, and the following costs to the Owner, less the unpaid balance of the Contract Sum, shall be recoverable under this Bond:
 - (a) the cost of completing the Contractor's responsibilities under the Contract, including correction of Defective Work;
 - (b) additional architectural, engineering, managerial, and administrative services, and reasonable attorneys' fees incident to completing the Work;
 - (c) interest on, and the cost of obtaining, funds to supplement the unpaid balance of the Contract Sum as may be necessary to cover the foregoing costs;
 - (d) the fair market value of any reductions in the scope of the Work necessitated by insufficiency of the unpaid balance of the Contract Sum and available supplemental funds to cover the foregoing costs; and
 - (f) additional architectural, engineering, managerial, and administrative services, and reasonable attorneys' fees incident to ascertaining and collecting the Owner's losses under the Bond.
- **10.** All claims and disputes arising out of or related to this bond, or its breach, shall be resolved in accordance with Article 24, General Conditions of the Contract.

SIGNED AND SEALED this da	y of,
SURETY:	CONTRACTOR as PRINCIPAL:
Company Name	Company Name
BySignature	By Signature
Name and Title	Name and Title

(11) NOTE: Original power of attorney for the Surety's signatory shall be furnished with each of the original six bond forms to be attached to each of the six contract forms per project.

Do not staple this form; use clips. Purpose: quickly and efficiently scan thousands of documents into DCM's database.

(9 &

(1)	PAYMENT BOND	SURETY'S BOND NUMBER	
	Do not staple this form; use clips.		
(2)	The PRINCIPAL (Company name and address of Contractor, same as appears in the Construction Contract) Name: Address:		
(3)	The SURETY (<i>Company name and primary place of business</i>) Name: Address:		
(4)	The OWNER(s) (Entity name and address, same as appears in the Construction Contract) Name: Address:		
(5)	The PENAL SUM of this Bond (the Contract Sum)	ollars (\$).	
(6)	DATE of the Construction Contract:		
(7)	The PROJECT : (Same as appears in the Construction Contract)		
	1. WE, THE PRINCIPAL (hereinafter "Contractor") AND THE SURETY, jointly and severally, hereby bind ourselves, our heirs, executors, administrators, successors, and assigns to the Owner in the Penal Sum stated above to promptly pay all persons supplying labor, materials, or supplies for or in the prosecution of the Contract, which is incorporated herein by reference, and any modifications thereof by Contract Change Orders. If the Contractor and its Subcontractors promptly pay all persons supplying labor, materials, or supplies for or in the prosecution of the Contract Change Orders. If the Contract or in the prosecution of the Contract and Contract Change Orders, then this obligation shall be null and void; otherwise to remain and be in full force and effect.		
	2. The Penal Sum shall remain equal to the Contract Sum as the Contract Sum is adjusted by Contract Change Orders. All Contract Change Orders involving an increase in the Contract Sum will require consent of Surety by endorsement of the Contract Change Order form. The Surety waive notification of any Contract Change Orders involving only extension of the Contract Time.		

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- and Contract Change Orders for which payment has not been timely made may institute a civil action upon this Bond and have their rights and claims adjudicated in a civil action and judgment entered Numbers in margin correspond to second page of "Checklist", DCM Form B-7 thereon. Notwithstanding the foregoing, a civil action may not be instituted on this bond until 45 days after written notice to the Surety of the amount claimed to be due and the nature of the claim. The civil action must commence not later than one year from the date of final settlement of the Contract. The giving of notice by registered or certified mail, postage prepaid, addressed to the Surety at any of its places of business or offices shall be deemed sufficient. In the event the Surety or Contractor fails to pay the claim in full within 45 days from the mailing of the notice, then the person or persons may recover from the Contractor and Surety, in addition to the amount of the claim, a reasonable attorney's fee based on the result, together with interest on the claim from the date of the notice. 4. Every person having a right of action on this bond shall, upon written application to the Owner indicating that labor, material, or supplies for the Work have been supplied and that payment has not been made, be promptly furnished a certified copy of this bond and the Construction Contract. The claimant may bring a civil action in the claimant's name on this Bond against the Contractor and the Surety, or either of them, in the county in which the Work is to be or has been performed or in any other county where venue is otherwise allowed by law. 5. This bond is furnished to comply with Code of Alabama, §39-1-1, and all provisions thereof shall be applicable to civil actions upon this bond.
 - 6. All claims and disputes between Owner and either the Contractor or Surety arising out of or related to this bond, or its breach, shall be resolved in accordance with Article 24, General Conditions of the Contract.

3. Any person that has furnished labor, materials, or supplies for or in the prosecution of the Contract

(8) SIGNED AND SEALED this _____ day of _____

SURETY: (9 & 10)

Company Name

Company Name

CONTRACTOR as PRINCIPAL:

By

Signature

Name and Title

Name and Title

Signature

(11)NOTE: Original power of attorney for the Surety's signatory shall be furnished with each of the original six bond forms to be attached to each of the six contract forms per project.

Do not staple this form; use clips. Purpose: quickly and efficiently scan thousands of documents into DCM's database.

By

GENERAL CONDITIONS of the CONTRACT

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ARTICLE 1 DEFINITIONS

Whenever the following terms, or pronouns in place of them, are used in the Contract Documents, the intent and meaning shall be interpreted as follows:

- A. ALABAMA DIVISION OF CONSTRUCTION MANAGEMENT: The Technical Staff of the Alabama Division of Construction Management.
- **B. ARCHITECT:** The Architect is the person or entity lawfully licensed to practice architecture in the State of Alabama, who is under contract with the Owner as the primary design professional for the Project and identified as the Architect in the Construction Contract. The term "Architect" means the Architect or the Architect's authorized representative. If the employment of the Architect is terminated, the Owner shall employ a new Architect whose status under the Contract Documents shall be that of the former Architect. If the primary design professional for the Project is a Professional Engineer, the term "Engineer" shall be substituted for the term "Architect" wherever it appears in this document.

- **C. COMMISSION:** The former Alabama Building Commission, for which the Alabama Division of Construction Management has been designated by the Legislature as its successor.
- **D. CONTRACT:** The Contract is the embodiment of the Contract Documents. The Contract represents the entire and integrated agreement between the Owner and Contractor and supersedes any prior written or oral negotiations, representations or agreements that are not incorporated into the Contract Documents. The Contract may be amended only by a Contract Change Order or a Modification to the Construction Contract. The contractual relationship which the Contract creates between the Owner and the Contractor extends to no other persons or entities. The Contract consists of the following Contract Documents, including all additions, deletions, and modifications incorporated therein before the execution of the Construction Contract:
 - (1) Construction Contract
 - (2) Performance and Payment Bonds
 - (3) Conditions of the Contract (General, Supplemental, and other Conditions)
 - (4) Specifications
 - (5) Drawings
 - (6) Contract Change Orders
 - (7) Modifications to the Construction Contract (applicable to PSCA Projects)
- **E. CONTRACT SUM:** The Contract Sum is the total amount payable by the Owner to the Contractor for performance of the Work under the Contract Documents. The term "Contract Sum" means the Contract Sum stated in the Construction Contract as may have been increased or decreased by Change Order(s) in accordance with the Contract Documents.
- F. CONTRACT TIME: The Contract Time is the period of time in which the Contractor must achieve Substantial Completion of the Work. The date on which the Contract Time begins is specified in the written Notice To Proceed issued to the Contractor by the Owner or Director. The Date of Substantial Completion is the date established in accordance with Article 32. The term "Contract Time" means the Contract Time stated in the Construction Contract as may have been extended by Change Order(s) in accordance with the Contract Documents. The term "day" as used in the Contract Documents shall mean calendar day unless otherwise specifically defined.
- **G. CONTRACTOR:** The Contractor is the person or persons, firm, partnership, joint venture, association, corporation, cooperative, limited liability company, or other legal entity, identified as such in the Construction Contract. The term "Contractor" means the Contractor or the Contractor's authorized representative.
- H. DCM: The Alabama Division of Construction Management.
- I. DCM PROJECT INSPECTOR: The member of the Technical Staff of the Alabama Division of Construction Management to whom the Project is assigned relative to executing the respective inspections and authorities described in Article 16, Inspection of the Work.
- J. DEFECTIVE WORK: The term "Defective Work" shall apply to: (1) any product, material, system, equipment, or service, or its installation or performance, which does not conform to the requirements of the Contract Documents, (2) in-progress or completed Work the workmanship of which does not conform to the quality specified or, if not specified, to the quality produced by skilled workers performing work of a similar nature on similar projects in the state, (3) substitutions and deviations not properly submitted and approved or otherwise authorized, (4) temporary

supports, structures, or construction which will not produce the results required by the Contract Documents, and (5) materials or equipment rendered unsuitable for incorporation into the Work due to improper storage or protection.

- K. DIRECTOR: The Director of the Alabama Division of Construction Management.
- L. DRAWINGS: The Drawings are the portions of the Contract Documents showing graphically the design, location, layout, and dimensions of the Work, in the form of plans, elevations, sections, details, schedules, and diagrams.
- **M. NOTICE TO PROCEED:** A proceed order issued by the Owner or Director, as applicable, fixing the date on which the Contractor shall begin the prosecution of the Work, which is also the date on which the Contract Time shall begin.
- N. OWNER: The Owner is the entity or entities identified as such in the Construction Contract and is referred to throughout the Contract Documents as if singular in number. The term "Owner" means the Owner or the Owner's authorized representative. The term "Owner" as used herein shall be synonymous with the term "Awarding Authority" as defined and used in Title 39 Public Works, <u>Code of Alabama</u>, 1975, as amended.
- **O. THE PROJECT:** The Project is the total construction of which the Work required by these Contract Documents may be the entirety or only a part with other portions to be constructed by the Owner or separate contractors.
- **P. PROJECT MANUAL:** The Project Manual is the volume usually assembled for the Work which may include the Advertisement for Bids, Instructions to Bidders, sample forms, General Conditions of the Contract, Supplementary Conditions, and Specifications of the Work.
- **Q. SPECIFICATIONS:** The Specifications are that portion of the Contract Documents which set forth in writing the standards of quality and performance of products, equipment, materials, systems, and services and workmanship required for acceptable performance of the Work.
- **R. SUBCONTRACTOR:** A Subcontractor is a person or entity who is undertaking the performance of any part of the Work by virtue of a contract with the Contractor. The term "Subcontractor" means a Subcontractor or its authorized representatives.
- **S. THE WORK:** The Work is the construction and services required by the Contract Documents and includes all labor, materials, supplies, equipment, and other items and services as are necessary to produce the required construction and to fulfill the Contractor's obligations under the Contract. The Work may constitute the entire Project or only a portion of it.

ARTICLE 2 INTENT and INTERPRETATION of the CONTRACT DOCUMENTS

A. <u>INTENT</u>

It is the intent of the Contract Documents that the Contractor shall properly execute and complete the Work described by the Contract Documents, and unless otherwise provided in the Contract, the

Contractor shall provide all labor, materials, equipment, tools, construction equipment and machinery, water, heat, utilities, transportation, and other facilities and services, whether temporary or permanent and whether or not incorporated or to be incorporated in the Work, in full accordance with the Contract Documents and reasonably inferable from them as being necessary to produce the indicated results.

B. <u>COMPLEMENTARY DOCUMENTS</u>

The Contract Documents are complementary. If Work is required by one Contract Document, the Contractor shall perform the Work as if it were required by all of the Contract Documents. However, the Contractor shall be required to perform Work only to the extent that is consistent with the Contract Documents and reasonably inferable from them as being necessary to produce the indicated results.

C. ORDER of PRECEDENCE

Should any discrepancy arise between the various elements of the Contract Documents, precedence shall be given to them in the following order unless to do so would contravene the apparent Intent of the Contract Documents stated in preceding Paragraph A:

- (1) The Construction Contract.
- (2) Addenda, with those of later date having precedence over those of earlier date.
- (3) Supplementary Conditions (or other Conditions which modify the General Conditions of the Contract).
- (4) General Conditions of the Contract.
- (5) The Specifications.
- (6) Details appearing on the Drawings; large scale details shall take precedence over smaller scale details.
- (7) The Drawings; large scale drawings shall take precedence over smaller scale drawings.

D. ORGANIZATION

Except as may be specifically stated within the technical specifications, neither the organization of the Specifications into divisions, sections, or otherwise, nor any arrangement of the Drawings shall control how the Contractor subcontracts portions of the Work or assigns Work to any trade.

E. <u>INTERPRETATION</u>

(1) The Contract Documents shall be interpreted collectively, each part complementing the others and consistent with the Intent of the Contract Documents stated in preceding Paragraph A. Unless an item shown or described in the Contract Documents is specifically identified to be furnished or installed by the Owner or others or is identified as "Not In Contract" ("N.I.C."), the Contractor's obligation relative to that item shall be interpreted to include furnishing, assembling, installing, finishing, and/or connecting the item at the Contractor's expense to produce a product or system that is complete, appropriately tested, and in operative condition ready for use or subsequent construction or operation of the Owner or separate contractors. The omission of words or phases for brevity of the Contract Documents, the inadvertent omission of words or phrases, or obvious typographical or written errors shall not defeat such interpretation as long as it is reasonably inferable from the Contract Documents as a whole.

(2) Words or phrases used in the Contract Documents which have well-known technical or

construction industry meanings are to be interpreted consistent with such recognized meanings unless otherwise indicated.

(3) Except as noted otherwise, references to standard specifications or publications of associations, bureaus, or organizations shall mean the latest edition of the referenced standard specification or publication as of the date of the Advertisement for Bids.

(4) In the case of inconsistency between Drawings and Specifications or within either document not clarified by addendum, the better quality or greater quantity of Work shall be provided in accordance with the Architect's interpretation.

(5) Any portions of the Contract Documents written in longhand must be initialed by all parties..

(6) Any doubt as to the meaning of the Contract Documents or any obscurity as to the wording of them, shall be promptly submitted in writing to the Architect for written interpretation, explanation, or clarification.

F. <u>SEVERABILITY</u>.

The partial or complete invalidity of any one or more provision of this Contract shall not affect the validity or continuing force and effect of any other provision.

ARTICLE 3 CONTRACTOR'S REPRESENTATIONS

By executing the Construction Contract the Contractor represents to the Owner:

- **A.** The Contractor has visited the site of the Work to become familiar with local conditions under which the Work is to be performed and to evaluate reasonably observable conditions as compared with requirements of the Contract Documents.
- **B.** The Contractor shall use its best skill and attention to perform the Work in an expeditious manner consistent with the Contract Documents.
- **C.** The Contractor is an independent contractor and in performance of the Contract remains and shall act as an independent contractor having no authority to represent or obligate the Owner in any manner unless authorized by the Owner in writing.

ARTICLE 4 DOCUMENTS FURNISHED to CONTRACTOR

Unless otherwise provided in the Contract Documents, twenty sets of Drawings and Project Manuals will be furnished to the Contractor by the Architect without charge. Other copies requested will be furnished at reproduction cost.

ARTICLE 5 OWNERSHIP of DRAWINGS

All original or duplicated Drawings, Specifications, and other documents prepared by the Architect, and furnished to the Contractor are the property of the Architect and are to be used solely for this Project and not to be used in any manner for other work. Upon completion of the Work, all copies of Drawings and Specifications, with the exception of the Contractor's record set, shall be returned or accounted for by the Contractor to the Architect, on request.

ARTICLE 6 <u>SUPERVISION, SUPERINTENDENT, and EMPLOYEES</u>

A. <u>SUPERVISION and CONSTRUCTION METHODS</u>

(1) The term "Construction Methods" means the construction means, methods, techniques, sequences, and procedures utilized by the Contractor in performing the Work. The Contractor is solely responsible for supervising and coordinating the performance of the Work, including the selection of Construction Methods, unless the Contract Documents give other specific instructions concerning these matters.

(2) The Contractor is solely and completely responsible for job site safety, including the protection of persons and property in accordance with Article 14.

(3) The Contractor shall be responsible to the Owner for acts and omissions of not only the Contractor and its agents and employees, but all persons and entities, and their agents and employees, who are performing portions of the Work for or on behalf of the Contractor or any of its Subcontractors.

(4) The Contractor shall be responsible to inspect the in-progress and completed Work to verify its compliance with the Contract Documents and to insure that any element or portion of the Work upon which subsequent Work is to be applied or performed is in proper condition to receive the subsequent Work.

B. <u>SUPERINTENDENT</u>

(1) The Contractor shall employ and maintain a competent level of supervision for the performance of the Work at the Project site, including a superintendent who shall:

(a) have full authority to receive instructions from the Architect or Owner and to act on those instructions and (b) be present at the Project site at all times during which Work is being performed.

(2) Before beginning performance of the Work, the Contractor shall notify the Architect in writing of the name and qualifications of its proposed superintendent so that the Owner may review the individual's qualifications. If, for reasonable cause, the Owner refuses to approve the individual, or withdraws its approval after once giving it, the Contractor shall name a different superintendent for the Owner's review and approval. Any disapproved superintendent will not perform in that capacity thereafter at the Project site.

C. <u>EMPLOYEES</u>

The Contractor shall permit only fit and skilled persons to perform the Work. The Contractor shall enforce safety procedures, strict discipline, and good order among persons performing the Work. The Contractor will remove from its employment on the Project any person who deliberately or persistently produces non-conforming Work or who fails or refuses to conform to reasonable rules of personal conduct contained in the Contract Documents or implemented by the Owner and delivered to the Contractor in writing during the course of the Work.

ARTICLE 7 REVIEW of CONTRACT DOCUMENTS and FIELD CONDITIONS by CONTRACTOR

- A. In order to facilitate assembly and installation of the Work in accordance with the Contract Documents, before starting each portion of the Work, the Contractor shall examine and compare the relevant Contract Documents, and compare them to relevant field measurements made by the Contractor and any conditions at the site affecting that portion of the Work.
- **B.** If the Contractor discovers any errors, omissions, or inconsistencies in the Contract Documents, the Contractor shall promptly report them to the Architect as a written request for information that includes a detailed statement identifying the specific Drawings or Specifications that are in need of clarification and the error, omission, or inconsistency discovered in them.

(1) The Contractor shall not be expected to act as a licensed design professional and ascertain whether the Contract Documents comply with applicable laws, statutes, ordinances, building codes, and rules and regulations, but the Contractor shall be obligated to promptly notify the Architect of any such noncompliance discovered by or made known to the Contractor. If the Contractor performs Work without fulfilling this notification obligation, the Contractor shall pay the resulting costs and damages that would have been avoided by such notification.

(2) The Contractor shall not be liable to the Owner for errors, omissions, or inconsistencies that may exist in the Contract Documents, or between the Contract Documents and conditions at the site, unless the Contractor knowingly fails to report a discovered error, omission, or inconsistency to the Architect, in which case the Contractor shall pay the resulting costs and damages that would have been avoided by such notification.

- **C.** If the Contractor considers the Architect's response to a request for information to constitute a change to the Contract Documents involving additional costs and/or time, the Contractor shall follow the procedures of Article 20, Claims for Extra Cost or Extra Work.
- **D.** If, with undue frequency, the Contractor requests information that is obtainable through reasonable examination and comparison of the Contract Documents, site conditions, and previous correspondence, interpretations, or clarifications, the Contractor shall be liable to the Owner for reasonable charges from the Architect for the additional services required to review, research, and respond to such requests for information.

ARTICLE 8 SURVEYS by CONTRACTOR

- A. The Contractor shall provide competent engineering services to assure accurate execution of the Work in accordance with the Contract Documents. The Contractor shall verify the figures given for the contours, approaches and locations shown on the Drawings before starting any Work and be responsible for the accuracy of the finished Work. Without extra cost to the Owner, the Contractor shall engage a licensed surveyor if necessary to verify boundary lines, keep within property lines, and shall be responsible for encroachments on rights or property of public or surrounding property owners.
- **B.** The Contractor shall establish all base lines for the location of the principal components of the Work and make all detail surveys necessary for construction, including grade stakes, batter boards and other working points, lines and elevations. If the Work involves alteration of or addition to existing structures or improvements, the Contractor shall locate and measure elements of the existing conditions as is necessary to facilitate accurate fabrication, assembly, and installation of new Work in the relationship, alignment, and/or connection to the existing structure or improvement as is shown in the Contract Documents.

ARTICLE 9 SUBMITTALS

- **A.** Where required by the Contract Documents, the Contractor shall submit shop drawings, product data, samples and other information (hereinafter referred to as Submittals) to the Architect for the purpose of demonstrating the way by which the Contractor proposes to conform to the requirements of the Contract Documents. Submittals which are not required by the Contract Documents may be returned by the Architect without action.
- **B.** The Contractor shall be responsible to the Owner for the accuracy of its Submittals and the conformity of its submitted information to the requirements of the Contract Documents. Each Submittal shall bear the Contractor's approval, evidencing that the Contractor has reviewed and found the information to be in compliance with the requirements of the Contract Documents. Submittals which are not marked as reviewed and approved by the Contractor may be returned by the Architect without action.
- **C.** The Contractor shall prepare and deliver its submittals to the Architect sufficiently in advance of construction requirements and in a sequence as to cause no delay in the Work or in the activities of the Owner or of separate contractors. In coordinating the Submittal process with its construction schedule, the Contractor shall allow sufficient time to permit adequate review by the Architect.
- **D.** By approving a Submittal the Contractor represents not only that the element of Work presented in the Submittal complies with the requirements of the Contract Documents, but also that the Contractor has:

(1) found the layout and/or dimensions in the Submittal to be comparable with those in the Contract Documents and other relevant Submittals and has made field measurements as necessary to verify their accuracy, and

(2) determined that products, materials, systems, equipment and/or procedures presented in the Submittal are compatible with those presented, or being presented, in other relevant Submittals and

with the Contractor's intended Construction Methods.

- **E.** The Contractor shall not fabricate or perform any portion of the Work for which the Contract Documents require Submittals until the respective Submittals have been approved by the Architect.
- **F.** In the case of a resubmission, the Contractor shall direct specific attention to all revisions in a Submittal. The Architect's approval of a resubmission shall not apply to any revisions that were not brought to the Architect's attention.
- **G.** If the Contract Documents specify that a Submittal is to be prepared and sealed by a registered architect or licensed engineer retained by the Contractor, all drawings, calculations, specifications, and certifications of the Submittal shall bear the Alabama seal of registration and signature of the registered/licensed design professional who prepared them or under whose supervision they were prepared. The Owner and the Architect shall be entitled to rely upon the adequacy, accuracy and completeness of such a Submittal, provided that all performance and design criteria that such Submittal must satisfy are sufficiently specified in the Contract Documents. The Architect will review, approve or take other appropriate action on such a Submittal only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. The Contractor shall not be responsible for the adequacy of the performance or design criteria specified in the Contract Documents.

H. <u>DEVIATIONS</u>

(1) The Architect is authorized by the Owner to approve "minor" deviations from the requirements of the Contract Documents. "Minor" deviations are defined as those which are in the interest of the Owner, do not materially alter the quality or performance of the finished Work, and do not affect the cost or time of performance of the Work. Deviations which are not "minor" may be authorized only by the Owner through the Change Order procedures of Article 19.

(2) Any deviation from the requirements of the Contract Documents contained in a Submittal shall be clearly identified as a "Deviation from Contract Requirements" (or by similar language) within the Submittal and, in a letter transmitting the Submittal to the Architect, the Contractor shall direct the Architect's attention to, and request specific approval of, the deviation. Otherwise, the Architect's approval of a Submittal does not constitute approval of deviations from the requirements of the Contract Documents contained in the Submittal.

(3) The Contractor shall bear all costs and expenses of any changes to the Work, changes to work performed by the Owner or separate contractors, or additional services by the Architect required to accommodate an approved deviation unless the Contractor has specifically informed the Architect in writing of the required changes and a Change Order has been issued authorizing the deviation and accounting for such resulting changes and costs.

I. <u>ARCHITECT'S REVIEW and APPROVAL</u>

(1) The Architect will review the Contractor's Submittals for conformance with requirements of, and the design concept expressed in, the Contract Documents and will approve or take other appropriate action upon them. This review is not intended to verify the accuracy and completeness of details such as dimensions and quantities nor to substantiate installation instructions or performance of equipment or systems, all of which remain the responsibility of the Contractor. However, the Architect shall advise the Contractor of any errors or omissions which the Architect

may detect during this review. The Architect's approval of a specific item shall not indicate approval of an assembly of which the item is a component.

(2) The Architect will review and respond to all Submittals with reasonable promptness to avoid delay in the Work or in the activities of the Owner, Contractor or separate contractors, while allowing sufficient time to permit adequate review.

(3) No corrections or changes to Submittals indicated by the Architect will be considered as authorizations to perform Extra Work. If the Contractor considers such correction or change of a Submittal to require Work which differs from the requirements of the Contract Documents, the Contractor shall promptly notify the Architect in writing in accordance with Article 20, Claims for Extra Cost or Extra Work.

J. <u>CONFORMANCE with SUBMITTALS</u>

The Work shall be constructed in accordance with approved Submittals.

ARTICLE 10 DOCUMENTS and SAMPLES at the SITE

A. <u>"AS ISSUED" SET</u>

The Contractor shall maintain at the Project site, in good order, at least one copy of all Addenda, Change Orders, supplemental drawings, written directives and clarifications, and approved Submittals intact as issued, and an updated construction schedule.

B. <u>"POSTED" SET</u>

The Contractor shall maintain at the Project site, in good order, at least one set of the Drawings and Project Manual into which the Contractor has "posted"(incorporated) all Addenda, Change Orders, supplemental drawings, clarifications, and other information pertinent to the proper performance of the Work. The Contractor shall assure that all sets of the Drawings and Project Manuals being used by the Contractor, Subcontractors, and suppliers are "posted" with the current information to insure that updated Contract Documents are used for performance of the Work.

C. <u>RECORD SET</u>

One set of the Drawings and Project Manual described in Paragraph B shall be the Contractor's record set in which the Contractor shall record all field changes, corrections, selections, final locations, and other information as will be duplicated on the "As-built" documents required under Article 11. The Contractor shall record such "as-built" information in its record set as it becomes available through progress of the Work. The Contractor's performance of this requirement shall be subject to confirmation by the Architect at any time as a prerequisite to approval of Progress Payments.

D. The documents and samples required by this Article to be maintained at the Project site shall be readily available to the Architect, Owner, DCM Project Inspector, and their representatives.

ARTICLE 11 <u>"AS-BUILT" DOCUMENTS</u>

- A. Unless otherwise provided in the Contract Documents, the Contractor shall deliver two (2) sets of "As-built" documents, as described herein, to the Architect for submission to the Owner upon completion of the Work. Each set of "As-built' documents shall consist of a copy of the Drawings and Project Manual, in like-new condition, into which the Contractor has neatly incorporated all Addenda, Change Orders, supplemental drawings, clarifications, field changes, corrections, selections, actual locations of underground utilities, and other information as required herein or specified elsewhere in the Contract Documents.
- **B.** The Contractor shall use the following methods for incorporating information into the "As-built" documents:

(1) Drawings

(a) To the greatest extent practicable, information shall be carefully drawn and lettered, in ink, on the Drawings in the form of sketches, details, plans, notes, and dimensions as required to provide a fully dimensioned record of the Work. When required for clarity, sketches, details, or partial plans shall be drawn on supplemental sheets and bound into the Drawings and referenced on the drawing being revised.

(b) Where a revised drawing has been furnished by the Architect, the drawing of latest date shall be bound into the Drawings in the place of the superseded drawing.

(c) Where a supplemental drawing has been furnished by the Architect, the supplemental drawing shall be bound into the Drawings in an appropriate location and referred to by notes added to the drawing being supplemented.

(d) Where the Architect has furnished details, partial plans, or lengthy notes of which it would be impractical for the Contractor to redraw or letter on a drawing, such information may be affixed to the appropriate drawing with transparent tape if space is available on the drawing.

(e) Any entry of information made in the Drawings that is the result of an Addendum or Change Order, shall identify the Addendum or Change Order from which it originated.

(2) **Project Manual**

(a) A copy of all Addenda and Change Orders, excluding drawings thereof, shall be bound in the front of the Project Manual.

(b) Where a document, form, or entire specification section is revised, the latest issue shall be bound into the Project Manual in the place of the superseded issue.

(c) Where information within a specification section is revised, the deleted or revised information shall be drawn through in ink and an adjacent note added identifying the Addendum or Change Order containing the revised information.

C. Within ten days after the Date of Substantial Completion of the Work, or the last completed portion of the Work, the Contractor shall submit the "As-built" documents to the Architect for approval. If the Architect requires that any corrections be made, the documents will be returned in a reasonable time for correction and resubmission.

ARTICLE 12 <u>PROGRESS SCHEDULE</u>

(Not applicable if the Contract Time is 60 days or less.)

- A. The Contractor shall within fifteen days after the date of commencement stated in the Notice to Proceed, or such other time as may be provided in the Contract Documents, prepare and submit to the Architect for review and approval a practicable construction schedule informing the Architect and Owner of the order in which the Contractor plans to carry on the Work within the Contract Time. The Architect's review and approval of the Contractor's construction schedule shall be only for compliance with the specified format, Contract Time, and suitability for monitoring progress of the Work and shall not be construed as a representation that the Architect has analyzed the schedule to form opinions of sequences or durations of time represented in the schedule.
- **B.** If a schedule format is not specified elsewhere in the Contract Documents, the construction schedule shall be prepared using DCM Form C-11, "Sample Progress Schedule and Report", (contained in the Project Manual) or similar format of suitable scale and detail to indicate the percentage of Work scheduled to be completed at the end of each month. At the end of each month the Contractor shall enter the actual percentage of completion on the construction schedule submit two copies to the Architect, and attach one copy to each copy of the monthly Application for Payment. The construction schedule shall be revised to reflect any agreed extensions of the Contract Time or as required by conditions of the Work.
- **C.** If a more comprehensive schedule format is specified elsewhere in the Contract Documents or voluntarily employed by the Contractor, it may be used in lieu of DCM Form C-11.
- **D.** The Contractor's construction schedule shall be used by the Contractor, Architect, and Owner to determine the adequacy of the Contractor's progress. The Contractor shall be responsible for maintaining progress in accordance with the currently approved construction schedule and shall increase the number of shifts, and/or overtime operations, days of work, and/or the amount of construction plant and equipment as may be necessary to do so. If the Contractor's progress falls materially behind the currently approved construction schedule and, in the opinion of the Architect or Owner, the Contractor is not taking sufficient steps to regain schedule, the Architect may, with the Owner's concurrence, issue the Contractor a Notice to Cure pursuant to Article 27. In such a Notice to Cure the Architect may require the Contractor to submit such supplementary or revised construction schedules as may be deemed necessary to demonstrate the manner in which schedule will be regained.

ARTICLE 13 EQUIPMENT, MATERIALS, and SUBSTITUTIONS

- A. Every part of the Work shall be executed in a workmanlike manner in accordance with the Contract Documents and approved Submittals. All materials used in the Work shall be furnished in sufficient quantities to facilitate the proper and expeditious execution of the Work and shall be new except such materials as may be expressly provided or allowed in the Contract Documents to be otherwise.
- **B.** Whenever a product, material, system, item of equipment, or service is identified in the Contract Documents by reference to a trade name, manufacturer's name, model number, etc.(hereinafter

referred to as "source"), and only one or two sources are listed, or three or more sources are listed and followed by "or approved equal" or similar wording, it is intended to establish a required standard of performance, design, and quality, and the Contractor may submit, for the Architect's approval, products, materials, systems, equipment, or services of other sources which the Contractor can prove to the Architect's satisfaction are equal to, or exceed, the standard of performance, design and quality specified, unless the provisions of Paragraph D below apply. Such proposed substitutions are not to be purchased or installed without the Architect's written approval of the substitution.

- **C.** If the Contract Documents identify three or more sources for a product, material, system, item of equipment or service to be used and the list of sources is not followed by "or approved equal" or similar wording, the Contractor may make substitution only after evaluation by the Architect and execution of an appropriate Contract Change Order.
- **D.** If the Contract Documents identify only one source and expressly provide that it is an approved sole source for the product, material, system, item of equipment, or service, the Contractor must furnish the identified sole source.

ARTICLE 14 SAFETY and PROTECTION of PERSONS and PROPERTY

- A. The Contractor shall be solely and completely responsible for conditions at the Project site, including safety of all persons (including employees) and property. The Contractor shall create, maintain, and supervise conditions and programs to facilitate and promote safe execution of the Work, and shall supervise the Work with the attention and skill required to assure its safe performance. Safety provisions shall conform to OSHA requirements and all other federal, state, county, and local laws, ordinances, codes, and regulations. Where any of these are in conflict, the more stringent requirement shall be followed. Nothing contained in this Contract shall be construed to mean that the Owner has employed the Architect nor has the Architect employed its consultants to administer, supervise, inspect, or take action regarding safety programs or conditions at the Project site.
- **B.** The Contractor shall employ Construction Methods, safety precautions, and protective measures that will reasonably prevent damage, injury or loss to:
 - (1) workers and other persons on the Project site and in adjacent and other areas that may be affected by the Contractor's operations;
 - (2) the Work and materials and equipment to be incorporated into the Work and stored by the Contractor on or off the Project site; and
 - (3) other property on, or adjacent to, the Project site, including trees, shrubs, lawns, walks, pavements, roadways, structures, utilities, and other improvements not designated in the Contract Documents to be removed, relocated, or replaced.
- **C.** The Contractor shall be responsible for the prompt remedy of damage and loss to property, including the filing of appropriate insurance claims, caused in whole or in part by the fault or negligence of the Contractor, a Subcontractor, or anyone for whose acts they may be liable.

- **D.** The Contractor shall comply with and give notices required by applicable laws, ordinances, rules, regulations and lawful orders of public authorities bearing on safety and protection of persons or property, including without limitation notices to adjoining property owners of excavation or other construction activities that potentially could cause damage or injury to adjoining property or persons thereon.
- **E.** The Contractor shall erect and maintain barriers, danger signs, and any other reasonable safeguards and warnings against hazards as may be required for safety and protection during performance of the Contract and shall notify owners and users of adjacent sites and utilities of conditions that may exist or arise which may jeopardize their safety.
- **F.** If use or storage of explosives or other hazardous materials or equipment or unusual Construction Methods are necessary for execution of the Work, the Contractor shall exercise commensurate care and employ supervisors and workers properly qualified to perform such activity.
- **G.** The Contractor shall furnish a qualified safety representative at the Project site whose duties shall include the prevention of accidents. The safety representative shall be the Contractor's superintendent, unless the Contractor assigns this duty to another responsible member of its on-site staff and notifies the Owner and Architect in writing of such assignment.
- **H.** The Contractor shall not permit a load to be applied, or forces introduced, to any part of the construction or site that may cause damage to the construction or site or endanger safety of the construction, site, or persons on or near the site.
- I. The Contractor shall have the right to act as it deems appropriate in emergency situations jeopardizing life or property. The Contractor shall be entitled to equitable adjustment of the Contract Sum or Contract Time for its efforts expended for the sole benefit of the Owner in an emergency. Such adjustment shall be determined as provided in Articles 19 and 20.
- J. The duty of the Architect and the Architect's consultants to visit the Project site to conduct periodic inspections of the Work or for other purposes shall not give rise to a duty to review or approve the adequacy of the Contractor's safety program, safety supervisor, or any safety measure which Contractor takes or fails to take in, on, or near the Project site.

ARTICLE 15 HAZARDOUS MATERIALS

- A. A Hazardous Material is any substance or material identified as hazardous under any federal, state, or local law or regulation, or any other substance or material which may be considered hazardous or otherwise subject to statutory or regulatory requirements governing its handling, disposal, and/or clean-up. Existing Hazardous Materials are Hazardous Materials discovered at the Project site and not introduced to the Project site by the Contractor, a Subcontractor, or anyone for whose acts they may be liable.
- **B.** If, during the performance of the Work, the Contractor encounters a suspected Existing Hazardous Material, the Contractor shall immediately stop work in the affected area, take measures appropriate to the condition to keep people away from the suspected Existing Hazardous Material, and

immediately notify the Architect and Owner of the condition in writing.

- **C.** The Owner shall obtain the services of an independent laboratory or professional consultant, appropriately licensed and qualified, to determine whether the suspected material is a Hazardous Material requiring abatement and, if so, to certify after its abatement that it has been rendered harmless. Any abatement of Existing Hazardous Materials will be the responsibility of the Owner. The Owner will advise the Contractor in writing of the persons or entities who will determine the nature of the suspected material and those who will, if necessary, perform the abatement. The Owner will not employ persons or entities to perform these services to whom the Contractor or Architect has reasonable objection.
- **D.** After certification by the Owner's independent laboratory or professional consultant that the material is harmless or has been rendered harmless, work in the affected area shall resume upon written agreement between the Owner and Contractor. If the material is found to be an Existing Hazardous Material and the Contractor incurs additional cost or delay due to the presence and abatement of the material, the Contract Sum and/or Contract Time shall be appropriately adjusted by a Contract Change Order pursuant to Article 19.
- **E.** The Owner shall not be responsible for Hazardous Materials introduced to the Project site by the Contractor, a Subcontractor, or anyone for whose acts they may be liable unless such Hazardous Materials were required by the Contract Documents.

ARTICLE 16 INSPECTION of the WORK

A. <u>GENERAL</u>

(1) The Contractor is solely responsible for the Work's compliance with the Contract Documents; therefore, the Contractor shall be responsible to inspect in-progress and completed Work, and shall verify its compliance with the Contract Documents and that any element or portion of the Work upon which subsequent Work is to be applied or performed is in proper condition to receive the subsequent Work. Neither the presence nor absence of inspections by the Architect, Owner, Director, DCM Project Inspector, any public authority having jurisdiction, or their representatives shall relieve the Contractor of responsibility to inspect the Work, for responsibility for Construction Methods and safety precautions and programs in connection with the Work, or from any other requirement of the Contract Documents.

(2) The Architect, Owner, Director, DCM Project Inspector, any public authority having jurisdiction, and their representatives shall have access at all times to the Work for inspection whenever it is in preparation or progress, and the Contractor shall provide proper facilities for such access and inspection. All materials, workmanship, processes of manufacture, and methods of construction, if not otherwise stipulated in the Contract Documents, shall be subject to inspection, examination, and test at any and all places where such manufacture and/or construction are being carried on. Such inspections will not unreasonably interfere with the Contractor's operations.

(3) The Architect will inspect the Work as a representative of the Owner. The Architect's inspections may be supplemented by inspections by the DCM Project Inspector as a representative of the Alabama Division of Construction Management.

(4) The Contractor may be charged by the Owner for any extra cost of inspection incurred by the Owner or Architect on account of material and workmanship not being ready at the time of inspection set by the Contractor.

B. <u>TYPES of INSPECTIONS</u>

(1) SCHEDULED INSPECTIONS and CONFERENCES. Scheduled Inspections and Conferences are conducted by the Architect, scheduled by the Architect in coordination with the Contractor and DCM Project Inspector, and are attended by the Contractor and applicable Subcontractors, suppliers and manufacturers, and the DCM Project Inspector. Scheduled Inspections and Conferences of this Contract include:

- (a) Pre-construction Conference.
- (b) **Pre-roofing Conference** (not applicable if the Contract involves no roofing work)

(c) Above Ceiling Inspection(s): An above ceiling inspection of all spaces in the building is required before the ceiling material is installed. Above ceiling inspections are to be conducted at a time when all above ceiling systems are complete and tested to the greatest extent reasonable pending installation of the ceiling material. System identifications and markings are to be complete. All fire-rated construction including fire-stopping of penetrations and specified identification above the ceiling shall be complete. Ceiling framing and suspension systems shall be complete with lights, grilles and diffusers, access panels, fire protection drops for sprinkler heads, etc., installed in their final locations to the greatest extent reasonable. Above ceiling framing to support ceiling mounted equipment shall be complete. The above ceiling construction shall be complete to the extent that after the inspection the ceiling material can be installed without disturbance.

(d) Final Inspection(s): A Final Inspection shall establish that the Work, or a designated portion of the Work, is Substantially Complete in accordance with Article 32 and is accepted by the Architect, Owner, and DCM Project Inspector as being ready for the Owner's occupancy or use. At the conclusion of this inspection, items requiring correction or completion ("punch list" items) shall be minimal and require only a short period of time for accomplishment to establish Final Acceptance of the Work. If the Work, or designated portion of the Work, includes the installation, or modification, of a fire alarm system or other life safety systems essential to occupancy, such systems shall have been tested and appropriately certified before the Final Inspection.

(e) Year-end Inspection(s): An inspection of the Work, or each separately completed portion thereof, is required near the end of the Contractor's one year warranty period(s). The subsequent delivery of the Architect's report of this inspection will serve as confirmation that the Contractor was notified of Defective Work found within the warranty period in accordance with Article 35.

(2) **PERIODIC INSPECTIONS.** Periodic Inspections are conducted throughout the course of the Work by the Architect, the Architect's consultants, their representatives, and the DCM Project Inspector, jointly or independently, with or without advance notice to the Contractor.

(3) SPECIFIED INSPECTIONS and TESTS. Specified Inspections and Tests include inspections, tests, demonstrations, and approvals that are either specified in the Contract Documents or required by laws, ordinances, rules, regulations, or orders of public authorities having jurisdiction, to be performed by the Contractor, one of its Subcontractors, or an independent testing laboratory or firm (whether paid for by the Contractor or Owner).

C. **INSPECTIONS by the ARCHITECT**

(1) The Architect is not authorized to revoke, alter, relax, or waive any requirements of the Contract Documents (other than "minor" deviations as defined in Article 9 and "minor" changes as defined in Article 19), to finally approve or accept any portion of the Work or to issue instructions contrary to the Contract Documents without concurrence of the Owner.

(2) The Architect will visit the site at intervals appropriate to the stage of the Contractor's operations and as otherwise necessary to:

(a) become generally familiar with the in-progress and completed Work and the quality of the Work,

(b) determine whether the Work is progressing in general accordance with the Contractor's schedule and is likely to be completed within the Contract Time,

(c) visually compare readily accessible elements of the Work to the requirements of the Contract Documents to determine, in general, if the Contractor's performance of the Work indicates that the Work will conform to the requirements of the Contract Documents when completed,

(d) endeavor to guard the Owner against Defective Work,

(e) review and address with the Contractor any problems in implementing the requirements of the Contract Documents that the Contractor may have encountered, and

(f) keep the Owner fully informed about the Project.

(3) The Architect shall have the authority to reject Defective Work or require its correction, but shall not be required to make exhaustive investigations or examinations of the in-progress or completed portions of the Work to expose the presence of Defective Work. However, it shall be an obligation of the Architect to report in writing, to the Owner, Contractor, and DCM Project Inspector, any Defective Work recognized by the Architect.

(4) The Architect shall have the authority to require the Contractor to stop work only when, in the Architect's reasonable opinion, such stoppage is necessary to avoid Defective Work. The Architect shall not be liable to the Contractor or Owner for the consequences of any decisions made by the Architect in good faith either to exercise or not to exercise this authority.

(5) "Inspections by the Architect" includes appropriate inspections by the Architect's consultants as dictated by their respective disciplines of design and the stage of the Contractor's operations.

D. **INSPECTIONS by the DCM PROJECT INSPECTOR**

- (1) The DCM Project Inspector will:
 - (a) participate in scheduled inspections and conferences as practicable,

(b) perform periodic inspections of in-progress and completed Work to ensure code compliance of the Project and general conformance of the Work with the Contract Documents, and

(c) monitor the Contractor's progress and performance of the Work.

(2) The DCM Project Inspector shall have the authority to:(a) reject Work that is not in compliance with the State Building Code adopted by the DCM,

(a) reject work that is not in compnance with the State Building Code adopted by the DCM, unless the Work is in accordance with the Contract Documents in which case the DCM Project Inspector will advise the Architect to initiate appropriate corrective action, and(b) notify the Architect, Owner, and Contractor of Defective Work recognized by the DCM Project Inspector.

(3) The DCM Project Inspector's periodic inspections will usually be scheduled around key stages of construction based upon information reported by the Architect. As the Architect or Owner deems appropriate, the DCM Project Inspector, as well as other members of the Technical Staff, can be requested to schedule special inspections or meetings to address specific matters. The written findings of DCM Project Inspector will be transmitted to the Owner, Contractor, and Architect.

(4) The DCM Project Inspector is not authorized to revoke, alter, relax, or waive any requirements of the Contract Documents, to finally approve or accept any portion of the Work or to issue instructions contrary to the Contract Documents without concurrence of the Owner. The Contractor shall not proceed with Work as a result of instructions or findings of the DCM Project Inspector which the Contractor considers to be a change to the requirements of the Contract Documents without written authorization of the Owner through the Architect.

E. <u>UNCOVERING WORK</u>

(1) If the Contractor covers a portion of the Work before it is examined by the Architect and this is contrary to the Architect's request or specific requirements in the Contract Documents, then, upon written request of the Architect, the Work must be uncovered for the Architect's examination and be replaced at the Contractor's expense without change in the Contract Time.

(2) Without a prior request or specific requirement that Work be examined by the Architect before it is covered, the Architect may request that Work be uncovered for examination and the Contractor shall uncover it. If the Work is in accordance with the Contract Documents, the Contract Sum shall be equitably adjusted under Article 19 to compensate the Contractor for the costs of uncovering and replacement. If the Work is not in accordance with the Contract Documents, uncovering, correction, and replacement shall be at the Contractor's expense unless the condition was caused by the Owner or a separate contractor in which event the Owner shall be responsible for payment of such costs.

F. <u>SPECIFIED INSPECTIONS and TESTS</u>

(1) The Contractor shall schedule and coordinate Specified Inspections and Tests to be made at appropriate times so as not to delay the progress of the Work or the work of the Owner or separate contractors. If the Contract Documents require that a Specified Inspection or Test be witnessed or attended by the Architect or Architect's consultant, the Contractor shall give the Architect timely notice of the time and place of the Specified Inspection or Test. If a Specified Inspection or Test reveals that Work is not in compliance with requirements of the Contract Documents, the Contractor shall bear the costs of correction, repeating the Specified Inspection or Test, and any related costs incurred by the Owner, including reasonable charges, if any, by the Architect for additional services. Through appropriate Contract Change Order the Owner shall bear costs of tests, inspections or approvals which become Contract requirements subsequent to the receipt of bids.

(2) If the Architect, Owner, or public authority having jurisdiction determines that inspections, tests, demonstrations, or approvals in addition to Specified Inspections and Tests are required, the Contractor shall, upon written instruction from the Architect, arrange for their performance by an entity acceptable to the Owner, giving timely notice to the architect of the time and place of their performance. Related costs shall be borne by the Owner unless the procedures reveal that Work is

not in compliance with requirements of the Contract Documents, in which case the Contractor shall bear the costs of correction, repeating the procedures, and any related costs incurred by the Owner, including reasonable charges, if any, by the Architect for additional services.

(3) Unless otherwise required by the Contract Documents, required certificates of Specified Inspections and Tests shall be secured by the Contractor and promptly delivered to the Architect.

(4) Failure of any materials to pass Specified Inspections and Tests will be sufficient cause for refusal to consider any further samples of the same brand or make of that material for use in the Work.

ARTICLE 17 CORRECTION of DEFECTIVE WORK

- **A.** The Contractor shall, at the Contractor's expense, promptly correct Defective Work rejected by the Architect or which otherwise becomes known to the Contractor, removing the rejected or nonconforming materials and construction from the project site.
- **B.** Correction of Defective Work shall be performed in such a timely manner as will avoid delay of completion, use, or occupancy of the Work and the work of the Owner and separate contractors.
- C. The Contractor shall bear all expenses related to the correction of Defective Work, including but not limited to: (1) additional testing and inspections, including repeating Specified Inspections and Tests, (2) reasonable services and expenses of the Architect, and (3) the expense of making good all work of the Contractor, Owner, or separate contractors destroyed or damaged by the correction of Defective Work.

ARTICLE 18 DEDUCTIONS for UNCORRECTED WORK

If the Owner deems it advisable and in the Owner's interest to accept Defective Work, the Owner may allow part or all of such Work to remain in place, provided an equitable deduction from the Contract Sum, acceptable to the Owner, is offered by the Contractor.

ARTICLE 19 CHANGES in the WORK

A. <u>GENERAL</u>

(1) The Owner may at any time direct the Contractor to make changes in the Work which are within the general scope of the Contract, including changes in the Drawings, Specifications, or other portions of the Contract Documents to add, delete, or otherwise revise portions of the Work. The Architect is authorized by the Owner to direct "minor" changes in the Work by written order to the Contractor. "Minor" changes in the Work are defined as those which are in the interest of the Owner, do not materially alter the quality or performance of the finished Work, and do not affect the cost or time of performance of the Work. Changes in the Work which are not "minor" may be

authorized only by the Owner.

(2) If the Owner directs a change in the Work, the change shall be incorporated into the Contract by a Contract Change Order prepared by the Architect and signed by the Contractor, Owner, and other signatories to the Construction Contract, stating their agreement upon the change or changes in the Work and the adjustments, if any, in the Contract Sum and the Contract Time.

(3) Subject to compliance with Alabama's Public Works Law, the Owner may, upon agreement by the Contractor, incorporate previously unawarded bid alternates into the Contract.

(4) In the event of a claim or dispute as to the appropriate adjustment to the Contract Sum or Contract Time due to a directive to make changes in the Work, the Work shall proceed as provided in this article subject to subsequent agreement of the parties or final resolution of the dispute pursuant to Article 24.

(5) Consent of surety will be obtained for all Contract Change Orders involving an increase in the Contract Sum.

(6) Changes in the Work shall be performed under applicable provisions of the Contract Documents and the Contractor shall proceed promptly to perform changes in the Work, unless otherwise directed by the Owner through the Architect.

(7) All change orders require DCM Form C-12: Contract Change Order and DCM Form B-11: Change Order Justification. Only Change Orders 10% or greater of the current contract amount require the Owner's legal advisor's signature on DCM Form B-11: Change Order Justification.

B. DETERMINATION of ADJUSTMENT of the CONTRACT SUM

The adjustment of the Contract Sum resulting from a change in the Work shall be determined by one of the following methods, or a combination thereof, as selected by the Owner:

(1) Lump Sum. By mutual agreement to a lump sum based on or negotiated from an itemized cost proposal from the Contractor. Additions to the Contract Sum shall include the Contractor's direct costs plus a maximum 15% markup for overhead and profit. Where subcontract work is involved the total mark-up for the Contractor and a Subcontractor shall not exceed 25%. Changes which involve a net credit to the Owner shall include fair and reasonable credits for overhead and profit on the deducted work, in no case less than 5%. For the purposes of this method of determining an adjustment of the Contract Sum, "overhead" shall cover the Contractor's indirect costs of the change, such as the cost of bonds, superintendent and other job office personnel, watchman, job office, job office supplies and expenses, temporary facilities and utilities, and home office expenses.

(2) Unit Price. By application of Unit Prices included in the Contract or subsequently agreed to by the parties. However, if the character or quantity originally contemplated is materially changed so that application of such unit price to quantities of Work proposed will cause substantial inequity to either party, the applicable unit price shall be equitably adjusted.

(3) Force Account. By directing the Contractor to proceed with the change in the Work on a "force account" basis under which the Contractor shall be reimbursed for reasonable expenditures incurred by the Contractor and its Subcontractors in performing added Work and the Owner shall

receive reasonable credit for any deleted Work. The Contractor shall keep and present, in such form as the Owner may prescribe, an itemized accounting of the cost of the change together with sufficient supporting data. Unless otherwise stated in the directive, the adjustment of the Contract Sum shall be limited to the following:

(a) costs of labor and supervision, including employee benefits, social security, retirement, unemployment and workers' compensation insurance required by law, agreement, or under Contractor's or Subcontractor's standard personnel policy;

(b) cost of materials, supplies and equipment, including cost of delivery, whether incorporated or consumed;

(c) rental cost of machinery and equipment, not to exceed prevailing local rates if contractorowned;

(d) costs of premiums for insurance required by the Contract Documents, permit fees, and sales, use or similar taxes related to the change in the Work;

(e) reasonable credits to the Owner for the value of deleted Work, without Contractor or Subcontractor mark-ups; and

(f) for additions to the Contract Sum, mark-up of the Contractor's direct costs for overhead and profit not exceeding 15% on Contractor's work nor exceeding 25% for Contractor and Subcontractor on a Subcontractor's work. Changes which involve a net credit to the Owner shall include fair and reasonable credits for overhead and profit on the deducted work, in no case less than 5%. For the purposes of this method of determining an adjustment of the Contract Sum, "overhead" shall cover the Contractor's indirect costs of the change, such as the cost of insurance other than mentioned above, bonds, superintendent and other job office personnel, watchman, use and rental of small tools, job office, job office supplies and expenses, temporary facilities and utilities, and home office expenses.

C. ADJUSTMENT of the CONTRACT TIME due to CHANGES

(1) Unless otherwise provided in the Contract Documents, the Contract Time shall be equitably adjusted for the performance of a change provided that the Contractor notifies the Architect in writing that the change will increase the time required to complete the Work. Such notice shall be provided no later than:

(a) with the Contractor's cost proposal stating the number of days of extension requested, or

(b) within ten days after the Contractor receives a directive to proceed with a change in advance of submitting a cost proposal, in which case the notice should provide an estimated number of days of extension to be requested, which may be subject to adjustment in the cost proposal.

(2) The Contract Time shall be extended only to the extent that the change affects the time required to complete the entire Work of the Contract, taking into account the concurrent performance of the changed and unchanged Work.

D. <u>CHANGE ORDER PROCEDURES</u>

(1) If the Owner proposes to make a change in the Work, the Architect will request that the Contractor provide a cost proposal for making the change to the Work. The request shall be in writing and shall adequately describe the proposed change using drawings, specifications, narrative, or a combination thereof. Within 21 days after receiving such a request, or such other time as may be stated in the request, the Contractor shall prepare and submit to the Architect a written proposal, properly itemized and supported by sufficient substantiating data to facilitate evaluation. The stated

time within which the Contractor must submit a proposal may be extended if, within that time, the Contractor makes a written request with reasonable justification thereof.

(2) The Contractor may voluntarily offer a change proposal which, in the Contractor's opinion, will reduce the cost of construction, maintenance, or operation or will improve the cost-effective performance of an element of the Project, in which case the Owner, through the Architect, will accept, reject, or respond otherwise within 21 days after receipt of the proposal, or such other reasonable time as the Contractor may state in the proposal.

(3) If the Contractor's proposal is acceptable to the Owner, or is negotiated to the mutual agreement of the Contractor and Owner, the Architect will prepare an appropriate Contract Change Order for execution. Upon receipt of the fully executed Contract Change Order, the Contractor shall proceed with the change.

(4) In advance of delivery of a fully executed Contract Change Order, the Architect may furnish to the Contractor a written authorization to proceed with an agreed change. However, such an authorization shall be effective only if it:

- (a) identifies the Contractor's accepted or negotiated proposal for the change,
- (b) states the agreed adjustments, if any, in Contract Sum and Contract Time,
- (c) states that funds are available to pay for the change, and
- (d) is signed by the Owner.

(5) If the Contractor and Owner cannot agree on the amount of the adjustment in the Contract Sum for a change, the Owner, through the Architect, may order the Contractor to proceed with the change on a Force Account basis, but the net cost to the Owner shall not exceed the amount quoted in the Contractor's proposal. Such order shall state that funds are available to pay for the change.

(6) If the Contractor does not promptly respond to a request for a proposal, or the Owner determines that the change is essential to the final product of the Work and that the change must be effected immediately to avoid delay of the Project, the Owner may:

(a) determine with the Contractor a sufficient maximum amount to be authorized for the change and

(b) direct the Contractor to proceed with the change on a Force Account basis pending delivery of the Contractor's proposal, stating the maximum increase in the Contract Sum that is authorized for the change.

(7) Pending agreement of the parties or final resolution of any dispute of the total amount due the Contractor for a change in the Work, amounts not in dispute for such changes in the Work may be included in Applications for Payment accompanied by an interim Change Order indicating the parties' agreement with part of all of such costs or time extension. Once a dispute is resolved, it shall be implemented by preparation and execution of an appropriate Change Order.

ARTICLE 20 CLAIMS for EXTRA COST or EXTRA WORK

A. If the Contractor considers any instructions by the Architect, Owner, DCM Project Inspector, or public authority having jurisdiction to be contrary to the requirements of the Contract Documents and will involve extra work and/or cost under the Contract, the Contractor shall give the Architect

written notice thereof within ten days after receipt of such instructions, and in any event before proceeding to execute such work. As used in this Article, "instructions" shall include written or oral clarifications, directions, instructions, interpretations, or determinations.

- **B.** The Contractor's notification pursuant to Paragraph 20.A shall state: (1) the date, circumstances, and source of the instructions, (2) that the Contractor considers the instructions to constitute a change to the Contract Documents and why, and (3) an estimate of extra cost and time that may be involved to the extent an estimate may be reasonably made at that time.
- **C.** Except for claims relating to an emergency endangering life or property, no claim for extra cost or extra work shall be considered in the absence of prior notice required under Paragraph 20.A.
- **D.** Within ten days of receipt of a notice pursuant to Paragraph 20.A, the Architect will respond in writing to the Contractor, stating one of the following:
 - (1) The cited instruction is rescinded.

(2) The cited instruction is a change in the Work and in which manner the Contractor is to proceed with procedures of Article 19, Changes in the Work.

(3) The cited instruction is reconfirmed, is not considered by the Architect to be a change in the Contract Documents, and the Contractor is to proceed with Work as instructed.

E. If the Architect's response to the Contractor is as in Paragraph 20.D(3), the Contractor shall proceed with the Work as instructed. If the Contractor continues to consider the instructions to constitute a change in the Contract Documents, the Contractor shall, within ten days after receiving the Architect's response, notify the Architect in writing that the Contractor intends to submit a claim pursuant to Article 24, Resolution of Claims and Disputes

ARTICLE 21 DIFFERING SITE CONDITIONS

A. <u>DEFINITION</u>

"Differing Site Conditions" are:

- (1) subsurface or otherwise concealed physical conditions at the Project site which differ materially from those indicated in the Contract Documents, or
- (2) unknown physical conditions at the Project site which are of an unusual nature, differing materially from conditions ordinarily encountered and generally recognized as inherent in construction activities of the character required by the Contract Documents.

B. <u>PROCEDURES</u>

If Differing Site Conditions are encountered, then the party discovering the condition shall promptly notify the other party before the condition is disturbed and in no event later than ten days after discovering the condition. Upon such notice and verification that a Differing Site Condition exists, the Architect will, with reasonable promptness and with the Owner's concurrence, make changes in the Drawings and/or Specifications as are deemed necessary to conform to the Differing

Site Condition. Any increase or decrease in the Contract Sum or Contract Time that is warranted by the changes will be made as provided under Article 19, Changes in the Work. If the Architect determines a Differing Site Condition has not been encountered, the Architect shall notify the Owner and Contractor in writing, stating the reason for that determination.

ARTICLE 22 CLAIMS for DAMAGES

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

ARTICLE 23 DELAYS

- A. A delay beyond the Contractor's control at any time in the commencement or progress of Work by an act or omission of the Owner, Architect, or any separate contractor or by labor disputes, unusual delay in deliveries, unavoidable casualties, fires, abnormal floods, tornadoes, or other cataclysmic events of nature, may entitle the Contractor to an extension of the Contract Time provided, however, that the Contractor shall, within ten days after the delay first occurs, give written notice to the Architect of the cause of the delay and its probable effect on progress of the entire Work.
- **B.** Adverse weather conditions that are more severe than anticipated for the locality of the Work during any given month may entitle the Contractor to an extension of Contract Time provided, however;
 - (1) the weather conditions had an adverse effect on construction scheduled to be performed during the period in which the adverse weather occurred, which in reasonable sequence would have an effect on completion of the entire Work,
 - (2) the Contractor shall, within twenty-one days after the end of the month in which the delay occurs, give the Architect written notice of the delay that occurred during that month and its probable effect on progress of the Work, and
 - (3) within a reasonable time after giving notice of the delay, the Contractor provides the Architect with sufficient data to document that the weather conditions experienced were unusually severe for the locality of the Work during the month in question. Unless otherwise provided in the Contract Documents, data documenting unusually severe weather conditions shall compare actual weather conditions to the average weather conditions for the month in question during the previous five years as recorded by the National Oceanic and Atmospheric Administration (NOAA) or similar record-keeping entities.
- **C.** Adjustments, if any, of the Contract Time pursuant to this Article shall be incorporated into the Contract by a Contract Change Order prepared by the Architect and signed by the Contractor, Owner, and other signatories to the Construction Contract or, at closeout of the Contract, by mutual

written agreement between the Contractor and Owner. The adjustment of the Contract Time shall not exceed the extent to which the delay extends the time required to complete the entire Work of the Contract.

- **D.** The Contractor shall not be entitled to any adjustment of the Contract Sum for damage due to delays claimed pursuant to this Article unless the delay was caused by the Owner or Architect and was either:
 - (1) the result of bad faith or active interference or

(2) beyond the contemplation of the parties and not remedied within a reasonable time after notification by the Contractor of its presence.

ARTICLE 24 RESOLUTION of CLAIMS and DISPUTES

A. <u>APPLICABILITY of ARTICLE</u>

(1) As used in this Article, "Claims and Disputes" include claims or disputes asserted by the Contractor, its Surety, or Owner arising out of or related to the Contract, or its breach, including without limitation claims seeking, under the provisions of the Contract, equitable adjustment of the Contract Sum or Contract Time and claims and disputes arising between the Contractor (or its Surety) and Owner regarding interpretation of the Contract Documents, performance of the Work, or breach of or compliance with the terms of the Contract.

(2) "Resolution" addressed in this Article applies only to Claims and Disputes arising between the Contractor (or its Surety) and Owner and asserted after execution of the Construction Contract and prior to the date upon which final payment is made. Upon making application for final payment the Contractor may reserve the right to subsequent Resolution of existing Claims by including a list of all Claims, in stated amounts, which remain to be resolved and specifically excluding them from any release of claims executed by the Contractor, and in that event Resolution may occur after final payment is made.

B. <u>CONTINUANCE of PERFORMANCE</u>

An unresolved Claim or Dispute shall not be just cause for the Contractor to fail or refuse to proceed diligently with performance of the Contract or for the Owner to fail or refuse to continue to make payments in accordance with the Contract Documents.

C. GOOD FAITH EFFORT to SETTLE

The Contractor and Owner agree that, upon the assertion of a Claim by the other, they will make a good faith effort, with the Architect's assistance and advice, to achieve mutual resolution of the Claim. If mutually agreed, the Contractor and Owner may endeavor to resolve a Claim through mediation. If efforts to settle are not successful, the Claim shall be resolved in accordance with paragraph D or E below, whichever applies.

D FINAL RESOLUTION for STATE-FUNDED CONTRACTS

(1) If the Contract is funded in whole or in part with state funds, the final Resolution of Claims

and Disputes which cannot be resolved by the Contractor (or its Surety) and Owner shall be by the Director, whose decision shall be final, binding, and conclusive upon the Contractor, its Surety, and the Owner.

(2) When it becomes apparent to the party asserting a Claim (the Claimant) that an impasse to mutual resolution has been reached, the Claimant may request in writing to the Director that the Claim be resolved by decision of the Director. Such request by the Contractor (or its Surety) shall be submitted through the Owner. Should the Owner fail or refuse to submit the Contractor's request within ten days of receipt of same, the Contractor may forward such request directly to the Director. Upon receipt of a request to resolve a Claim, the Director will instruct the parties as to procedures to be initiated and followed.

(3) If the respondent to a Claim fails or refuses to participate or cooperate in the Resolution procedures to the extent that the Claimant is compelled to initiate legal proceedings to induce the Respondent to participate or cooperate, the Claimant will be entitled to recover, and may amend its Claim to include, the expense of reasonable attorney's fees so incurred.

E. <u>FINAL RESOLUTION for LOCALLY-FUNDED CONTRACTS</u>

If the Contract is funded in whole with funds provided by a city or county board of education or other local governmental authority and the Contract Documents do not stipulate a binding alternative dispute resolution method, the final resolution of Claims and Disputes which cannot be resolved by the Contractor (or its Surety) and Owner may be by any legal remedy available to the parties. Alternatively, upon the written agreement of the Contractor (or its Surety) and the Owner, final Resolution of Claims and Disputes may be by submission to binding arbitration before a neutral arbitrator or panel or by submission to the Director in accordance with preceding Paragraph D.

ARTICLE 25 OWNER'S RIGHT to CORRECT DEFECTIVE WORK

If the Contractor fails or refuses to correct Defective Work in a timely manner that will avoid delay of completion, use, or occupancy of the Work or work by the Owner or separate contractors, the Architect may give the Contractor written Notice to Cure the Defective Work within a reasonable, stated time. If within ten days after receipt of the Notice to Cure the Contractor has not proceeded and satisfactorily continued to cure the Defective Work or provided the Architect with written verification that satisfactory positive action is in process to cure the Defective Work, the Owner may, without prejudice to any other remedy available to the Owner, correct the Defective Work and deduct the actual cost of the correction from payment then or thereafter due to the Contractor.

ARTICLE 26 OWNER'S RIGHT to STOP or SUSPEND the WORK

A. STOPPING the WORK for CAUSE

If the Contractor fails to correct Defective Work or persistently fails to carry out Work in accordance with the Contract Documents, the Owner may direct the Contractor in writing to stop the Work, or any part of the Work, until the cause for the Owner's directive has been eliminated;

however, the Owner's right to stop the Work shall not be construed as a duty of the Owner to be exercised for the benefit of the Contractor or any other person or entity.

B. <u>SUSPENSION by the OWNER for CONVENIENCE</u>

(1) The Owner may, at any time and without cause, direct the Contractor in writing to suspend, delay or interrupt the Work, or any part of the Work, for a period of time as the Owner may determine.

(2) The Contract Sum and Contract Time shall be adjusted, pursuant to Article 19, for reasonable increases in the cost and time caused by an Owner-directed suspension, delay or interruption of Work for the Owner's convenience. However, no adjustment to the Contract Sum shall be made to the extent that the same or concurrent Work is, was or would have been likewise suspended, delayed or interrupted for other reasons not caused by the Owner.

ARTICLE 27 OWNER'S RIGHT to TERMINATE CONTRACT

A. <u>TERMINATION by the OWNER for CAUSE</u>

(1) **Causes:** The Owner may terminate the Contractor's right to complete the Work, or any designated portion of the Work, if the Contractor:

(a) should be adjudged bankrupt, or should make a general assignment for the benefit of the Contractor's creditors, or if a receiver should be appointed on account of the Contractor's insolvency to the extent termination for these reasons is permissible under applicable law;

(b) refuses or fails to prosecute the Work, or any part of the Work, with the diligence that will insure its completion within the Contract Time, including any extensions, or fails to complete the Work within the Contract Time;

(c) refuses or fails to perform the Work, including prompt correction of Defective Work, in a manner that will insure that the Work, when fully completed, will be in accordance with the Contract Documents;

(d) fails to pay for labor or materials supplied for the Work or to pay Subcontractors in accordance with the respective Subcontract;

(e) persistently disregards laws, ordinances, or rules, regulations or orders of a public authority having jurisdiction, or the instructions of the Architect or Owner; or

(f) is otherwise guilty of a substantial breach of the Contract.

(2) Procedure for Unbonded Construction Contracts (Generally, contracts less than \$50,000):

(a) Notice to Cure: In the presence of any of the above conditions the Architect may give the Contractor written notice to cure the condition within a reasonable, stated time, but not less than ten days after the Contractor receives the notice.

(b) Notice of Termination: If, at the expiration of the time stated in the Notice to Cure, the Contractor has not proceeded and satisfactorily continued to cure the condition or provided the Architect with written verification that satisfactory positive action is in process to cure the condition, the Owner may, without prejudice to any other rights or remedies of the Owner, give the Contractor written notice that the Contractor's right to complete the Work, or a designated portion of the Work, shall terminate seven days after the Contractor's receipt of the

written Notice of Termination.

(c) If the Contractor satisfies a Notice to Cure, but the condition for which the notice was first given reoccurs, the Owner may give the Contractor a seven day Notice of Termination without giving the Contractor another Notice to Cure.

(d) At the expiration of the seven days of the termination notice, the Owner may:

.1 take possession of the site, of all materials and equipment stored on and off site, and of all Contractor-owned tools, construction equipment and machinery, and facilities located at the site, and

.2 finish the Work by whatever reasonable method the Owner may deem expedient.

(e) The Contractor shall not be entitled to receive further payment under the Contract until the Work is completed.

(f) If the Owner's cost of completing the Work, including correction of Defective Work, compensation for additional architectural, engineering, managerial, and administrative services, and reasonable attorneys' fees due to the default and termination, is less than the unpaid balance of the Contract Sum, the excess balance less liquidated damages for delay shall be paid to the Contractor. If such cost to the Owner including attorney's fees, plus liquidated damages, exceeds the unpaid balance of the Contract Sum, the Contract Sum, the Contractor shall pay the difference to the Owner. Final Resolution of any claim or Dispute involving the termination or any amount due any party as a result of the termination shall be pursuant to Article 24.

(g) Upon the Contractor's request, the Owner shall furnish to the Contractor a detailed accounting of the Owner's cost of completing the Work.

(3) **Procedure for Bonded Construction Contracts (Generally, contracts over \$50,000):**

(a) Notice to Cure: In the presence of any of the above conditions the Architect may give the Contractor and its Surety written Notice to Cure the condition within a reasonable, stated time, but not less than ten days after the Contractor receives the notice.

(b) Notice of Termination: If, at the expiration of the time stated in the Notice to Cure, the Contractor has not proceeded and satisfactorily continued to cure the condition or provided the Architect with written verification that satisfactory positive action is in process to cure the condition, the Owner may, without prejudice to any other rights or remedies of the Owner, give the Contractor and its Surety written notice declaring the Contractor to be in default under the Contract and stating that the Contractor's right to complete the Work, or a designated portion of the Work, shall terminate seven days after the Contractor's receipt of the written Notice of Termination.

(c) If the Contractor satisfies a Notice to Cure, but the condition for which the notice was first given reoccurs, the Owner may give the Contractor a Notice of Termination without giving the Contractor another Notice to Cure.

(d) **Demand on the Performance Bond:** With the Notice of Termination the Owner shall give the Surety a written demand that, upon the effective date of the Notice of Termination, the Surety promptly fulfill its obligation to take charge of and complete the Work in accordance with the terms of the Performance Bond.

(e) Surety Claims: Upon receiving the Owner's demand on the Performance Bond, the Surety shall assume all rights and obligations of the Contractor under the Contract. However, the Surety shall also have the right to assert "Surety Claims" to the Owner, which are defined as claims relating to acts or omissions of the Owner or Architect prior to termination of the Contractor which may have prejudiced its rights as Surety or its interest in the unpaid balance of the Contract Sum. If the Surety wishes to assert a Surety Claim, it shall give the Owner, through the Architect, written notice within twenty-one days after first recognizing the

condition giving rise to the Surety Claim. The Surety Claim shall then be submitted to the Owner, through the Architect, no later than sixty days after giving notice thereof, but no such Surety Claims shall be considered if submitted after the date upon which final payment becomes due. Final resolution of Surety Claims shall be pursuant to Article 24, Resolution of Claims and Disputes. The presence or possibility of a Surety Claim shall not be just cause for the Surety to fail or refuse to take charge of and complete the Work or for the Owner to fail or refuse to continue to make payments in accordance with the Contract Documents.

(f) Payments to Surety: The Surety shall be paid for completing the Work in accordance with the Contract Documents as if the Surety were the Contractor. The Owner shall have the right to deduct from payments to the Surety any reasonable costs incurred by the Owner, including compensation for additional architectural, engineering, managerial, and administrative services, and attorneys' fees as necessitated by termination of the Contractor and completion of the Work by the Surety. No further payments shall be made to the Contractor by the Owner. The Surety shall be solely responsible for any accounting to the Contractor for the portion of the Contract Sum paid to Surety by Owner or for the costs and expenses of completing the Work.

(4) Wrongful Termination: If any notice of termination by the Owner for cause, made in good faith, is determined to have been wrongly given, such termination shall be effective and compensation therefore determined as if it had been a termination for convenience pursuant to Paragraph B below.

B. <u>TERMINATION by the OWNER for CONVENIENCE</u>

(1) The Owner may, without cause and at any time, terminate the performance of Work under the Contract in whole, or in part, upon determination by the Owner that such termination is in the Owner's best interest. Such termination is referred to herein as Termination for Convenience.

(2) Upon receipt of a written notice of Termination for Convenience from the Owner, the Contractor shall:

(a) stop Work as specified in the notice;

(b) enter into no further subcontracts or purchase orders for materials, services, or facilities, except as may be necessary for Work directed to be performed prior to the effective date of the termination or to complete Work that is not terminated;

(c) terminate all existing subcontracts and purchase orders to the extent they relate to the terminated Work;

(d) take such actions as are necessary, or directed by the Architect or Owner, to protect, preserve, and make safe the terminated Work; and

(e) complete performance of the Work that is not terminated.

(3) In the event of Termination for Convenience, the Contractor shall be entitled to receive payment for the Work performed prior to its termination, including materials and equipment purchased and delivered for incorporation into the terminated Work, and any reasonable costs incurred because of the termination. Such payment shall include reasonable mark-up of costs for overhead and profit, not to exceed the limits stated in Article 19, Changes in the Work. The Contractor shall be entitled to receive payment for reasonable anticipated overhead ("home office") and shall not be entitled to receive payment for any profits anticipated to have been gained from the terminated Work. A proposal for decreasing the Contract Sum shall be submitted to the Architect by the Contractor in such time and detail, and with such supporting documentation, as is reasonably

directed by the Owner. Final modification of the Contract shall be by Contract Change Order pursuant to Article 19. Any Claim or Dispute involving the termination or any amount due a party as a result shall be resolved pursuant to Article 24.

ARTICLE 28 CONTRACTOR'S RIGHT to SUSPEND or TERMINATE the CONTRACT

A. **SUSPENSION by the OWNER**

If all of the Work is suspended or delayed for the Owner's convenience or under an order of any court, or other public authority, for a period of sixty days, through no act or fault of the Contractor or a Subcontractor, or anyone for whose acts they may be liable, then the Contractor may give the Owner a written Notice of Termination which allows the Owner fourteen days after receiving the Notice in which to give the Contractor appropriate written authorization to resume the Work. Absent the Contractor's receipt of such authorization to resume the Work, the Contract shall terminate upon expiration of this fourteen day period and the Contractor will be compensated by the Owner as if the termination had been for the Owner's convenience pursuant to Article 27.B.

B. <u>NONPAYMENT</u>

The Owner's failure to pay the undisputed amount of an Application for Payment within sixty days after receiving it from the Architect (Certified pursuant to Article 30) shall be just cause for the Contractor to give the Owner fourteen days' written notice that the Work will be suspended pending receipt of payment but that the Contract shall terminate if payment is not received within fourteen days (or a longer period stated by the Contractor) of the expiration of the fourteen day notice period.

(1) If the Work is then suspended for nonpayment, but resumed upon receipt of payment, the Contractor will be entitled to compensation as if the suspension had been by the Owner pursuant to Article 26, Paragraph B.

(2) If the Contract is then terminated for nonpayment, the Contractor will be entitled to compensation as if the termination had been by the Owner pursuant to Article 27, Paragraph B.

ARTICLE 29 PROGRESS PAYMENTS

A. FREQUENCY of PROGRESS PAYMENTS

Unless otherwise provided in the Contract Documents, the Owner will make payments to the Contractor as the Work progresses based on monthly estimates prepared and certified by the Contractor, approved and certified by the Architect, and approved by the Owner and other authorities whose approval is required.

B. <u>SCHEDULE of VALUES</u>

Within ten days after receiving the Notice to Proceed the Contractor shall submit to the Architect a

DCM Form C-10SOV, Schedule of Values, which is a breakdown of the Contract Sum showing the value of the various parts of the Work for billing purposes. The Schedule of Values shall be printable on $8.5^{"} \times 11^{"}$ for DCM's scanning purposes and shall divide the Contract Sum into as many parts ("line items") as the Architect and Owner determine necessary to permit evaluation and to show amounts attributable to Subcontractors. The Contractor's overhead and profit are to be proportionately distributed throughout the line items of the Schedule of Values. Upon approval, the Schedule of Values shall be used as a basis for monthly Applications for Payment, unless it is later found to be in error. Approved change order amounts shall be added to or incorporated into the Schedule of Values as mutually agreed by the Contractor and Architect.

C. <u>APPLICATIONS for PAYMENTS</u>

(1) Based on the approved Schedule of Values, each DCM Form C-10, Application and Certificate for Payment shall show the Contractor's estimate of the value of Work performed in each line item as of the end of the billing period. The Contractor's cost of materials and equipment not yet incorporated into the Work, but delivered and suitably stored on the site, may be considered in monthly Applications for Payment. One payment application per month may be submitted. Each DCM Form C-10, Application and Certificate for Payment shall match to the penny and be accompanied by an attached DCM Form C-10SOV, Schedule of Values.

(2) The Contractor's estimate of the value of Work performed and stored materials must represent such reasonableness as to warrant certification by the Architect to the Owner in accordance with Article 30. Each monthly Application for Payment shall be supported by such data as will substantiate the Contractor's right to payment, including without limitation copies of requisitions from subcontractors and material suppliers.

(3) If no other date is stated in the Contract Documents or agreed upon by the parties, each Application for Payment shall be submitted to the Architect on or about the first day of each month and payment shall be issued to the Contractor within thirty days after an Application for Payment is Certified pursuant to Article 30 and delivered to the Owner.

(4) Four copies of DCM Form C-10, Application and Certificate for Payment containing original signatures, with each copy of DCM Form C-10 to include all attachments, shall be submitted to DCM for review following the Contractor's, Notary's, Architect's and Owner's signatures.

D. MATERIALS STORED OFF SITE

Unless otherwise provided in the Contract Documents, the Contractor's cost of materials and equipment to be incorporated into the Work, which are stored off the site, may also be considered in monthly Applications for Payment under the following conditions:

- (1) the contractor has received written approval from the Architect and Owner to store the materials or equipment off site in advance of delivering the materials to the off site location;
- (2) a Certificate of Insurance is furnished to the Architect evidencing that a special insurance policy, or rider to an existing policy, has been obtained by the Contractor providing all-risk property insurance coverage, specifically naming the materials or equipment stored, and naming the Owner as an additionally insured party;
- (3) the Architect is provided with a detailed inventory of the stored materials or equipment and the materials or equipment are clearly marked in correlation to the inventory to facilitate inspection and verification of the presence of the materials or equipment by the Architect or

Owner;

- (4) the materials or equipment are properly and safely stored in a bonded warehouse, or a facility otherwise approved in advance by the Architect and Owner; and
- (5) compliance by the Contractor with procedures satisfactory to the Owner to establish the Owner's title to such materials and equipment or otherwise protect the Owner's interest.

E. <u>RETAINAGE</u>

(1) "Retainage" is defined as the money earned and, therefore, belonging to the Contractor (subject to final settlement of the Contract) which has been retained by the Owner conditioned on final completion and acceptance of all Work required by the Contract Documents. Retainage shall not be relied upon by Contractor (or Surety) to cover or off-set unearned monies attributable to uncompleted or uncorrected Work.

(2) In making progress payments the Owner shall retain five percent of the estimated value of Work performed and the value of the materials stored for the Work; but after retainage has been held upon fifty percent of the Contract Sum, no additional retainage will be withheld.

F. <u>CONTRACTOR'S CERTIFICATION</u>

(1) Each Application for Payment shall bear the Contractor's notarized certification that, to the best of the Contractor's knowledge, information, and belief, the Work covered by the Application for Payment has been completed in accordance with the Contract Documents, that all amounts have been paid by the Contractor for Work for which previous Certificates for Payments were issued and payments received from the Owner and that the current payment shown in the Application for Payment has not yet been received.

(2) By making this certification the Contractor represents to the Architect and Owner that, upon receipt of previous progress payments from the Owner, the Contractor has promptly paid each Subcontractor, in accordance with the terms of its agreement with the Subcontractor, the amount due the Subcontractor from the amount included in the progress payment on account of the Subcontractor's Work and stored materials. The Architect and Owner may advise Subcontractors and suppliers regarding percentages of completion or amounts requested and/or approved in an Application for Payment on account of the Subcontractor's Work and stored materials.

G. <u>PAYMENT ESTABLISHES OWNERSHIP</u>

All material and Work covered by progress payments shall become the sole property of the Owner, but the Contractor shall not be relieved from the sole responsibility for the care and protection of material and Work upon which payments have been made and for the restoration of any damaged material and Work.

ARTICLE 30 CERTIFICATION and APPROVALS for PAYMENT

A. The Architect's review, approval, and certification of Applications for Payment shall be based on the Architect's general knowledge of the Work obtained through site visits and the information provided by the Contractor with the Application. The Architect shall not be required to perform
exhaustive examinations, evaluations, or estimates of the cost of completed or uncompleted Work or stored materials to verify the accuracy of amounts requested by the Contractor, but the Architect shall have the authority to adjust the Contractor's estimate when, in the Architect's reasonable opinion, such estimates are overstated or understated.

B. Within seven days after receiving the Contractor's monthly Application for Payment, or such other time as may be stated in the Contract Documents, the Architect will take one of the following actions:

(1) The Architect will approve and certify the Application as submitted and forward it to the Owner as a Certification for Payment for approval by the Owner (and other approving authorities, if any) and payment.

(2) If the Architect takes exception to any amounts claimed by the Contractor and the Contractor and Architect cannot agree on revised amounts, the Architect will promptly issue a Certificate for Payment for the amount for which the Architect is able to certify to the Owner, transmitting a copy of same to the Contractor.

(3) To the extent the Architect determines may be necessary to protect the Owner from loss on account of any of the causes stated in Article 31, the Architect may subtract from the Contractor's estimates and will issue a Certificate for Payment to the Owner, with a copy to the Contractor, for such amount as the Architect determines is properly due and notify the Contractor and Owner in writing of the Architect's reasons for withholding payment in whole or in part.

- **C.** Neither the Architect's issuance of a Certificate for Payment nor the Owner's resulting progress payment shall be a representation to the Contractor that the Work in progress or completed at that time is accepted or deemed to be in conformance with the Contract Documents.
- **D.** The Architect shall not be required to determine that the Contractor has promptly or fully paid Subcontractors and suppliers or how or for what purpose the Contractor has used monies paid under the Construction Contract. However, the Architect may, upon request and if practical, inform any Subcontractor or supplier of the amount, or percentage of completion, approved or paid to the Contractor on account of the materials supplied or the Work performed by the Subcontractor.

ARTICLE 31 PAYMENTS WITHHELD

- A. The Architect may nullify or revise a previously issued Certificate for Payment prior to Owner's payment thereunder to the extent as may be necessary in the Architect's opinion to protect the Owner from loss on account of any of the following causes not discovered or fully accounted for at the time of the certification or approval of the Application for Payment:
 - (1) Defective Work;
 - (2) filed, or reasonable evidence indicating probable filing of, claims arising out of the Contract by other parties against the Contractor;
 - (3) the Contractor's failure to pay for labor, materials or equipment or to pay Subcontractors;
 - (4) reasonable evidence that the Work cannot be completed for the unpaid balance of the Contract Sum;
 - (5) damage suffered by the Owner or another contractor caused by the Contractor, a

Subcontractor, or anyone for whose acts they may be liable;

- (6) reasonable evidence that the Work will not be completed within the Contract Time, and that the unpaid balance is insufficient to cover applicable liquidated damages; or
- (7) the Contractor's persistent failure to conform to the requirements of the Contract Documents.
- **B.** If the Owner deems it necessary to withhold payment pursuant to preceding Paragraph A, the Owner will notify the Contractor and Architect in writing of the amount to be withheld and the reason for same.
- C. The Architect shall not be required to withhold payment for completed or partially completed Work for which compliance with the Contract Documents remains to be determined by Specified Inspections or Final Inspections to be performed in their proper sequence. However, if Work for which payment has been approved, certified, or made under an Application for Payment is subsequently determined to be Defective Work, the Architect shall determine an appropriate amount that will protect the Owner's interest against the Defective Work.

(1) If payment has not been made against the Application for Payment first including the Defective Work, the Architect will notify the Owner and Contractor of the amount to be withheld from the payment until the Defective Work is brought into compliance with the Contract Documents.

(2) If payment has been made against the Application for Payment first including the Defective Work, the Architect will withhold the appropriate amount from the next Application for Payment submitted after the determination of noncompliance, such amount to then be withheld until the Defective Work is brought into compliance with the Contract Documents.

- **D.** The amount withheld will be paid with the next Application for Payment certified and approved after the condition for which the Owner has withheld payment is removed or otherwise resolved to the Owner's satisfaction.
- **E.** The Owner shall have the right to withhold from payments due the Contractor under this Contract an amount equal to any amount which the Contractor owes the Owner under another contract.

ARTICLE 32 SUBSTANTIAL COMPLETION

- A. Substantial Completion is the stage in the progress of the Work when the Work or designated portion of the Work is sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work for its intended use without disruption or interference by the Contractor in completing or correcting any remaining unfinished Work ("punch list" items). Substantial Completion of the Work, or a designated portion of the Work, is not achieved until so agreed in a Certificate of Substantial Completion signed by the Contractor, Architect, Owner, and Technical Staff of the Alabama Division of Construction Management.
- **B.** The Contractor shall notify the Architect in writing when it considers the Work, or a portion of the Work which the Owner has agreed to accept separately, to be substantially complete and ready for a Final Inspection pursuant to Article 16. In this notification the Contractor shall identify any items remaining to be completed or corrected for Final Acceptance prior to final payment.

C. Substantial Completion is achieved and a Final Inspection is appropriate only when a minimal number of punch list items exists and only a short period of time will be required to correct or complete them. Upon receipt of the Contractor's notice for a Final Inspection, the Architect will advise the Contractor in writing of any conditions of the Work which the Architect or Owner is aware do not constitute Substantial Completion, otherwise, a Final Inspection will proceed within a reasonable time after the Contractor's notice is given. However, the Architect will not be required to prepare lengthy listings of punch list items; therefore, if the Final Inspection discloses that Substantial Completion has not been achieved, the Architect may discontinue or suspend the inspection until the Contractor does achieve Substantial Completion.

D. <u>CERTIFICATE of SUBSTANTIAL COMPLETION</u>

(1) When the Work or a designated portion of the Work is substantially complete, the Architect will prepare and sign a Certificate of Substantial Completion to be signed in order by the Contractor, Owner, and Alabama Division of Construction Management.

(2) When signed by all parties, the Certificate of Substantial Completion shall establish the Date of Substantial Completion which is the date upon which:

(a) the Work, or designated portion of the Work, is accepted by the Architect, Owner, and Alabama Division of Construction Management as being ready for occupancy,

(b) the Contractor's one-year and special warranties for the Work covered by the Certificate commence, unless stated otherwise in the Certificate (the one-year warranty for punch list items completed or corrected after the period allowed in the Certificate shall commence on the date of their Final Acceptance), and

(c) Owner becomes responsible for building security, maintenance, utility services, and insurance, unless stated otherwise in the Certificate.

(3) The Certificate of Substantial Completion shall set the time within which the Contractor shall finish all items on the "punch list" accompanying the Certificate. The completion of punch list items shall be a condition precedent to Final Payment.

(4) If the Work or designated portion covered by a Certificate of Substantial Completion includes roofing work, the General Contractor's (5-year) Roofing Guarantee, DCM Form C-9, must be executed by the Contractor and attached to the Certificate of Substantial Completion. If the Contract Documents specify any other roofing warranties to be provided by the roofing manufacturer, Subcontractor, or Contractor, they must also be attached to the Certificate of Substantial Completion. The Alabama Division of Construction Management will not sign the Certificate of Substantial Completion in the absence of the roofing guarantees.

E. The Date of Substantial Completion of the Work, as set in the Certificate of Substantial Completion of the Work or of the last completed portion of the Work, establishes the extent to which the Contractor is liable for Liquidated Damages, if any; however, should the Contractor fail to complete all punch list items within thirty days, or such other time as may be stated in the respective Certificate of Substantial Completion, the Contractor shall bear any expenses, including additional Architectural services and expenses, incurred by the Owner as a result of such failure to complete punch list items in a timely manner.

ARTICLE 33 OCCUPANCY or USE PRIOR to COMPLETION

A. <u>UPON SUBSTANTIAL COMPLETION</u>

Prior to completion of the entire Work, the Owner may occupy or begin utilizing any designated portion of the Work on the agreed Date of Substantial Completion of that portion of the Work.

B. <u>BEFORE SUBSTANTIAL COMPLETION</u>

(1) The Owner shall not occupy or utilize any portion of the Work before Substantial Completion of that portion has been achieved.

(2) The Owner may deliver furniture and equipment and store, or install it in place ready for occupancy and use, in any designated portion of the Work before it is substantially completed under the following conditions:

(a) The Owner's storage or installation of furniture and equipment will not unreasonably disrupt or interfere with the Contractor's completion of the designated portion of the Work.

(b) The Contractor consents to the Owner's planned action (such consent shall not be unreasonably withheld).

(c) The Owner shall be responsible for insurance coverage of the Owner's furniture and equipment, and the Contractor's liability shall not be increased.

(d) The Contractor, Architect, and Owner will jointly inspect and record the condition of the Work in the area before the Owner delivers and stores or installs furniture and equipment; the Owner will equitably compensate the Contractor for making any repairs to the Work that may subsequently be required due to the Owner's delivery and storage or installation of furniture and equipment.

(e) The Owner's delivery and storage or installation of furniture and equipment shall not be deemed an acceptance of any Work not completed in accordance with the requirements of the Contract Documents.

ARTICLE 34 <u>FINAL PAYMENT</u>

A. <u>PREREQUISITES to FINAL PAYMENT</u>

The following conditions are prerequisites to Final Payment becoming due the Contractor:

- (1) Full execution of a Certificate of Substantial Completion for the Work, or each designated portion of the Work.
- (2) Final Acceptance of the Work.
- (3) The Contractor's completion, to the satisfaction of the Architect and Owner, of all documentary requirements of the Contract Documents; such as delivery of "as-built" documents, operating and maintenance manuals, warranties, etc.
- (4) Delivery to the Owner of a final Application for Payment, prepared by the Contractor and approved and certified by the Architect. Architect prepares DCM Form B-13: Final Payment Checklist and forwards it to the Owner along with the final Application for Payment.
- (5) Completion of an Advertisement for Completion pursuant to Paragraph C below.
- (6) Delivery by the Contractor to the Owner through the Architect of DCM Form C-18: Contractor's Affidavit of Payment of Debts and Claims, and a Release of Claims, if any, and

such other documents as may be required by Owner, satisfactory in form to the Owner pursuant to Paragraph D below.

- (7) Consent of Surety to Final Payment, if any, to Contractor. This Consent of Surety is required for projects which have Payment and Performance Bonds.
- (8) Delivery by the Contractor to the Architect and Owner of other documents, if any, required by the Contract Documents as prerequisites to Final Payment.
- (9) See Manual of Procedures Chapter 7, Section L.7 concerning reconciliation of contract time, if any.

B. FINAL ACCEPTANCE of the WORK

"Final Acceptance of the Work" shall be achieved when all "punch list" items recorded with the Certificate(s) of Substantial Completion are accounted for by either: (1) their completion or correction by the Contractor and acceptance by the Architect, Owner, and DCM Project Inspector, or (2) their resolution under Article 18, Deductions for Uncorrected Work.

C. <u>ADVERTISEMENT for COMPLETION</u>

(1) If the Contract Sum is \$50,000 or less: The Owner, immediately after being notified by the Architect that all other requirements of the Contract have been completed, shall give public notice of completion of the Contract by having an Advertisement for Completion published one time in a newspaper of general circulation, published in the county in which the Owner is located for one week, and shall require the Contractor to certify under oath that all bills have been paid in full. Final payment may be made at any time after the notice has been posted for one entire week.

(2) If the Contract Sum is more than \$50,000: The Contractor, immediately after being notified by the Architect that all other requirements of the Contract have been completed, shall give public notice of completion of the Contract by having an Advertisement for Completion, similar to the sample contained in the Project Manual, published for a period of four successive weeks in some newspaper of general circulation published within the city or county where the Work was performed. Proof of publication of the Advertisement for Completion shall be made by the Contractor to the Architect by affidavit of the publisher, in duplicate, and a printed copy of the Advertisement for Completion published, in duplicate. If no newspaper is published in the county where the work was done, the notice may be given by posting at the Court House for thirty days and proof of same made by Probate Judge or Sheriff and the Contractor. Final payment shall not be due until thirty days after this public notice is completed.

D. <u>RELEASE of CLAIMS</u>

The Release of Claims and other documents referenced in Paragraph A(6) above are as follows:

(1) A release executed by Contractor of all claims and claims of lien against the Owner arising under and by virtue of the Contract, other than such claims of the Contractor, if any, as may have been previously made in writing and as may be specifically excepted by the Contractor from the operation of the release in stated amounts to be set forth therein.

(2) An affidavit under oath, if required, stating that so far as the Contractor has knowledge or information, there are no claims or claims of lien which have been or will be filed by any Subcontractor, Supplier or other party for labor or material for which a claim or claim of lien could be filed.

(3) A release, if required, of all claims and claims of lien made by any Subcontractor, Supplier or other party against the Owner or unpaid Contract funds held by the Owner arising under or related to the Work on the Project; provided, however, that if any Subcontractor, Supplier or others refuse to furnish a release of such claims or claims of lien, the Contractor may furnish a bond executed by Contractor and its Surety to the Owner to provide an unconditional obligation to defend, indemnify and hold harmless the Owner against any loss, cost or expense, including attorney's fees, arising out of or as a result of such claims, or claims of lien, in which event Owner may make Final Payment notwithstanding such claims or claims of lien. If Contractor and Surety fail to fulfill their obligations to Owner under the bond, the Owner shall be entitled to recover damages as a result of such failure, including all costs and reasonable attorney's fees incurred to recover such damages.

E. EFFECT of FINAL PAYMENT

(1) The making of Final Payment shall constitute a waiver of Claims by the Owner except those arising from:

- (a) liens, claims, security interests or encumbrances arising out of the Contract and unsettled;
- (b) failure of the Work to comply with the requirements of the Contract Documents;
- (c) terms of warranties or indemnities required by the Contract Documents, or
- (d) latent defects.

(2) Acceptance of Final Payment by the Contractor shall constitute a waiver of claims by Contractor except those previously made in writing, identified by Contractor as unsettled at the time of final Application for Payment, and specifically excepted from the release provided for in Paragraph D(1), above.

ARTICLE 35 CONTRACTOR'S WARRANTY

A. <u>GENERAL WARRANTY</u>

The Contractor warrants to the Owner and Architect that all materials and equipment furnished under the Contract will be of good quality and new, except such materials as may be expressly provided or allowed in the Contract Documents to be otherwise, and that none of the Work will be Defective Work as defined in Article 1.

B. <u>ONE-YEAR WARRANTY</u>

(1) If, within one year after the date of Substantial Completion of the Work or each designated portion of the Work (or otherwise as agreed upon in a mutually-executed Certificate of Substantial Completion), any of the Work is found to be Defective Work, the Contractor shall promptly upon receipt of written notice from the Owner or Architect, and without expense to either, replace or correct the Defective Work to conform to the requirements of the Contract Documents, and repair all damage to the site, the building and its contents which is the result of Defective Work or its replacement or correction.

(2) The one-year warranty for punch list items shall begin on the Date of Substantial Completion if they are completed or corrected within the time period allowed in the Certificate of Substantial Completion in which they are recorded. The one-year warranty for punch list items that are not

completed or corrected within the time period allowed in the Certificate of Substantial Completion, and other Work performed after Substantial Completion, shall begin on the date of Final Acceptance of the Work. The Contractor's correction of Work pursuant to this warranty does not extend the period of the warranty. The Contractor's one-year warranty does not apply to defects or damages due to improper or insufficient maintenance, improper operation, or wear and tear during normal usage.

(3) Upon recognizing a condition of Defective Work, the Owner shall promptly notify the Contractor of the condition. If the condition is causing damage to the building, its contents, equipment, or site, the Owner shall take reasonable actions to mitigate the damage or its continuation, if practical. If the Contractor fails to proceed promptly to comply with the terms of the warranty, or to provide the Owner with satisfactory written verification that positive action is in process, the Owner may have the Defective Work replaced or corrected and the Contractor and the Contractor's Surety shall be liable for all expense incurred.

(4) Year-end Inspection(s): An inspection of the Work, or each separately completed portion thereof, is required near the end of the Contractor's one-year warranty period(s). The inspection must be scheduled with the Owner, Architect and DCM Inspector. The subsequent delivery of the Architect's report of a Year-end Inspection will serve as confirmation that the Contractor was notified of Defective Work found within the warranty period.

(5) The Contractor's warranty of one year is in addition to, and not a limitation of, any other remedy stated herein or available to the Owner under applicable law.

C. <u>GENERAL CONTRACTOR'S ROOFING GUARANTEE</u>

(1) In addition to any other roof related warranties or guarantees that may be specified in the Contract Documents, the roof and associated work shall be guaranteed by the General Contractor against leaks and defects of materials and workmanship for a period of five (5) years, starting on the Date of Substantial Completion of the Project as stated in the Certificate of Substantial Completion. This guarantee for punch list items shall begin on the Date of Substantial Completion if they are completed or corrected within the time period allowed in the Certificate of Substantial Completion in which they are recorded. The guarantee for punch list items that are not completed or corrected within the time period allowed in the Certificate of Substantial begin on the date of Final Acceptance of the Work.

(2) The "General Contractor's Roofing Guarantee" (DCM Form C-9), included in the Project Manual, shall be executed in triplicate, signed by the appropriate party and submitted to the Architect for submission with the Certificate of Substantial Completion to the Owner and the Division of Construction Management.

(3) This guarantee does not include costs which might be incurred by the General Contractor in making visits to the site requested by the Owner regarding roof problems that are due to lack of proper maintenance (keeping roof drains and/or gutters clear of debris that cause a stoppage of drainage which results in water ponding, overflowing of flashing, etc.), or damages caused by vandalism or misuse of roof areas. Should the contractor be required to return to the job to correct problems of this nature that are determined not to be related to faulty workmanship and materials in the installation of the roof, payment for actions taken by the Contractor in response to such request will be the responsibility of the Owner. A detailed written report shall be made by the General Contractor on each of these 'Service Calls' with copies to the Architect, Owner and Division of

Construction Management.

D. <u>SPECIAL WARRANTIES</u>

(1) The Contractor shall deliver to the Owner through the Architect all special or extended warranties required by the Contract Documents from the Contractor, Subcontractors, and suppliers.

(2) The Contractor and the Contractor's Surety shall be liable to the Owner for such special warranties during the Contractor's one-year warranty; thereafter, the Contractor's obligations relative to such special warranties shall be to provide reasonable assistance to the Owner in their enforcement.

E. ASSUMPTION of GUARANTEES of OTHERS

If the Contractor disturbs, alters, or damages any work guaranteed under a separate contract, thereby voiding the guarantee of that work, the Contractor shall restore the work to a condition satisfactory to the Owner and shall also guarantee it to the same extent that it was guaranteed under the separate contract.

ARTICLE 36 INDEMNIFICATION AGREEMENT

To the fullest extent permitted by law, the Contractor shall defend, indemnify, and hold harmless the Owner, Architect, Architect's consultants, Alabama Division of Construction Management, State Department of Education (if applicable), and their agents, employees, and consultants (hereinafter collectively referred to as the "Indemnitees") from and against all claims, damages, losses and expenses, including but not limited to attorneys' fees, arising out of, related to, or resulting from performance of the Work, provided that such claim, damage, loss or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property, including loss of use resulting therefrom, and is caused in whole or in part by negligent acts or omissions of the Contractor, a Subcontractor, anyone directly or indirectly employed by them, or anyone for whose acts they may be liable, regardless of whether such claim, damage, loss or expense is caused in part, or is alleged but not legally established to have been caused in whole or in part by the negligence or other fault of a party indemnified hereunder.

- **A.** This indemnification shall extend to all claims, damages, losses and expenses for injury or damage to adjacent or neighboring property, or persons injured thereon, that arise out of, relate to, or result from performance of the Work.
- **B.** This indemnification does not extend to the liability of the Architect, or the Architect's Consultants, agents, or employees, arising out of (1) the preparation or approval of maps, shop drawings, opinions, reports, surveys, field orders, Change Orders, drawings or specifications, or (2) the giving of or the failure to give directions or instructions, provided such giving or failure to give instructions is the primary cause of the injury or damage.
- C. This indemnification does not apply to the extent of the sole negligence of the Indemnitees.

ARTICLE 37 CONTRACTOR'S and SUBCONTRACTORS' INSURANCE

(Provide entire Article 37 to Contractor's insurance representative.)

A. <u>GENERAL</u>

(1) **RESPONSIBILITY.** The Contractor shall be responsible to the Owner from the time of the signing of the Construction Contract or from the beginning of the first work, whichever shall be earlier, for all injury or damage of any kind resulting from any negligent act or omission or breach, failure or other default regarding the work by the Contractor, a Subcontractor, anyone directly or indirectly employed by them or anyone for whose acts they may be liable, regardless of who may be the owner of the property.

(2) INSURANCE PROVIDERS. Each of the insurance coverages required below shall be issued by an insurer licensed by the Insurance Commissioner to transact the business of insurance in the State of Alabama for the applicable line of insurance, and such insurer (or, for qualified self-insureds or group self-insureds, a specific excess insurer providing statutory limits) must have a Best Policyholders Rating of "A-" or better and a financial size rating of Class V or larger.

(3) NOTIFICATION ENDORSEMENT. Each policy shall be endorsed to provide that the insurance company agrees that the policy shall not be canceled, changed, allowed to lapse or allowed to expire for any reason until thirty days after the Owner has received written notice by certified mail as evidenced by return receipt or until such time as other insurance coverage providing protection equal to protection called for in the Contract Documents shall have been received, accepted and acknowledged by the Owner. Such notice shall be valid only as to the Project as shall have been designated by Project Name and Number in said notice.

(4) INSURANCE CERTIFICATES. The Contractor shall procure the insurance coverages identified below, or as otherwise required in the Contract Documents, at the Contractor's own expense, and to evidence that such insurance coverages are in effect, the Contractor shall furnish the Owner an insurance certificate(s) acceptable to the Owner and listing the Owner as the certificate holder. The insurance certificate(s) must be delivered to the Owner with the Construction Contract and Bonds for final approval and execution of the Construction Contract. The insurance certificate must provide the following:

- (a) Name and address of authorized agent of the insurance company
- (b) Name and address of insured
- (c) Name of insurance company or companies
- (d) Description of policies
- (e) Policy Number(s)
- (f) Policy Period(s)
- (g) Limits of liability
- (h) Name and address of Owner as certificate holder
- (i) Project Name and Number, if any
- (j) Signature of authorized agent of the insurance company
- (k) Telephone number of authorized agent of the insurance company
- (I) Mandatory thirty day notice of cancellation / non-renewal / change

(5) MAXIMUM DEDUCTIBLE. Self-insured retention, except for qualified self-insurers or

group self-insurers, in any policy shall not exceed \$25,000.00.

B. INSURANCE COVERAGES

Unless otherwise provided in the Contract Documents, the Contractor shall purchase the types of insurance coverages with liability limits not less than as follows:

(1) WORKERS' COMPENSATION and EMPLOYER'S LIABILITY INSURANCE

(a) Workers' Compensation coverage shall be provided in accordance with the statutory coverage required in Alabama. A group insurer must submit a certificate of authority from the Alabama Department of Industrial Relations approving the group insurance plan. A self-insurer must submit a certificate from the Alabama Department of Industrial Relations stating the Contractor qualifies to pay its own workers' compensation claims.

- (b) Employer's Liability Insurance limits shall be at least:
 - .1 Bodily Injury by Accident \$1,000,000 each accident
 - .2 Bodily Injury by Disease \$1,000,000 each employee

(2) COMMERCIAL GENERAL LIABILITY INSURANCE

(a) Commercial General Liability Insurance, written on an ISO Occurrence Form (current edition as of the date of Advertisement for Bids) or equivalent, shall include, but need not be limited to, coverage for bodily injury and property damage arising from premises and operations liability, products and completed operations liability, blasting and explosion, collapse of structures, underground damage, personal injury liability and contractual liability. The Commercial General Liability Insurance shall provide at minimum the following limits:

Coverage

.1 General Aggregate

- .2 Products, Completed Operations Aggregate
- .3 Personal and Advertising Injury
- .4 Each Occurrence

- Limit \$ 2,000,000.00 per Project \$ 2,000,000.00 per Project \$ 1,000,000.00 per Occurrence \$ 1,000,000.00
- (b) Additional Requirements for Commercial General Liability Insurance:
 - .1 The policy shall name the Owner, Architect, Alabama Division of Construction Management, State Department of Education (if applicable), and their agents, consultants and employees as additional insureds, state that this coverage shall be primary insurance for the additional insureds; and contain no exclusions of the additional insureds relative to job accidents.
 - .2 The policy must include separate per project aggregate limits.

(3) COMMERCIAL BUSINESS AUTOMOBILE LIABILITY INSURANCE

(a) Commercial Business Automobile Liability Insurance which shall include coverage for bodily injury and property damage arising from the operation of any owned, non-owned or hired automobile. The Commercial Business Automobile Liability Insurance Policy shall provide not less than \$1,000,000 Combined Single Limits for each occurrence.

(b) The policy shall name the Owner, Architect, Alabama Division of Construction Management, State Department of Education (if applicable), and their agents, consultants, and employees as additional insureds.

(4) COMMERCIAL UMBRELLA LIABILITY INSURANCE

(a) Commercial Umbrella Liability Insurance to provide excess coverage above the

Commercial General Liability, Commercial Business Automobile Liability and the Workers' Compensation and Employer's Liability to satisfy the minimum limits set forth herein.

(b) Minimum <u>Combined</u> Primary Commercial General Liability and Commercial/Excess Umbrella Limits of:

- **.1** \$ 5,000,000 per Occurrence
- **.2** \$ 5,000,000 Aggregate
- (c) Additional Requirements for Commercial Umbrella Liability Insurance:
 - .1 The policy shall name the Owner, Architect, Alabama Division of Construction Management, State Department of Education (if applicable), and their agents, consultants, and employees as additional insureds.
 - .2 The policy must be on an "occurrence" basis.

(5) BUILDER'S RISK INSURANCE

(a) The Builder's Risk Policy shall be made payable to the Owner and Contractor, as their interests may appear. The policy amount shall be equal to 100% of the Contract Sum, written on a Causes of Loss - Special Form (current edition as of the date of Advertisement for Bids), or its equivalent. All deductibles shall be the sole responsibility of the Contractor.

(b) The policy shall be endorsed as follows:

"The following may occur without diminishing, changing, altering or otherwise affecting the coverage and protection afforded the insured under this policy:

(i) Furniture and equipment may be delivered to the insured premises and installed in place ready for use; or

(ii) Partial or complete occupancy by Owner; or

(iii) Performance of work in connection with construction operations insured by the Owner, by agents or lessees or other contractors of the Owner, or by contractors of the lessee of the Owner."

C. <u>SUBCONTRACTORS' INSURANCE</u>

(1) WORKERS' COMPENSATION and EMPLOYER'S LIABILITY INSURANCE. The Contractor shall require each Subcontractor to obtain and maintain Workers' Compensation and Employer's Liability Insurance coverages as described in preceding Paragraph B, or to be covered by the Contractor's Workers' Compensation and Employer's Liability Insurance while performing Work under the Contract.

(2) LIABILITY INSURANCE. The Contractor shall require each Subcontractor to obtain and maintain adequate General Liability, Automobile Liability, and Umbrella Liability Insurance coverages similar to those described in preceding Paragraph B. Such coverage shall be in effect at all times that a Subcontractor is performing Work under the Contract.

(3) ENFORCEMENT RESPONSIBILITY. The Contractor shall have responsibility to enforce its Subcontractors' compliance with these or similar insurance requirements; however, the Contractor shall, upon request, provide the Architect or Owner acceptable evidence of insurance for any Subcontractor.

D. TERMINATION of OBLIGATION to INSURE

Unless otherwise expressly provided in the Contract Documents, the obligation to insure as provided herein shall continue as follows:

(1) BUILDER'S RISK INSURANCE. The obligation to insure under Subparagraph B(5) shall remain in effect until the Date of Substantial Completion as shall be established in the Certificate of Substantial Completion. In the event that multiple Certificates of Substantial Completion covering designated portions of the Work are issued, Builder's Risk coverage shall remain in effect until the Date of Substantial Completion as shall be established in the last issued Certificate of Substantial Completion. However, in the case that the Work involves separate buildings, Builder's Risk coverage of each separate building may terminate on the Date of Substantial Completion as established in the Certificate of Substantial Completion as

(2) **PRODUCTS and COMPLETED OPERATIONS.** The obligation to carry Products and Completed Operations coverage specified under Subparagraph B(2) shall remain in effect for two years after the Date(s) of Substantial Completion.

(3) ALL OTHER INSURANCE. The obligation to carry other insurance coverages specified under Subparagraphs B(1) through B(4) and Paragraph C shall remain in effect after the Date(s) of Substantial Completion until such time as all Work required by the Contract Documents is completed. Equal or similar insurance coverages shall remain in effect if, after completion of the Work, the Contractor, a Subcontractor, anyone directly or indirectly employed by them or anyone for whose acts they may be liable, returns to the Project to perform warranty or maintenance work pursuant to the terms of the Contract Documents.

E. WAIVERS of SUBROGATION

The Owner and Contractor waive all rights against (1) each other and any of their subcontractors, sub-subcontractors, agents and employees, each of the other, and (2) the Architect, Architect's consultants, separate contractors performing construction or operations related to the Project, if any, and any of their subcontractors, sub-subcontractors, agents and employees, for damages caused by fire or other causes of loss. But said waiver shall apply only to the extent the loss or damage is covered by builder's risk insurance applicable to the Work or to other property located within or adjacent to the Project, except such rights as they may have to proceeds of such insurance held by the Owner or Contractor as fiduciary. The Owner or Contractor, as appropriate, shall require of the Architect, Architect's consultants, separate contractors, if any, and the subcontractor, subsubcontractors, suppliers, agents and employees of any of them, by appropriate agreements, written where legally required for validity, similar waivers each in favor of other parties enumerated herein. The Policies shall provide such waivers of subrogation by endorsement or otherwise. A waiver of subrogation shall be effective as to the person or entity even though that person or entity would otherwise have a duty of indemnification, contractual or otherwise, did not pay the insurance premium directly or indirectly, and whether or not the person or entity had an insurable interest in the property damaged. The waivers provided for in this paragraph shall not be applicable to loss or damage that occurs after final acceptance of the Work.

ARTICLE 38 PERFORMANCE and PAYMENT BONDS

A. <u>GENERAL</u>

Upon signing and returning the Construction Contract to the Owner for final approval and execution, the Contractor shall, at the Contractor's expense, furnish to the Owner a Performance Bond and a Payment Bond (P&P Bonds), DCM Forms C-6 and C-7 as contained in the Project

Manual, each in a penal sum equal to 100% of the Contract Sum. Each bond shall be on the form contained in the Project Manual, shall be executed by a surety company (Surety) acceptable to the Owner and duly authorized and qualified to make such bonds in the State of Alabama in the required amount. There shall be six original P&P Bonds submitted with original signatures for each of the six contracts required. The P&P bonds must be signed either on the same day or after the construction contract date. Each P&P Bond shall have attached thereto an original power of attorney (POA) of the signing official. The POA signature date must be the same day as the P&P Bond's signature date. All signatures must be present.

The provisions of this Article are not applicable to this Contract if the Contract Sum is less than \$50,000, unless bonds are required for this Contract in the Supplemental General Conditions.

B. <u>PERFORMANCE BOND</u>

Through the Performance Bond, the Surety's obligation to the Owner shall be to assure the prompt and faithful performance of the Contract and Contract Change Orders. The Penal Sum shall remain equal to the Contract Sum as the Contract Sum is adjusted by Contract Change Orders. In case of default on the part of the Contractor, the Surety shall take charge of and complete the Work in accordance with the terms of the Performance Bond. Any reasonable expenses incurred by the Owner as a result of default on the part of the Contractor, including architectural, engineering, administrative, and legal services, shall be recoverable under the Performance Bond.

C. <u>PAYMENT BOND</u>

Through the Payment Bond the Surety's obligation to the Owner shall be to guarantee that the Contractor and its Subcontractors shall promptly make payment to all persons supplying labor, materials, or supplies for, or in, the prosecution of the Work, including the payment of reasonable attorneys fees incurred by successful claimants or plaintiffs in civil actions on the Bond. Any person or entity indicating that they have a claim of nonpayment under the Bond shall, upon written request, be promptly furnished a certified copy of the Bond and Construction Contract by the Contractor, Architect, Owner, or Alabama Division of Construction Management, whomever is recipient of the request.

D. <u>CHANGE ORDERS</u>

The Penal Sum shall remain equal to the Contract Sum as the Contract Sum is adjusted by Contract Change Orders. All Contract Change Orders involving an increase in the Contract Sum will require consent of Surety by endorsement of the Contract Change Order form. The Surety waives notification of any Contract Change Orders involving only extension of the Contract Time.

E. <u>EXPIRATION</u>

The obligations of the Contractor's performance bond surety shall be coextensive with the contractor's performance obligations under the Contract Documents; provided, however, that the surety's obligation shall expire at the end of the one-year warranty period(s) of Article 35.

ARTICLE 39 ASSIGNMENT

The Contractor shall not assign the Contract or sublet it as a whole nor assign any moneys due or to

become due to the Contractor thereunder without the previous written consent of the Owner (and of the Surety, in the case of a bonded Construction Contract). As prescribed by the Public Works Law, the Contract shall in no event be assigned to an unsuccessful bidder for the Contract whose bid was rejected because the bidder was not a responsible or responsive bidder.

ARTICLE 40 CONSTRUCTION by OWNER or SEPARATE CONTRACTORS

A. OWNER'S RESERVATION of RIGHT

(1) The Owner reserves the right to self-perform, or to award separate contracts for, other portions of the Project and other Project related construction and operations on the site. The contractual conditions of such separate contracts shall be substantially similar to those of this Contract, including insurance requirements and the provisions of this Article. If the Contractor considers such actions to involve delay or additional cost under this Contract, notifications and assertion of claims shall be as provided in Article 20 and Article 23.

(2) When separate contracts are awarded, the term "Contractor" in the separate Contract Documents shall mean the Contractor who executes the respective Construction Contract.

B. <u>COORDINATION</u>

Unless otherwise provided in the Contract Documents, the Owner shall be responsible for coordinating the activities of the Owner's forces and separate contractors with the Work of the Contractor. The Contractor shall cooperate with the Owner and separate contractors, shall participate in reviewing and comparing their construction schedules relative to that of the Contractor when directed to do so, and shall make and adhere to any revisions to the construction schedule resulting from a joint review and mutual agreement.

C. CONDITIONS APPLICABLE to WORK PERFORMED by OWNER

Unless otherwise provided in the Contract Documents, when the Owner self-performs construction or operations related to the Project, the Owner shall be subject to the same obligations to Contractor as Contractor would have to a separate contractor under the provision of this Article 40.

D. <u>MUTUAL RESPONSIBILITY</u>

(1) The Contractor shall reasonably accommodate the required introduction and storage of materials and equipment and performance of activities by the Owner and separate contractors and shall connect and coordinate the Contractor's Work with theirs as required by the Contract Documents.

(2) By proceeding with an element or portion of the Work that is applied to or performed on construction by the Owner or a separate contractor, or which relies upon their operations, the Contractor accepts the condition of such construction or operations as being suitable for the Contractor's Work, except for conditions that are not reasonably discoverable by the Contractor. If the Contractor discovers any condition in such construction or operations that is not suitable for the proper performance of the Work, the Contractor shall not proceed, but shall instead promptly notify

the Architect in writing of the condition discovered.

(3) The Contractor shall reimburse the Owner for any costs incurred by a separate contractor and payable by the Owner because of acts or omissions of the Contractor. Likewise, the Owner shall be responsible to the Contractor for any costs incurred by the Contractor because of the acts or omissions of a separate contractor.

(4) The Contractor shall not cut or otherwise alter construction by the Owner or a separate contractor without the written consent of the Owner and separate contractor; such consent shall not be unreasonably withheld. Likewise, the Contractor shall not unreasonably withhold its consent allowing the Owner or a separate contractor to cut or otherwise alter the Work.

(5) The Contractor shall promptly remedy any damage caused by the Contractor to the construction or property of the Owner or separate contractors.

ARTICLE 41 <u>SUBCONTRACTS</u>

A. <u>AWARD of SUBCONTRACTS and OTHER CONTRACTS for PORTIONS of the WORK</u>

(1) Unless otherwise provided in the Contract Documents, when delivering the executed Construction Contract, bonds, and evidence of insurance to the Architect, the Contractor shall also submit a listing of Subcontractors proposed for each principal portion of the Work and fabricators or suppliers proposed for furnishing materials or equipment fabricated to the design of the Contract Documents. This listing shall be in addition to any naming of Subcontractors, fabricators, or suppliers that may have been required in the bid process. The Architect will promptly reply to the Contractor in writing stating whether or not the Owner, after due investigation, has reasonable objection to any Subcontractor, fabricator, or supplier proposed by the Contractor. The issuance of the Notice to Proceed in the absence of such objection by the Owner shall constitute notice that no reasonable objection to them is made.

(2) The Contractor shall not contract with a proposed Subcontractor, fabricator, or supplier to whom the Owner has made reasonable and timely objection. Except in accordance with prequalification procedures as may be contained in the Contract Documents, through specified qualifications, or on the grounds of reasonable objection, the Owner may not restrict the Contractor's selection of Subcontractors, fabricators, or suppliers.

(3) Upon the Owner's reasonable objection to a proposed Subcontractor, fabricator, or supplier, the Contractor shall promptly propose another to whom the Owner has no reasonable objection. If the proposed Subcontractor, fabricator, or supplier to whom the Owner made reasonable objection was reasonably capable of performing the Work, the Contract Sum and Contract Time shall be equitably adjusted by Contract Change Order for any resulting difference if the Contractor has acted promptly and responsively in this procedure.

(4) The Contractor shall not change previously selected Subcontractors, fabricators, or suppliers without notifying the Architect and Owner in writing of proposed substitute Subcontractors, fabricators, or suppliers. If the Owner does not make a reasonable objection to a proposed substitute within three working days, the substitute shall be deemed approved.

B. SUBCONTRACTUAL RELATIONS

(1) The Contractor agrees to bind every Subcontractor and material supplier (and require every Subcontractor to so bind its subcontractors and material suppliers) to all the provisions of the Contract Documents as they apply to the Subcontractor's and material supplier's portion of the Work.

(2) Nothing contained in the Contract Documents shall be construed as creating any contractual relationship between any Subcontractor and the Owner, nor to create a duty of the Architect, Owner, or Director to resolve disputes between or among the Contractor or its Subcontractors and suppliers or any other duty to such Subcontractors or suppliers.

ARTICLE 42 ARCHITECT'S STATUS

- A. The Architect is an independent contractor performing, with respect to this Contract, pursuant to an agreement executed between the Owner and the Architect. The Architect has prepared the Drawings and Specifications and assembled the Contract Document and is, therefore, charged with their interpretation and clarification as described in the Contract Documents. As a representative of the Owner, the Architect will endeavor to guard the Owner against variances from the requirements of the Contract Documents by the Contractor. On behalf of the Owner, the Architect will administer the Contract as described in the Contract Documents during construction and the Contractor's one-year warranty.
- **B.** So as to maintain continuity in administration of the Contract and performance of the Work, and to facilitate complete documentation of the project record, all communications between the Contractor and Owner regarding matters of or related to the Contract shall be directed through the Architect, unless direct communication is otherwise required to provide a legal notification. Unless otherwise authorized by the Architect, communications by and with the Architect's consultants shall be through the Architect. Unless otherwise authorized by the Contractor, communications by and with Subcontractors and material suppliers shall be through the Contractor.

C. ARCHITECT'S AUTHORITY

Subject to other provisions of the Contract Documents, the following summarizes some of the authority vested in the Architect by the Owner with respect to the Construction Contract and as further described or conditioned in other Articles of these General Conditions of the Contract.

(1) The Architect is authorized to:

- (a) approve "minor" deviations as defined in Article 9, Submittals,
- (b) make "minor" changes in the Work as defined in Article 19, Changes in the Work,
- (c) reject or require the correction of Defective Work,
- (d) require the Contractor to stop the performance of Defective Work,
- (e) adjust an Application for Payment by the Contractor pursuant to Article 30, Certification
- and Approval of payments, and
- (f) issue Notices to Cure pursuant to Article 27.

(2) The Architect is not authorized to:

(a) revoke, alter, relax, or waive any requirements of the Contract Documents (other than "minor" deviations and changes) without concurrence of the Owner,

- (b) finally approve or accept any portion of the Work without concurrence of the Owner,
- (c) issue instructions contrary to the Contract Documents,
- (d) issue Notice of Termination or otherwise terminate the Contract, or

(e) require the Contractor to stop the Work except only to avoid the performance of Defective Work.

D. LIMITATIONS of RESPONSIBILITIES

(1) The Architect shall not be responsible to Contractors or to others for supervising or coordinating the performance of the Work or for the Construction Methods or safety of the Work, unless the Contract Documents give other specific instructions concerning these matters.

(2) The Architect will not be responsible to the Contractor (nor the Owner) for the Contractor's failure to perform the Work in accordance with the requirements of the Contract Documents or for acts or omissions of the Contractor, a Subcontractor, or anyone for whose acts they may be liable. However, the Architect will report to the Owner and Contractor any Defective Work recognized by the Architect.

(3) The Architect will endeavor to secure faithful performance by Owner and Contractor, and the Architect will not show partiality to either or be liable to either for results of interpretations or decisions rendered in good faith.

(4) The Contractor's remedies for additional time or expense arising out of or related to this Contract, or the breach thereof, shall be solely as provided for in the Contract Documents. The Contractor shall have no claim or cause of action against the Owner, Architect, or its consultants for any actions or failures to act, whether such claim may be in contract, tort, strict liability, or otherwise, it being the agreement of the parties that the Contractor shall make no claim against the Owner or any agents of the Owner, including the Architect or its consultants, except as may be provided for claims or disputes submitted in accordance with Article 24. The Architect and Architect's consultants shall be considered third party beneficiaries of this provision of the Contract and entitled to enforce same.

E. <u>ARCHITECT'S DECISIONS</u>

Decisions by the Architect shall be in writing The Architect's decisions on matters relating to aesthetic effect will be final and binding if consistent with the intent expressed in the Contract Documents. The Architect's decisions regarding disputes arising between the Contractor and Owner shall be advisory.

ARTICLE 43 CASH ALLOWANCES

- **A.** All allowances stated in the Contract Documents shall be included in the Contract Sum. Items covered by allowances shall be supplied by the Contractor as directed by the Architect or Owner and the Contractor shall afford the Owner the economy of obtaining competitive pricing from responsible bidders for allowance items unless other purchasing procedures are specified in the Contract Documents.
- **B.** Unless otherwise provided in the Contract Documents:
 - (1) allowances shall cover the cost to the Contractor of materials and equipment delivered to the

Project site and all applicable taxes, less applicable trade discounts;

- (2) the Contractor's costs for unloading, storing, protecting, and handling at the site, labor, installation, overhead, profit and other expenses related to materials or equipment covered by an allowance shall be included in the Contract Sum but not in the allowances;
- (3) if required, the Contract Sum shall be adjusted by Change Order to reflect the actual costs of an allowance.
- **C.** Any selections of materials or equipment required of the Architect or Owner under an allowance shall be made in sufficient time to avoid delay of the Work.

ARTICLE 44 <u>PERMITS, LAWS, and REGULATIONS</u>

A. <u>PERMITS, FEES AND NOTICES</u>

(1) Unless otherwise provided in the Contract Documents, the Contractor shall secure and pay for the building permit and other permits and governmental fees, licenses, and inspections necessary for proper execution and completion of the Work which are customarily secured after award of the Construction Contract and which are in effect on the date of receipt of bids.

(2) The Contractor shall comply with and give notices required by all laws, ordinances, rules, regulations, and lawful orders of public authorities applicable to performance of the Work.

B. <u>TAXES</u>

Unless stated otherwise in the Contract Documents, materials incorporated into the Work are exempt from sales and use tax pursuant to Section 40-9-33, <u>Code of Alabama</u>, 1975 as amended. The Owner, Contractor and its subcontractors shall be responsible for complying with rules and regulations of the Sales, Use, & Business Tax Division of the Alabama Department of Revenue regarding certificates and other qualifications necessary to claim such exemption when making qualifying purchases from vendors. The Contractor shall pay all applicable taxes that are not covered by the exemption of Section 40-9-33 and which are imposed as of the date of receipt of bids, including those imposed as of the date of receipt of bids but scheduled to go into effect after that date.

C. <u>COMPENSATION for INCREASES</u>

The Contractor shall be compensated for additional costs incurred because of increases in tax rates imposed after the date of receipt of bids.

D. ALABAMA IMMIGRATION LAW

Per ACT 2011-535 as codified in Title 31, Chapter 13 of the Code of Alabama, 1975, as amended:

The contracting parties affirm, for the duration of the agreement, that they will not violate federal immigration law or knowingly employ, hire for employment, or continue to employ an unauthorized alien within the State of Alabama. Furthermore, a contracting party found to be in violation of this provision shall be deemed in breach of the agreement and shall be responsible for

all damages resulting therefrom.

E. <u>ALABAMA BOYCOTT LAW</u>

Per Act 2016-312as codified in Title 41, Chapter 16, Article 1, of the Code of Alabama, 1975, as amended:

The contracting parties affirm, for the duration of the agreement, that they are not currently engaged in, and will not engage in, the boycott of a person or an entity based in or doing business with a jurisdiction with which this state can enjoy open trade.

F. ACCOUNTING OF SALES TAX EXEMPT PROJECTS

Per Act 2013-205 as codified in Title 40, Chapter 9, Article 1, of the Code of Alabama, 1975, as amended:

In bidding the work on a tax exempt project, the bid form shall provide an accounting for the tax savings.

ARTICLE 45 <u>ROYALTIES, PATENTS, and COPYRIGHTS</u>

The Contractor shall pay all royalties and license fees. The Contractor shall defend, indemnify and hold harmless the Owner, Architect, Architect's consultants, Alabama Division of Construction Management, State Department of Education (if applicable), and their agents, employees, and consultants from and against all claims, damages, losses and expenses, including but not limited to attorney's fees, arising out of, related to, or resulting from all suits or claims for infringement of any patent rights or copyrights arising out of the inclusion of any patented or copyrighted materials, methods, or systems selected by the Contractor and used during the execution of or incorporated into the Work. This indemnification does not apply to any suits or claims of infringement of any patent rights or copyrights arising out of any patented anterials, methods, or systems specified in the Contract Documents. However, if the Contractor has information that a specified material, method, or system is or may constitute an infringement of a patent or copyright, the Contractor shall be responsible for any resulting loss unless such information is promptly furnished to the Architect.

ARTICLE 46 USE of the SITE

- **A.** The Contractor shall confine its operations at the Project site to areas permitted by the Owner and by law, ordinances, permits and the Contract Documents and shall not unreasonably encumber the site with materials, equipment, employees' vehicles, or debris. The Contractor's operations at the site shall be restricted to the sole purpose of constructing the Work, use of the site as a staging, assembly, or storage area for other business which the Contractor may undertake shall not be permitted.
- **B.** Unless otherwise provided in the Contract Documents, temporary facilities, such as storage sheds, shops, and offices may be erected on the Project site with the approval of the Architect and Owner.

Such temporary buildings and/or utilities shall remain the property of the Contractor, and be removed at the Contractor's expense upon completion of the Work, unless the Owner authorizes their abandonment without removal.

ARTICLE 47 CUTTING and PATCHING

- **A.** The Contractor shall be responsible for all cutting, fitting, or patching that may be required to execute the Work to the results indicated in the Contract Documents or to make its parts fit together properly.
- **B.** Any cutting, patching, or excavation by the Contractor shall be supervised and performed in a manner that will not endanger persons nor damage or endanger the Work or any fully or partially completed construction of the Owner or separate contractors.

ARTICLE 48 IN-PROGRESS and FINAL CLEANUP

A. <u>IN-PROGRESS CLEAN-UP</u>

(1) The Contractor shall at all times during the progress of the Work keep the premises and surrounding area free from rubbish, scrap materials and debris resulting from the Work. Trash and combustible materials shall not be allowed to accumulate inside buildings or elsewhere on the premises. At no time shall any rubbish be thrown from window openings. Burning of trash and debris on site is not permitted.

(2) The Contractor shall make provisions to minimize and confine dust and debris resulting from construction activities.

B. FINAL CLEAN-UP

(1) Before Substantial Completion or Final Acceptance is achieved, the Contractor shall have removed from the Owner's property all construction equipment, tools, and machinery; temporary structures and/or utilities including the foundations thereof (except such as the Owner permits in writing to remain); rubbish, debris, and waste materials; and all surplus materials, leaving the site clean and true to line and grade, and the Work in a safe and clean condition, ready for use and operation.

(2) In addition to the above, and unless otherwise provided in the Contract Documents, the Contractor shall be responsible for the following special cleaning for all trades as the Work is completed:

(a) Cleaning of all painted, enameled, stained, or baked enamel work: Removal of all marks, stains, finger prints and splatters from such surfaces.

(b) Cleaning of all glass: Cleaning and removing of all stickers, labels, stains, and paint from all glass, and the washing and polishing of same on interior and exterior.

(c) Cleaning or polishing of all hardware: Cleaning and polishing of all hardware.

(d) Cleaning all tile, floor finish of all kinds: Removal of all splatters, stains, paint, dirt,

and dust, the washing and polishing of all floors as recommended by the manufacturer or required by the Architect.

(e) Cleaning of all manufactured articles, materials, fixtures, appliances, and equipment: Removal of all stickers, rust stains, labels, and temporary covers, and cleaning and conditioning of all manufactured articles, material, fixtures, appliances, and electrical, heating, and air conditioning equipment as recommended or directed by the manufacturers, unless otherwise required by the Architect; blowing out or flushing out of all foreign matter from all equipment, piping, tanks, pumps, fans, motors, devices, switches, panels, fixtures, boilers, sanitizing potable water systems; and freeing identification plates on all equipment of excess paint and the polishing thereof.

C. <u>OWNER'S RIGHT to CLEAN-UP</u>

If the Contractor fails to comply with these clean-up requirements and then fails to comply with a written directive by the Architect to clean-up the premises within a specified time, the Architect or Owner may implement appropriate clean-up measures and the cost thereof shall be deducted from any amounts due or to become due the Contractor.

ARTICLE 49 LIQUIDATED DAMAGES

- **A.** Time is the essence of the Contract. Any delay in the completion of the Work required by the Contract Documents may cause inconvenience to the public and loss and damage to the Owner including but not limited to interest and additional administrative, architectural, inspection and supervision charges. By executing the Construction Contract, the Contractor agrees that the Contract Time is sufficient for the achievement of Substantial Completion.
- **B.** The Contract Documents may provide in the Construction Contract or elsewhere for a certain dollar amount for which the Contractor and its Surety (if any) will be liable to the Owner as liquidated damages for each calendar day after expiration of the Contract Time that the Contractor fails to achieve Substantial Completion of the Work. If such daily liquidated damages are provided for, Owner and Contractor, and its Surety, agree that such amount is reasonable and agree to be bound thereby.
- **C.** If a daily liquidated damage amount is not otherwise provided for in the Contract Documents, a time charge equal to six percent interest per annum on the total Contract Sum may be made against the Contractor for the entire period after expiration of the Contract Time that the Contractor fails to achieve Substantial Completion of the Work.
- **D.** The amount of liquidated damages due under either paragraph B or C, above, may be deducted by the Owner from the moneys otherwise due the Contractor in the Final Payment, not as a penalty, but as liquidated damages sustained, or the amount may be recovered from Contractor or its Surety. If part of the Work is substantially completed within the Contract Time and part is not, the stated charge for liquidated damages shall be equitably prorated to that portion of the Work that the Contractor fails to substantially complete within the Contract Time. It is mutually understood and agreed between the parties hereto that such amount is reasonable as liquidated damages.

ARTICLE 50 USE of FOREIGN MATERIALS

- **A.** In the performance of the Work the Contractor agrees to use materials, supplies, and products manufactured, mined, processed or otherwise produced in the United States or its territories, if same are available at reasonable and competitive prices and are not contrary to any sole source specification implemented under the Public Works Law.
- **B.** In the performance of the Work the Contractor agrees to use steel produced in the United States if the Contract Documents require the use of steel and do not limit its supply to a sole source pursuant to the Public Works Law. If the Owner decides that the procurement of domestic steel products becomes impractical as a result of national emergency, national strike, or other cause, the Owner shall waive this restriction.
- **C.** If domestic steel or other domestic materials, supplies, and products are not used in accordance with preceding Paragraphs A and B, the Contract Sum shall be reduced by an amount equal to any savings or benefits realized by the Contractor.
- **D.** This Article applies only to Public Works projects financed entirely by the State of Alabama or any political subdivision of the state.

ARTICLE 51 PROJECT SIGN

- A. <u>Fully locally-funded State Agency and Public Higher Education projects</u>: DCM Form C-15: Detail of Project Sign must be included in the project manual regardless of expected bid amount. If the awarded contract sum is \$100,000.00 or more, Contractor shall furnish and erect a project sign. Other conditions besides the contract sum may warrant waiver of this requirement, but only with approval of the Technical Staff.
- **B.** <u>Fully locally-funded K-12 school projects</u>: Project sign is not required unless requested by Owner; if project sign is requested by Owner, include DCM Form C-15: Detail of Project Sign in the project manual.
- C. <u>Partially or fully PSCA-funded projects</u>: DCM Form C-15: Detail of Project Sign must be included in the project manual. Contractor shall furnish and erect a project sign for all PSCA-funded projects, regardless of the contract sum. "Alabama Public School and College Authority" as well as the local owner entity must be included as awarding authorities on the project sign of all PSCAfunded projects.

When required per the above conditions, the project sign shall be erected in a prominent location selected by the Architect and Owner and shall be maintained in good condition until completion of Work. If the Contract involves Work on multiple sites, only one project sign is required, which shall be erected on one of the sites in a location selected by the Architect and Owner. Slogan: The title of the current PSCA Act should be placed on the project sign of all PSCA-funded projects, otherwise the Awarding Authority/Owner's slogan, if any, should be used. If the Awarding Authority/Owner of a fully locally-funded project does not have a slogan, the project sign does not require a slogan.



State of Alabama

Disclosure Statement

Required by Article 3B of Title 41, Code of Alabama 1975

ENTITY COMPLETING FORM
ADDRESS
CITY, STATE, ZIP TELEPHONE NUMBER
STATE AGENCY/DEPARTMENT THAT WILL RECEIVE GOODS, SERVICES, OR IS RESPONSIBLE FOR GRANT AWARD
ADDRESS
CITY, STATE, ZIP TELEPHÓNE NUMBER
This form is provided with:
Have you or any of your partners, divisions, or any related business units previously performed work or provided goods to any State Agency/Department in the current or last fiscal year? Yes No If yes, identify below the State Agency/Department that received the goods or services, the type(s) of goods or services previously pro- vided, and the amount received for the provision of such goods or services.
STATE AGENCY/DEPARTMENT TYPE OF GOODS/SERVICES AMOUNT RECEIVED
Have you or any of your partners, divisions, or any related business units previously applied and received any grants from any State Agency/Department in the current or last fiscal year? Yes No If yes, identify the State Agency/Department that awarded the grant, the date such grant was awarded, and the amount of the grant. STATE AGENCY/DEPARTMENT DATE GRANT AWARDED AMOUNT OF GRANT
 List below the name(s) and address(es) of all public officials/public employees with whom you, members of your immediate family, or any of your employees have a family relationship and who may directly personally benefit financially from the proposed transaction. Identify the State Department/Agency for which the public officials/public employees work. (Attach additional sheets if necessary.)
NAME OF PUBLIC OFFICIAL/EMPLOYEE ADDRESS STATE DEPARTMENT/AGENCY

2. List below the name(s) and address(es) of all family members of public officials/public employees with whom you, members of your immediate family, or any of your employees have a family relationship and who may directly personally benefit financially from the proposed transaction. Identify the public officials/public employees and State Department/Agency for which the public officials/public employees work. (Attach additional sheets if necessary.)

NAME OF		NAME OF PUBLIC OFFICIAL/	STATE DEPARTMENT/
FAMILY MEMBER	ADDRESS	PUBLIC EMPLOYEE	AGENCY WHERE EMPLOYED

If you identified individuals in items one and/or two above, describe in detail below the direct financial benefit to be gained by the public officials, public employees, and/or their family members as the result of the contract, proposal, request for proposal, invitation to bid, or grant proposal. (Attach additional sheets if necessary.)

Describe in detail below any indirect financial benefits to be gained by any public official, public employee, and/or family members of the public official or public employee as the result of the contract, proposal, request for proposal, invitation to bid, or grant proposal. (Attach additional sheets if necessary.)

List below the name(s) and address(es) of all paid consultants and/or lobbyists utilized to obtain the contract, proposal, request for proposal, invitation to bid, or grant proposal:

NAME OF PAID CONSULTANT/LOBBYIST

ADDRESS

By signing below, I certify under oath and penalty of perjury that all statements on or attached to this form are true and correct to the best of my knowledge. I further understand that a civil penalty of ten percent (10%) of the amount of the transaction, not to exceed \$10,000.00, is applied for knowingly providing incorrect or misleading information.

Signature	Date	
Notary's Signature	Date	Date Notary Expires
Article 3B of Title 41. Code of Alabama 1975 re	auires the disclosure statement to be co	moleted and filed with all proposals, bids,

Article 3B of Title 41, Code of Alabama 1975 requires the disclosure statement to be completed and filed with all proposals, bids, contracts, or grant proposals to the State of Alabama in excess of \$5,000.

E-Verify MOU Instructions Revised January 2021



Kay Ivey Governor

Kelly Butler Director of Finance

TATE OF ALABAMA DE ARTMENT OF FINANCE REAL PROPERTY MANAGEMENT Division of Construction Management

P.O. Box 301150, Montgomery, AL 36130-1150 770 Wa hingto Avenue, uite 444, Mo tgomery, AL 36104 Telephone: (334) 242-4082 Fax: (334) 242-4182



Mickey Allen Assistant Finance Director Real Property Management

ank Barnes, Director Construction Management

E-Verify Memorandum of Understanding

Instruction fo inclusio in p oject ma uals.

Per DCM's May 29, 2012 bulletin *Guidance on Act 2012-491 Amending the Alabama Immigration Law*: "Contractors (including architects and engineers) will ... be equired to enroll i the E-Verify program and to provide docume tation of en ollme t in the E-Ve ify p ogram with their contracts or agreements."

Upon completing enrollment in the E-Ve ify prog am available at <u>https://www.e-verify.gov/employers/enrolling-i -e-verify</u>, a E-Verify Memorandum of Understanding (MOU) is issued to the enrolled busines . The same E-Ve ify MOU can be repeatedly used u til any information in the business's E-Verify user p ofile is updated, at which time E-Verify updates the printable Company Information section of the MOU, while the original ignatory information remains the same. Typically, a E-Verify MOU i 13-18 pages lo g depending on business type and number of employees.

DCM requires a copy of the entire current E-Verify MOU document to be submitted as an attachment to each Construction Contract original and to each Agreement Between Owner and Architect original.



E

ALABAMA DEPARTMENT OF FINANCE REAL PROPERTY MANAGEMENT Division of Construction Management

Revised August 2021

Department Use Only
Invoice #
Date Paid
Confirmation #

www.dcm.alabama.gov, 334-242-4082, inspections@realproperty.alabama.gov

PERMIT FEE & PER	MIT RE-INSPE	CTION FEE CAL	CULATON	WORKSHEET
DCM (BC) #		Date		
Project Name; Owner/Archit	ect/Engineer Project #	& Phase/Package #		
				· · · · · · · · · · · · · · · · · · ·
Owner Entity Name			• · · · · · • • • • • • • •	
Architect/Engineer Firm Nar	ne			
Contractor Company Name		· · · · · · · · · · · · · · · · · · ·		
Select only ONE of the follow	ving:			
Basic Permit Fee. Fee is based on awarded contract sum.	ACCS AL Community Colle projects started afte estimate of storm s utilities connecting (including exit passa	Storm Shelter Permit Fe ge System (ACCS) storm er 07/31/21: Fee is base shelter (not just fortification to storm shelter, and me geways/corridors, exit, e	e. shelter-related d on total cost on upcharge), ans of egress xit discharges).	Permit Re-Inspection Flat Fee.
Awarded Contract Sum, or A	CCS Storm Shelter Are	ea Estimate:		
Email address(es) for Payme	nt Receipt:			·····
BASIC PERMIT FEE CALC	ULATION:			
Awarded Contract Sum or AC	CS Storm Shelter Ar	ea Estimate is less tha	a n \$1,000 : N	I/A
Awarded Contract Sum or AC	CS Storm Shelter Ar	rea Estimate is \$1,001	<u>- \$50,000</u> :	
Contract Sum or Shelter Estima	te less \$1,000=	/1,000 x \$5.00	0=	+\$15.00=
Awarded Contract Sum or AC	CS Storm Shelter A	rea Estimate is \$50,00)1 - \$100,000:	
Contract Sum or Shelter Estima	te less \$50,000=	/1,000 x \$4.0	0=+;	\$260.00=
Awarded Contract Sum or AC	CS Storm Shelter A	rea Estimate is \$100,0	001 - \$500,000	<u>):</u>
Contract Sum or Shelter Estimat	e less \$100,000=	/1,000 x \$3.0	++	\$460.00=
Awarded Contract Sum or A	CCS Storm Shelter A	Area Estimate is \$500,	,001 and up:	
Contract Sum or Shelter Estimate	e less \$500,000=	/1,000 x \$2.00	=+\$	1,660.00=
PERMIT RE-INSPECTION F	EE:			
Flat fee of \$1,500.00 per occurr	ence	Ľ	TOTAL DUE:	
asic Permit Fee: Covers all requ	ired pre-construction co	nferences, construction in	spections and ce	etificate of substantial

completion issuance by the DCM Inspector. This fee is due when a construction contract or self-performance letter is received by DCM and must be paid before the required Pre-Construction Conference is scheduled with the DCM Inspector.

<u>ACCS Storm Shelter Permit Fee</u>: Covers all required storm shelter pre-construction meetings and construction inspections by the DCM Inspector. This fee is due when a copy of the construction contract and Notice-to-Proceed is received by DCM and must be paid before the required Storm Shelter Pre-Construction Meeting is scheduled with the DCM Inspector.

<u>Permit Re-Inspection Fee</u>: May be charged if (A) the contractor has not completed the work required for the particular inspection as detailed in DCM Form B-8: Pre-Construction Conference Checklist, or (B) the inspection is canceled or rescheduled without the required minimum 48 hours notice to all parties.

Make check payable to: "Finance - Construction Management," include the DCM (BC) Project # on the check and attach the fee worksheet. Mail payment to: Finance - Construction Management, P.O. Box 301150, Montgomery, AL 36130-1150.

State agency inter-fund transfer and payments using Public School and College Authority (PSCA) funds: contact Jennie Jones at 334-242-4808 or jennie.jones@realproperty.alabama.gov.

Fees may be paid online at www.dcm.alabama.gov (in which case a completed fee worksheet is not required).

The Basic Permit Fee and ACCS Storm Shelter Permit Fee is subject to Final Reconciliation of Fees at the end of construction.

PRE-CONSTRUCTION CONFERENCE CHECKLIST

The following are recommended topics to be covered during the required Pre-Construction Conference. Contact the DCM Project Inspector at least fourteen (14) days prior to scheduling the conference.

*Item shall be discussed while Owner is present.	
*1. Name and relationship to job of local Owner personnel	
2. Public officials involved	
3. Names of architect/engineer personnel involved	
4. Provide e-mail addresses on Pre-Construction Sign-in sheet	
5. Construction sets of plans available to contractor	
6. Verify alternates accepted, etc.	
7. Approved list of sub-contractors	
8. Approved cost breakdown & Progress Schedule	
9. Method of approving monthly payment requests	
10. Change Orders - Documentation - no prior work, unless authorized in writing	
11. Shop drawings, time to process	
12. Advance notice for required inspections The contractor will notify the architect by email of the date the project will be ready for an inspectio by the Division of Construction Management. Inspections must be requested 14 days in advance. When the DCM Inspector confirms the inspection date and time, the architect will send an email confirming the inspection date and time to all parties as well as a copy to inspections@realproperty.alabama.gov. Cancellations of any scheduled inspection must be receiv in writing no later than 48 hours prior to the scheduled inspection. If the inspection is canceled, it w be rescheduled subject to the DCM Inspector's availability. Cancellations received less than 48 hour in advance shall incur a \$1,500.00 re-inspection fee. If the contractor is not ready for the scheduled inspection he shall incur a \$1,500.00 re-inspection fee.	on /ed will urs ed
 13. Inspection Minimum Requirements The following minimum requirements listed below are provided to aid the contractors and architec determining if a project is ready for a required inspection. <u>Pre-Construction Conference</u>: Required Attendees: Contractor, Owner, Architect, Major Subs Fully-executed construction contract and Notice to Proceed Verification of payment of permit fee Contractor's statement of responsibility and quality assurance plan (storm shelter) Fire alarm contractor and fire sprinkler contractor certification (from State Fire Marshal) ADEM permit, if more than one acre of land is disturbed Pre-Construction Conference for Storm Shelter: Required Attendees: Contractor, Owner, Architect Structural Engineer, Major Subs, Special Inspections Representative The completed and signed DCM Form C-17: Contractor's Statement of Responsibility for Construction of Tornado Storm Shelter (Hurricane Shelter Where Applicable) along with the required Quality Assurance Plan (QAP) must be submitted to the DCM Inspector at the pre-construction conference. 	et in

13. <u>Pre-Roofing Conference</u> : Required Attendees: Contractor, Owner, Architect, Roofing Sub, Roofing
Manufacturer's Representative
 Roofing submittals must be approved by the architect prior to pre-roofing conference Roofing manufacturer must provide documentation that roof design and roofing materials
meet code requirements for wind uplift and impact resistance
 Copy of sample roof warranty – Note: Standard manufacturer's roofing guarantees which
contain language regarding the governing of the guarantee by any state other than the State
of Alabama, must be amended to exclude such language, and substituting the requirement
that the Laws of the State of Alabama shall govern all such guarantees.
Above Ceiling Inspections: Required Attendees: Contractor, Owner, Architect, MEP Engineers,
Major Subs
 All work must be completed except for installation of centing tiles, and/or hard centings Space must be conditioned
 Permanent power must be connected unless otherwise arranged with the DCM Inspector
Grease duct must be inspected and approved by the DCM Inspector prior to fire wrapping
and above-ceiling inspection
Life Safety Inspections and Final Inspection: Required Attendees: Contractor, Owner, Architect,
Engineers, Major Subs, Local Fire Marshal
Fire alarm certification
Kitchen hood fire suppression system certification
 General contractor's 5-year rooming guarantee (DCM Form C-9) Roofing manufacturer's warranty
 Above ground and below ground sprinkler certifications
 Completed certificate of structural engineer's observations (for storm shelter)
Emergency and exit lighting tests
Fire alarm must be monitored
Elevator inspection completed and certificate of operation provided by the State of Alabama
Department of Labor
 Boiler/vessels inspection completed and certificate of operation provided by the State of Alabama Department of Labar
Alabama Department of Labor Pressure test/Elush test for underground sprinkler lines (witnessed by local fire marshal, fire
chief and/or DCM Inspector)
 Flush/pressure test for new and/or existing fire hydrants
 Must have clear egress/access and emergency (for first responders) access to building
 Must have ADA access completed
<u>Year-End Inspection</u> : Required Attendees: Contractor, Owner, Architect, Engineers and/or Major
Substitiation be required
 Reconciliation of user fees with DCM shall be completed prior to inspection
14. Other inspections required before work is covered
15 Inspection report distribution – weekly per Owner-Architect Agreement
16. Record Drawings, definition of, procedures, addenda posted, etc.
*17. Project sign and other job signs
18. Point of contact for project. Job Superintendent and phone number.
*19. Overall phasing of job
20. Contractor's duty to coordinate work of separate contractors
*21. Use of site and existing building, access drive, signs
*22. Use of existing toilets
*23. Coordinate any utilities supplied by Owner
*24. Coordinate outages and work in existing building with Owner
25. Keeping existing exit paths open

26	Poutino ich deopun
20.	
27.	O.S.H.A Report all accidents - safety General Contractor's responsibility
28.	Contractor is reminded of obligation to comply with the Alabama Child Labor Law and E-verify
29.	Project limits
30.	Building location relative to critical property line, easement, setback, etc.
31.	Locating property line, corners, etc.
32.	Verify sanitary outfall before committing floor level
33.	ADEM land disturbance permits shall be required if site is over 1-acre.
34.	Procedure if bad soil or rock is encountered: Geotech and special inspections
35.	Stockpiling topsoil
36.	Protecting trees
37.	Soil compaction, type soil, lab tests, etc.
38.	Soil Treatment, mix on site in presence of Job Superintendent
39.	Surveyor to check foundation wall if location critical
40.	Ready mix plant, file delivery tickets, slump tests, cylinders
41.	Quality of concrete work; concrete testing
42.	Inspections before pouring concrete
43.	What is expected of masonry work, mortar additive
44.	Problems with hollow metal - install proper fire labels
45.	Pre-roofing Conference - no roofing materials installed prior to conference, all roofing submittals and warranties must have been reviewed and approved by the Architect prior to the Pre-roofing Conference. Manufacturer's Representative must be present at Pre-roofing conference. The Roofing Manufacturer must show compliance with the IBC wind and impact-resistance requirements. Contractor shall video existing building interior and exterior prior to roofing operations and provide copy to Owner.
46.	General Contractor's Roofing Guarantee and Manufacturer's Roofing Warrantees must be presented to DCM Inspector at Final Inspection and submitted with Certificate of Substantial Completion
47.	Potential conflict of mechanical and electrical equipment; shop drawings
48.	Return air plenums (no combustibles)
49.	Fire damper installation issues
50.	Certificate of Substantial Completion/Final Inspection
51.	Conduct of contractor's personnel. No interaction with staff and/or students. No foul language, no smoking or use of tobacco products, no drugs and no firearms on school property.
52.	Elevators/Pressure Vessels must be inspected and approved by the State of AL Dept. of Labor prior to final inspection.
53.	Life safety, fire alarm, sprinkler and kitchen hood fire suppression systems must be complete and certified prior to final Inspection. Also, exit and emergency lighting must be complete.
54.	Comply with ADA requirements: plumbing fixture heights, toilet partition widths, turnaround, signage, parking lot striping, etc.

55. C ec re	oordinate with local fire authority to assure access to the building for firefighting quipment during construction and before final acceptance. Provide fire extinguishers as equired.
56. Li ei	ight gauge metal roof framing and/or wood truss framing to be inspected by the structural ngineer.
57. Co M	omply with fire hydrant requirement; coordinate with local Fire Authority or State Fire arshal.
58. C	raft-faced insulation is not to be installed exposed.
59. Fire Al	e alarm contractor and fire sprinkler contractor must be permitted through the State of abama Fire Marshal's Office. Provide permits.
60. Al	I sprinkler system valves must be electrically supervised
*61. Fi	re alarm monitoring requirements
62. St a. b.	torm Shelter requirements Contractor's Statement of Responsibility and Quality Assurance Plan – Provide paperwork at Pre-Construction Conference Certification of Structural Observations from the Structural Engineer of Record must be attached to the Certificate of Substantial Completion form.
63. Th	nird-party inspections/special inspections
64. Re	elease of retainage – 30 days to complete punch list and closeout
*65. Sa	les tax savings (Alabama Department of Revenue)
66. Pr a. b. c. d.	oject Closeout - precedes Final Payment Warranties Operating and Maintenance Manuals As-built Drawings Other requirements
67. Ao a. b.	dvertisement of Completion - start ad after substantial completion for projects less than \$50,000.00, Owner advertises 1 week for projects \$50,000.00 or more, Contractor advertises for 4 consecutive weeks
68. Ti	me Extensions
69. Fir	nal Payment Application checklist

DETAIL OF PROJECT SIGN

N.T.S.

8'-0"



Notes:

1. Fully locally-funded State Agency, Public University and ACCS projects: DCM Form C-15 must be included in the project manual regardless of expected bid amount. If the awarded contract sum is \$100,000.00 or more, Contractor shall furnish and erect a project sign.

Fully locally-funded K-12 school projects: Project sign is not required unless requested by Owner, if project sign is requested by Owner, include DCM Form C-15 in the project manual.

<u>Partially or fully PSCA-funded projects</u>: DCM Form C-15 must be included in the project manual. Contractor shall furnish and erect a project sign for all PSCA-funded projects, regardless of contract sum. "Alabama Public School and College Authority" as well as the local owner entity must be included as awarding authorities on the project sign of all PSCA-funded projects.

- 2. Sign to be constructed of $\frac{3}{4}$ " exterior grade plywood.
- 3. Paint with two coats best grade exterior paint before letters are painted. Option: In lieu of painted lettering on plywood, a corrugated plastic sign (displaying the same lettering, layout and colors as above) may be secured directly to the unpainted exterior grade plywood.
- 4. Sign shall be placed in a prominent location and easily readable from existing street or roadway.
- 5. Sign shall be maintained in good condition until project completion.
- 6. Slogan: Act 2020-167's title "Investing In Alabama's Future" should be placed on the project signs of all PSCA-funded projects, otherwise the Awarding Authority/Owner's slogan, if any, should be used. If the Awarding Authority/Owner of a fully locally-funded project does not have a slogan, the project sign does not require a slogan.

DCM (BC) No.

PSCA Projects: PSCA No. _____

Application No. _____

Date: _____

APPLICATION and CERTIFICATE for PAYMENT

Attach DCM Form C-10SOV: Schedule of Values

TO OWNER: PRO	DJECT:
Entity Name:	
Address:	
FROM CONTRACTOR: Company Name & Address, which must exactly match AR	CHITECT / ENGINEER:
co. name & payment	n Name:
address spelling as registered in State Add	ress
of AL Accounting	
& Resource System (STAARS) to avoid	
STAARS rejection:	
STAARS Vendor#:	
A. Total Original Contract	\$
B. Fully Executed (signed by all parties) Change Order(s) Nur	nbers through +\$
C Total Contract To Date	
C. Total Contract To Date	Φ
1. Work Completed to Date per attached Schedule of Va	ues ^{(Form C-10SOV's} Column F Total) \$
2. Materials Presently Stored (When this amount is greater than \$ C-10SM: Inventory of Stored Materi	0.00, attach Form als, or similar list) +\$
3. Total Work Completed to Date & Materials Presently Store	d(% of Contract To Date) \$
4. Less Retainage (If 1 total Work Completed to Date & Materials Presently) or equal to 50% of Total Contract to Date (C), Retainage (Date #3 exceeds 50% of C and un util project is comple	Stored (#3) is less than $e = #3 \times 0.05$. $e = \text{Retuining} = C \times 0.025$
5. Total Due	point below for requirements.) \$
6. Less Total Previous Payments Billed (Must exactly match application.)	#5 Total Due from previous # 6 is \$0.00 if there is no -\$
7. Balance Due This Estimate	(lication)
CONTRACTOR'S CERTIFICATION	ARCHITECT'S / ENGINEER'S CERTIFICATION
The undersigned Contractor certifies that to the best of his knowledge, information, belief the Work covered by this Application for Payment has been complete	and In accordance with the Contract Documents, the Architect/
accordance with the Contract Documents, that all amounts have been paid by him	for Engineer's knowledge and belief, the Work has progressed to the
Work for which previous Certificates for Payments were issued and payments rece	point indicated herein, the quality of the Work is in accordance with
from the Owner and that current payment shown herein has not yet been received.	the Contract Documents, and the Contractor is entitled to payment of the amount approved.
By: Date:	-
	By
Name & Title	Architect's / Engineer's Signature
Sworn and subscribed before me this day of	
Seal: Day Month, Year	Name & Title
	Date
Notary Public's Signature	—
INSTRUCTIONS	APPROVAL
• Four copies of pay. app., each with original signatures and all attachments require	d.
• Date of first payment application cannot precede the Notice to Proceed's Begin Date	e.
• A change order must be fully executed before inclusion on a payment application.	Owner Entity
• Contractor's signature date cannot precede the payment application date.	
 Contractor and Notary signee dates must match. Progress schedules must be included with non-final navment applications 	By
• One payment application per month may be submitted.	Signature
• On a final payment application, the following is required for release of retainage: all	
change orders must be fully executed (signed by all parties) and included the	
change orders must be fully executed (signed by all parties) and included, the Certificate of Substantial Completion for entire work is fully executed, and all other	Name & Title
change orders must be fully executed (signed by all parties) and included, the Certificate of Substantial Completion for entire work is fully executed, and all other close-out requirements per General Conditions Article 34 are completed.	Name & Title

	SCI	HEDULE	OF VALUE	ES (SOV)				DCM Revise	Form C-10SOV d October 2021
Projec	ct:					DCM (BC) Proje	ect Number:		
						PSCA Project N	umber, if any:		
Contr	actor Company:					Application Num	ıber:		
						Application Date			
						Period From:		Period To:	
А	В	С	D	Е	F	G	Н	Ι	J
		Schedulad	Work Co	mpleted		Materials	Total Work	c F	Dataing an
		Value	Work		Total Work	Presently Stored	Completed to	Percent of	This column's
Itam		v alue (including fully	Previously	Work ~	Completed to	(G total greater than \$0 must match C-	Date &	Contract	Total's cell
No.	Description of Work	executed [signed	Completed	Completed	Date	10SM's column E	Materials	Completed	formula
		by all parties] change order	(Previous pay app SOV's column F.	1 his Period (Period as noted	(This application $SOV'_{S} D + E$)	total. This SOV's G amounts are not in	Presently Stored	(This SOV's	calculates the applicable
		amounts)	D is \$0 if this SOV is for first pay app.)	above)	~	this SOV's D nor E amounts.)	(This SOV's F + G)	H/C)	variable rate)
1.					•		•		Retainage
2.					-		- \$		Variable Rate:
3.					-		- \$		
4.					۰ \$		- 8		If Total Work
5.					-		- \$		Completed to
6.					•		- \$		Date & Materials
7.					-		-		Presently Stored
%					-		-		(H) IS less than or $\frac{1}{2} = \frac{500}{2}$
9.					•		-		equal to 20% of
10.					•		- \$		Value (C)
11.					•				Retainage =
12.					\$		-		$H \ge 0.05$.
13.					-		-		
14. 14.					، ج		۰ ۲		Once H exceeds
					•		•		50% of C and up
16.					•		۰ ۶		until project is
10.					•		- •		complete,
19.					• •		• •		$C \ge 0.025$.
20.					• • •		۰ ج		
21.					•		- \$		There will be no
22.					-		- \$		retainage on final
23.					-		- \$		payment
24.					- \$		- \$		application.
25.					۰ \$		- \$		
	TOTALS:	•	•	' \$	•	•	۰ \$		•
This p ⁶	ay app SOV's column totals must match amounts in this pay	ζ	;	;		¢	¢	•	
app Fo	rm C-10 per the following indicated Form C-10 line #s:	ن ن	None	None	Ι.	2.	3.	3.	4.
Note: nart of	If this SOV's column G: Materials Presently Stored inc othe maxment annlication documentation	cludes any amoun	ts other than \$0, th	en DCM Form C-	10SM: Inventory	of Stored Material	s with back-up re	ceipts must be	submitted as

INVENTORY O	F STORED MAT	ERIALS		DCM Form C-10SM Revised October 2021
Project:			DCM (BC) No.:	
			PSCA No, if any:	
Contractor Company:			For Estimate No.:	
			For Period Ending:	
Α	В	С	D	E
Description	Materials Stored	Materials	Materials Used This	Materials
	Last Period	Purchased This	Period	Presently Stored
		Period	(period noted above)	$(\mathbf{B} + \mathbf{C} - \mathbf{D})$
		(neriod noted above)		
		*****		****
			-	
TOTALS:				
<u>Instructions</u> : • This Form C-10SM must be submitted as part of the payment appli	ication documentation whe	en a Materials Presently St	ored amount of anything g	reater
than \$0 is noted on line 2 of DCM Form C-10: Application and Cet	rtificate for Payment.	•))	
· Receipts must be provided as attachments to this form C-10SM for	r all amounts placed in Coli	umn C: Materials Purchas	ed This Period.	
· The total \$ amount of this Form C-10SM's column E: Materials Pre	esently Stored must match	both Form C-10's line 2: N	Materials Presently Stored, a	pu
Form C-10SOV: Schedule of Values' total \$ amount of Column G:	Materials Presently Stored	1. 	, , , , , , , , , , , , , , , , , , ,	
• The 3 amounts in this current Form C-10SM's Column D: Material amblication's Form C-10SOV's Column F: Work Completed This P	IS Used 1 his Period are am	ounts that must all be incl	uded in the current payment	
• The \$ amounts in this current Form C-10SM's Column E: Material	ls Presently Stored are the a	amounts that must be listed	d in the next payment applic	ation's
Form C-10SM's Column B. Materials Stored I ast Period	•		4 4 4	

SAM	PLE PROGRESS SCHEI	DULE &	REPORT	COL	VTRACTOR (Contr	actor may use own	form in lieu of	DATE OF REF	PORT:		
DCM (I	BC) No.:			For	m C-11):						
PSCA p	projects: PSCA No.:							PROCEED DA	VTE:		
PROJE(CT:										
				ARC	CHITECT/ENGINEE	.R:		PROJECTED (COMPLETION DA	TE:	
	WORK DIVISION	%	AMOUNT								
1. (GENERAL REQUIREMENTS										
2. 5	SITEWORK										
3. (CONCRETE	[
4.	MASONRY										
5.	METALS										
6. /	WOOD AND PLASTIC									1	%00ï
7. 1	THERMAL AND MOISTURE										
Т	PROTECTION										%06
8. L	DOORS AND WINDOWS	<u> </u>									80%
9. F	INISHES										70%
10. 5	SPECIALTIES										60%
11. E	EQUIPMENT										50%
12. F	-URNISHINGS										40%
13. 5	SPECIAL CONSTRUCTION	[30%
14. (CONVEYING SYSTEMS										20%
15. ľ	MECHANICAL										10%
16. E	ELECTRICAL										%0
TOTAL	ORIG. CONTRACT	100%									I
ANTICI	IPATED DRAW IN \$1,000										DCI
ACTUA	1 DRAW IN \$1,000									Aug	ИF
										gust	orm
		•	 				1	USE ADDITION [≠]	AL SHEETS IF JOB IS	20	n C-
LEGEN	D: ANTICIPATED ACTIVITY	ACTU	AL ACTIVITY	ANTICIPAT	ED CASH FLOW	ACTUAL CASH FI	LOW	SCHEDULED OV	ER 12 MONTHS.	21	·11

August 2021 CHANGE ORDER CHECKLIST

DCM Form B-12

For use with DCM Form C-12 and DCM Form 9-J

WHICH FORM DO YOU USE?

Use **DCM Form C-12** for contracts of state agencies and departments, SDE, and ACCS projects. Use **DCM Form 9-J** for contracts of projects partially or fully Public School and College Authority (PSCA)-funded. Include a completed **DCM Form B-11:** Change Order Justification with either DCM Forms C-12 or 9-J.

Verify th attached	hat the following information is inserted in the spaces provided on the CONTRACT CHANGE ORDER form, or d to the form where attachments are noted to be acceptable or obviously necessary. Do not staple forms; use clips.
1.	CHANGE ORDER NUMBER: Insert current change order number.
2.	DATE: Insert date.
3.	DCM (BC) PROJECT NUMBER: Insert DCM Project Number in the block provided at top of document.
4.	CONTRACTOR Insert name and address of the Contractor, exactly as they appear on the Construction Contract.
5.	NAME OF PROJECT: Under "Project", insert the complete name of the project as identified in the bid documents. If using DCM Form 9-J, insert the PSCA Project Number in the space provided.
6.	CONTRACTOR'S PROPOSALS: Under "TERMS", identify the change order proposals submitted by the contractor that are being addressed by the Contract Change Order. Identify these proposals by inserting their dates.
7.	DESCRIPTION OF THE CHANGE(S) IN WORK: <u>Fully</u> describe the change or changes to the original contract work for which the Construction Contract is being modified. This description should be written so that a reader of the document who is not directly involved in the project can understand what is being changed. If the space provided on the form is inadequate for such a description, use attachments and cite them.
8.	CONTRACT AND CHANGE ORDER AMOUNTS: Insert the applicable dollar amounts to record the original contract sum, change orders, and the currently revised contract sum.
9.	EXTENSION OF TIME: If the Contract Time is being extended by the Contract Change Order, insert appropriate number of calendar days in the space provided. If the Contract Time is not being extended, insert "NONE".
10.	RESPONSIBILITY FOR CHANGE ORDER FUNDING - DCM Form 9-J ONLY: The authority responsible for funding the change order is to be identified in the following sentence in the form,: "The amount of this Change Order will be the responsibility of" Insert whichever is appropriate: (1) "PSCA", (2) name of LEA, or (3) "PSCA" and name of LEA.
11.	SIGNATURES: The signature spaces for State Agency, PSCA and fully locally-funded Alabama Community College System projects are different from each other. Download the appropriate document per Owner/project type from www.dcm.alabama.gov/forms.aspx. Before submitting a Contract Change Order to DCM, the document must be signed by the contractor, surety (for additive change orders only), design professional and owner (local owner or using agency). Signature by the surety is not necessary on deductive change orders or change orders involving only extensions of time. If the cumulative change order amount exceeds 10% of the original contract amount then the Owner's legal consultant must sign DCM Form B-11: Change Order Justification.
12.	 ATTACHMENTS: To each copy of the Contract Change Order form, attach with clips (do not staple): Contractor's change order proposals and/or invoices providing a detailed breakdown of change order costs. General Contractors (GC) must include subcontractors' (sub) quotes as backup. All GC and sub quotes must be broken down by labor (hours and rates), materials including quantities and unit prices (with receipts or quotes attached), equipment whether rented or owned (with receipts or quotes attached), and Overhead & Profit (OH&P). Total OH&P can be a maximum of 25% divided between GC and subs; GC can have a maximum of 15% OH&P (in which case a sub could have up to 10% OH&P). See General Conditions- Article #19. Sales tax cannot be included in change orders. Deductive change orders also require backup including breakdown of labor and material, and must also deduct OH&P if included in original bid. Include specification section regarding allowances. POWER OF ATTORNEY for the individual signing the Contract Change Order for the surety. DCM Form B-11, CHANGE ORDER JUSTIFICATION: completed and signed by the design professional and owner.
CONTRACT CHANGE ORDER

Change Order No	Date	DCM (BC) No	
TO: (<i>Contractor</i>) Co. Name: Address:		PROJECT:	

TERMS: You are hereby authorized, subject to the provisions of your Contract for this project, to make the

following changes thereto in accordance with your proposal(s) dated

FURNISH the necessary labor, materials, and equipment to (*Description of work to be done or changes to be made. If the description is continued in an attachment, identify the attachment below.*):

ORIGINAL CONTRACT SUM	\$
NET TOTAL OF PREVIOUS CHANGE ORDERS	\$
PREVIOUS REVISED CONTRACT SUM	\$
THIS CHANGE ORDER WILL INCREASE DECREASE THE CONTRACT SUM BY	\$
REVISED CONTRACT SUM, INCLUDING THIS CHANGE ORDER	\$
EXTENSION OF TIME resulting from this Change Order None or	Calendar days.

The Owner does hereby certify that this Change Order was executed in accordance with the provisions of Title 39, Code of Alabama, 1975, as amended.

	CONTRACTING PARTIES
Architectural/Engineering Firm	
Recommended By	Contractor Company
Name & Title	By
APPROVAL	Awarding Authority/Owner Entity By
(SDE)	Name & Title
(Required for locally-funded, SDE projects.)	CONSENT OF SURETY (for additive \$ change orders only)
By Date: State Superintendent of Education	Surety Company
	By(Attach current Power of Attorney) Name & Title

Review/Signature flow: Architect/Engineer (prepare documents) > Contractor (review and sign) (> Surety for additive \$ change orders only [sign]) > Architect/Engineer (review and sign) > Owner (review and sign) > SDE (review, sign, distribute the fully executed Change Order to all parties and forward a copy to the Alabama Division of Construction Management [DCM]). Note: DCM does not sign fully locally-funded SDE project contract documents.

Real	Property Management CH	IANGE ORDER JUSTIFICATIO
70 Wa	ashington Avenue, Suite 444	Change Order No
ontgo 34) 24	mery, Alabama 36104 42-4082 FAX (334) 242-4182	Date:
	Purpose and instructions on next page.	DCM (BC) No
A)	PROJECT NAME & LOCATION:	OWNER ENTITY NAME & ADDRESS:
	CONTRACTOR COMPANY NAME & ADDRESS:	ARCHITECTURAL / ENGINEERING FIRM NAME & ADDRESS:
B)	DESCRIPTION OF PROPOSED CHANGE(S): ATTA	CH CONTRACTOR'S DETAILED COST PROPOSAL(
C)	AMOUNT: ADD DEDUCT \$ ORIGINAL CONTRACT AMOUNT PREVIOUS C.O.'s	TIME EXTENSION: CALENDAR DAY: THRU CONTRACT AMOUNT PRIOR PROPOSED CHANGE ORDER
	\$ + \$	= \$
E)	JUSTIFICATION OF CHANGE ORDER VS. COMPETITIVE BID.	
)	ARCHITECT / ENGINEER'S EVALUATION OF PROPOSED COST	T:
3)	CHANGE ORDER RECOMMENDED	CHANGE ORDER JUSTIFIED AND APPROVED
	ARCHITECTURAL / ENGINEERING FIRM NAME	LOCAL OWNER ENTITY NAME
	ARCHITECT / ENGINEER'S SIGNATURE	OWNER'S SIGNATURE
	By: OWNER'S PROJECT REPRESENTATIVE'S SIGNATURE	OWNER'S LEGAL COUNSEL'S SIGNATURE

TO: Alabama Department of Finance

CHANGE ORDER JUSTIFICATION: PURPOSE and INSTRUCTIONS

PURPOSE

The awarding of work through an existing contract may potentially conflict with, or violate, the "Competitive Bid Laws" of the State of Alabama. **The determination of legality of Change Orders rests with the Awarding Authority and its legal advisor.** In a June 15, 1979, Opinion, the Office of the Attorney General offered guidelines for making such determinations in conjunction with considering the facts and merits of each situation. The purpose of the CHANGE ORDER JUSTIFICATION is to provide a means through which the Awarding Authority considers these guidelines and the intent of the "Competitive Bid Laws" when authorizing Change Orders. Pursuant to these guidelines, the following types of changes meet the criteria for awarding work through Change Orders in lieu of through the Competitive Bid process:

- I. Minor Changes for a monetary value less than required for competitive bidding.
- II. Changes for matters relatively minor and incidental to the original contract necessitated by unforeseeable circumstances arising during the course of the work.
- III. Emergencies arising during the course of the work of the contract.
- IV. Bid alternates provided for in the original bidding where there is no difference in price of the change order from the original best bid on the alternate.
- V. Changes of relatively minor items not contemplated when the plans and specifications were prepared and the project was bid which are in the public interest and which do not exceed 10% of the contract price.

Under these guidelines the cumulative total of Change Orders, including any negotiations to bring the original contract price within the funds available, would become questionable if the total of such changes and negotiations exceed 10% of the original contract price. These guidelines are not intended to interfere with the Awarding Authority's good faith discretion to respond to specific situations in the public's best interest. If the cumulative change order amount exceeds 10% of the original contract amount then the Owner's legal consultant must sign the Change Order Justification prior to submission to the Division of Construction Management (DCM).

INSTRUCTIONS

The CHANGE ORDER JUSTIFICATION is to be prepared by the design professional, who has evaluated the fairness and reasonableness of the proposed cost of the change(s) and recommends that the proposed Change Order be executed. The fully executed Form B-11: CHANGE ORDER JUSTIFICATION must accompany the proposed DCM Form C-12: Change Order. Instructions for completing the B-11 form are:

- 1. Insert the <u>proposed</u> Change Order Number, date of the Justification, and DCM (BC) Project Number in the spaces provided in the upper right-hand corner.
- 2. Section (A): Insert the complete name and address of the PROJECT, OWNER, CONTRACTOR, AND ARCHITECT/ENGINEER.
- 3. Section (B): Provide a complete description of the proposed changes in work, referring to and attaching revised specifications and/or drawings as appropriate. An attachment may be used if additional space is needed, but insert the proposed amount and time extension of the change(s) in the spaces provided. Attached a copy of the contractor's detailed cost proposal.
- 4. **Section (C)**: Insert the Original Contract amount, the net increase or decrease of previous Change Orders, and the Current Contract amount (preceding the currently proposed Change Order).
- 5. Section (D): Explain why it is necessary, or in the public's interest, to make the proposed change(s) to the Work.
- 6. Section (E): Explain why award of the changed work to the existing contractor instead of awarding the work under the competitive bid process is justified.
- 7. Section (F): The design professional must state his evaluation of the reasonableness and fairness of the proposed costs based upon his review of the contractor's proposal.
- 8. Section (G): The design professional must recommend the Change Order to the Owner by signing the document; the Owner may require such recommendation from other individuals. The Owner must sign the document indicating that they believe change order action in lieu of the competitive bid process is justified for the proposed change(s). Review of the matter and signing of the document by the Owner's legal counsel is highly recommended. If the cumulative change order amount exceeds 10% of the original contract amount then the Owner's legal consultant must sign the Change Order Justification prior to submission to DCM.

Do not staple this form and/or attachments; use clips.

GENERAL CONTRACTOR'S	DCM (BC) Project No
ROOFING GUARANTEE	

Project Name & Address	Project Owner Entity(ies) Name(s) & Address(es)

General Contractor's Company Name, Address, & Telephone Number	EFFECTIVE DATES OF GUARANTEE
	Date of Acceptance:
	Date of Expiration:

- 1. The General Contractor does hereby certify that the roofing work included in this contract was installed in strict accordance with all requirements of the plans and specifications and in accordance with approved roofing manufacturers recommendations.
- 2. The General Contractor does hereby guarantee the roofing and associated work including but not limited to all flashing and counter flashing both composition and metal, roof decking and/or sheathing; all materials used as a roof substrate or insulation over which roof is applied; promenade decks or any other work on the surface of the roof; metal work; gravel stops and roof expansion joints to be absolutely watertight and free from all leaks, due to faulty or defective materials and workmanship for a period of five (5) years, starting on the date of substantial completion of the project. This guarantee does not include liability for damage to interior contents of building due to roof leaks, nor does it extend to any deficiency which was caused by the failure of work which the general contractor did not damage or did not accomplish or was not charged to accomplish.
- 3. Subject to the terms and conditions listed below, the General Contractor also guarantees that during the Guarantee Period he will, at his own cost and expense, make or cause to be made such repairs to, or replacements of said work, in accordance with the roofing manufacturers standards as are necessary to correct faulty and defective work and/or materials which may develop in the work including, but not limited to: blisters, delamination, exposed felts, ridges, wrinkles, splits, warped insulation and/or loose flashings, etc. in a manner pursuant to the total anticipated life of the roofing system and the best standards applicable to the particular roof type in value and in accordance with construction documents as are necessary to maintain said work in satisfactory condition, and further, to respond on or within three (3) calendar days upon proper notification or leaks or defects by the Owner or Architect.

- A. Specifically excluded from this Guarantee are damages to the work, other parts of the building and building contents caused by: (1) lightning, windstorm, hailstorm and other unusual phenomena of the elements; and (2) fire. When the work has been damaged by any of the foregoing causes, the Guarantee shall be null and void until such damage has been repaired by the General Contractor, and until the cost and expense thereof has been paid by the Owner or by the responsible party so designated.
- B. During the Guarantee Period, if the Owner allows alteration of the work by anyone other than the General Contractor, including cutting, patching and maintenance in connection with penetrations, and positioning of anything on the roof, this Guarantee shall become null and void upon the date of said alterations. If the owner engages the General Contractor to perform said alterations, the Guarantee shall not become null and void, unless the General Contractor, prior to proceeding with the said work, shall have notified the Owner in writing, showing reasonable cause for claim that said alterations would likely damage or deteriorate the work, thereby reasonably justifying a termination of this Guarantee.
- C. Future building additions will not void this guarantee, except for that portion of the future addition that might affect the work under this contract at the point of connection of the roof areas, and any damage caused by such addition. If this contract is for roofing of an addition to an existing building, then this guarantee covers the work involved at the point of connection with the existing roof.
- D. During the Guarantee period, if the original use of the roof is changed and it becomes used for, but was not originally specified for, a promenade, work deck, spray cooled surface, flooded basin, or other use of service more severe than originally specified, this Guarantee shall become null and void upon the date of said change.
- E. The Owner shall promptly notify the General Contractor of observed, known or suspected leaks, defects or deterioration, and shall afford reasonable opportunity for the General Contractor to inspect the work, and to examine the evidence of such leaks, defects or deterioration.

IN WITNESS THEREOF, this instrument has been duly executed this _____ day of _____, ____.

General Contractor's Authorized Signature

Typed Name and Title

ROUTING PROCEDURES ON NEXT PAGE

CERTIFICATE OF SUBSTANTIAL COMPLETION

Do not staple this form and/or attachments; use clips. Print single-sided; do not submit double-side printed documents.

DCM (BC) No.

OWNER ENTITY NAME AND ADDRESS:	ARCHITECTURAL / ENGINEERING FIRM NAME AND ADDRESS:
Email to receive executed copy:	Email to receive executed copy:
CONTRACTOR COMPANY NAME AND ADDRESS:	BONDING COMPANY NAME AND ADDRESS:
Email to receive executed copy:	Email to receive executed copy:
PROJECT:	
Substantial Completion has been achieved for the ent	ire Work the following portion of the Work:

The Date of Substantial Completion of the Work covered by this certificate is established to be _____

"Substantial Completion" means the designated Work is sufficiently complete, in accordance with the Contract Documents, such that the Owner may occupy or utilize the Work for its intended use without disruption or interference by the Contractor in completing or correcting any remaining unfinished Work. The Date of Substantial Completion is the date upon which all warranties for the designated Work commence, unless otherwise agreed and recorded herein.

Punch List: A _____ page list of items to be completed or corrected prior to the Owner's approval of Final Payment is attached hereto, but does not alter the Contractor's responsibility to complete or correct all Work in full compliance with the Contract Documents. The Contractor shall complete or correct all items on the attached list, ready for re-inspection for Final Acceptance, within 30 days after the above Date of Substantial Completion, unless another date is stated here: ______.

If completed or corrected within this period, warranties of these items commence on the Date of Substantial Completion, otherwise such warranties commence on the date of Final Acceptance of each item.

Only <u>one</u> (1) originally executed substantial completion form shall be routed for signature. DCM office will mail the fully-executed original to the Owner and email copies to all parties.

RECOMMENDED BY (signature and email address required):	
ARCHITECT/ENGINEER:	DATE:
CONTRACTING PARTIES:	
CONTRACTOR:	DATE:
OWNER:	DATE:
	DATE:
APPROVALS:	
DCM INSPECTOR:	DATE:
DCM CHIEF INSPECTOR:	DATE:
DCM DIRECTOR:	DATE:

CERTIFICATE OF SUBSTANTIAL COMPLETION ROUTING PROCEDURE

Only <u>one</u> (1) originally executed substantial completion form shall be routed for signature. DCM office will mail the fully-executed original to the owner and email copies to all parties.

ARCHITECT/ENGINEER: Sign and date document, then mail it to Contractor. <u>Provide Owner</u> with DCM Inspector's name & field office address; territories and addresses are available at www.dcm.alabama.gov/staff.aspx.

CONTRACTOR: Sign and date document, then mail it to Owner.

OWNER: Sign and date document, then mail it to DCM Inspector's <u>field office address</u>; DCM Inspector territories and addresses are available at www.dcm.alabama.gov/staff.aspx.

DCM INSPECTOR: Sign and date document, then mail it to DCM Montgomery office.

DCM OFFICE: After review and signature/date by DCM Chief Inspector and DCM Director, DCM office will mail the fully-executed original document to Owner and will email copies to all parties.

NOTICE

THEEXECUTED"GENERALCONTRACTOR'SROOFING GUARANTEE"(DCM Form C-9)AND ANYOTHERROOFING WARRANTYREQUIREDBY THECONTRACT MUSTACCOMPANYTHISCERTIFICATETO OBTAIN DCM APPROVAL.

SAMPLE FORM OF ADVERTISEMENT FOR COMPLETION

LEGAL NOTICE

In accordance with Chapter 1, Title 39, Code of Alabama, 1975, as amended, notice is hereby given

that			,
(Contracte	tor Company Name)		
Contractor, has completed the Contract for [[(Equipment)] (Improvement) of	(Construction) (Na	(Renovation) <i>time of Project</i>):	(Alteration)
at			
(Insert location	data in County or Cit	ty)	
for the State of Alabama and the (County) (C Owner(s), and have made request for final set any claim for labor, materials, or otherwise in notify	ttlement of said Control Contr	ontract. All perso this project should	ns having immediately
(Archite	tect / Engineer)		
		(Contractor)

(Business Address)

NOTE: This notice must be run once a week for four successive weeks for projects exceeding \$50,000.00. For projects of \$50,000.00 or less, run one time only. A copy of the publisher's affidavit of publication (including a copy of the advertisement) shall be submitted by the Contractor to the Design Professional for inclusion with DCM Form B-13: Final Payment Checklist for state agencies, PSCA-funded and other bond-funded projects.

FINAL PAYMENT CHECKLIST (FPC)

To be completed by the Architect/Engineer and submitted to DCM for review; applicable only to state agencies, partially or fully PSCA-funded and other bond-funded projects. Four copies of the FPC are required. Each copy of the FPC shall include all attachments including the Contractor's Application for Final Payment.

(For further guidance refer to Article 34/Final Payment of DCM Form C-8: General Conditions of the Contract.)

PROJECT:		DCM (BC) No.		
			. ,	
			PSCA No.	(If appliable)
YES	N/A	Select "YES" or "N/A" as applicable.		
		Application and Certificate for Final Payment, D application must include original signatures of all par	OCM Form C-10: Attach ties and include all application	one copy to FPC. The ation attachments.
		Certificate of Substantial Completion, DCM For	m C-13: Attach one fully-	executed copy to FPC.
		Advertisement for Completion, DCM Form C-14 publication (including the advertisement) to the FPC	4: Attach one copy of the	affidavit of
		Contractor's Affidavit of Payment of Debts & Cla	ims, DCM Form C-18: A	attach one copy to FPC.
		Contractor's Affidavit of Release of Liens, if req one copy to the FPC.	uired by Owner, DCM F	Form C-19: Attach
		Consent of Surety to Final Payment, if any, To C required for projects with P&P Bonds. Original has be	Contractor, DCM Form C en delivered to Owner. Att	C-20: Consent is tach one copy to FPC.
		General Contractor's Roofing Guarantee, DCM Form C-9, and Other Specified Roofing Guarantees, if any: Attached to Certificate of Substantial Completion.		
		Contractor's One-Year Warranty: Original has been delivered to the Owner. Attach one copy to the FPC.		
		Other Warranties: All other specified original warranties has been delivered to the Owner. Attach one copy to the FPC.		
		Record Documents: Specified "As-built" plans and specifications have been delivered to the Owner.		
		O & M Manuals: Specified instructions and O&M M	lanuals have been deliver	red to the Owner.
		Time Extension: Over-run of Contract Time has been reconciled by: Change Order Liquidated Damages Attached explanation		
		Additional Documents or Explanations which are attached:		
Cubro	ittad D			
maue	iiilea B	y . Architectural / Engineering F	ïrm	
		Signature Printed Nam	e and Title	Date

Final Reconciliation of Fees: Between the final change order execution and the year-end inspection, report the final project cost to <u>https://appengine.egov.com/apps/al/dcm-fees</u> (back-up is not needed unless requested by DCM). DCM will then email a Final Reconciliation of Fees Statement to the Owner. If the Final Statement shows a net payment is owed to DCM, that amount must be paid prior to scheduling the year-end inspection. If the Final Statement shows a net refund is owed then a check will be mailed to the Owner.

DCM (BC) Number:

PSCA Projects: PSCA Number: _____

Date of the Construction Contract:

Contractor's Affidavit of Payment of Debts and Claims

To Owner (<i>Entity name and address</i>):	Project (Same as appears in the Construction Contract):

STATE OF:

COUNTY OF:

The undersigned hereby certifies that, except as listed below, payment has been made in full and all obligations have otherwise been satisfied for all materials and equipment furnished, for all work, labor and services performed, and for all known indebtedness and claims against the Contractor for damages arising in any manner in connection with the performance of the Construction Contract referenced above for which the Owner or Owner's property might in any way be held responsible or encumbered.

EXCEPTIONS:

Supporting Documents Attached Hereto:

1. Consent of Surety to Final Payment. Whenever Surety is involved, Consent of Surety is required. DCM Form C-20, Consent of Surety to Final Payment, may be used for this purpose.

Indicate attachment:

Yes No

The following supporting document should be attached hereto if required by the Owner:

- 1. Contractor's Release of Waiver of Liens.
- 2. Separate Releases or Waivers of Liens from Subcontractors and material and equipment supplies, to the extent required by the Owner, accompanied by the list thereof.
- 3. Contractor's Affidavit of Release of Liens, DCM Form C-19.

Contractor (Insert company name and address):

By:

Signature of authorized representative

Name and Title

Sworn to and subscribed before me this _____ day

of_____,____.

Notary Public's Signature

My commission expires:

Seal:

DCM (BC) Number:

PSCA Projects: PSCA Number: _____

Date of the Construction Contract:

Contractor's Affidavit of Release of Liens

To Owner (<i>Entity name and address</i>):	Project (Same as appears in the Construction Contract):

STATE OF:

COUNTY OF:

The undersigned hereby certifies that, except as listed below, the Releases or Waivers of Lien attached hereto include the Contractor, all Subcontractors, all suppliers of materials and equipment, and all performers of Work, labor or services who have or may have liens or encumbrances or the right to assert liens or encumbrances against any property of the Owner arising in any manner out of the performance of the Construction Contract referenced above.

EXCEPTIONS:

Supporting Documents Attached Hereto:

- 1. Contractor's Release of Waiver of Liens.
- 2. Separate Releases or Waivers of Liens from Subcontractors and material and equipment supplies, to the extent required by the Owner, accompanied by the list thereof.

Contractor (Insert company name and address):

By: _

Signature of authorized representative

Name and Title

Sworn to and subscribed before me this _____ day

of_____,____.

Notary Public's Signature

My commission expires: _____

Seal:

DCM (BC) Number: _____

PSCA Projects: PSCA Number:

Date of the Construction Contract:

Surety's Bond Number:

CONSENT OF SURETY TO FINAL PAYMENT

Seal:

To Owner (<i>Entity name and address</i>):	Project (Same as appears in the Construction Contract):

In accordance with the provisions of the Contract between the Owner and the Contractor as indicated above, the

Surety (Insert name and address of Surety)

on bond of

Contractor (Insert name and address of Contractor)

hereby approves of the final payment to the Contractor, and agrees that final payment to the Contractor shall not relieve the Surety of any of its obligations to

Owner (Insert name and address of Entity):

as set forth in said Surety's bond.

SIGNED AND SEALED this ______ day of ______, _____.

SURETY:

Company Name

By _____

Signature of Authorized Representative

Printed Name and Title

Note: Original Power of Attorney for the Surety's signatory shall be furnished with each of the original forms to be attached to each of the four (4) final payment forms.

PROJI Cit COMP	ECT NAME y, Alabama PLETED 20
I	OR THE BOARD OF EDUCATION
Name	Superintendent
Name	Chairman
Name	Vice Chairman
Name	Board Member
Name	Board Member
Name	Board Member
SUPERVISED BY THE STATE O	F ALABAMA BUILDING COMMISSION
GOODWYN MILLS CAV Huntsv	VOOD, LLC. ARCHITECT ille, Alabama
(Contractor's Name) (Contract	CONTRACTOR or's City & State)

Notes: 1. Refer to Section 10400 - "Identification Devices", for additional information and requirements.

- 2. Approximate Size: 22-inches wide x 28-inches high.
- 3. Verify names, date, and Contractor's information before fabrication.
- 4. Submit Shop Drawings in accordance with Section 01300 Administrative Requirements.

PLAQUE DETAIL – 1 REQUIRED PER NEW BUILDING NOT TO SCALE

TRANSMITTAL

	No
DATE:	PROJECT:
	GM&C PROJECT No
FROM:	PROJECT MANAGER:
	GOODWYN, MILLS, CAWOOD, LLC.
	117 Jefferson Street North
	Huntsville, AL 35801

Shop Drawing / Submittal No. (see example below)

Description

Copies	Submittal Number	Description		
RESPON	NSE: ROUTING:	DATE REC'D:		
SIGNATURE:		DATE RET'D:		
Shop Dra	Shop Drawing / Submittal Number Example 005 - 09650 - 01A			

shop Drawing / Sut	omittal Number Exam	iple 005	- ⁰⁹⁶⁵⁰ - ^{01A} –	
	/			
	Consecutive	Specification	First submittal	A = First time submitted
	submittal	Section	for spec section	for that section/item.
	for Project		$02 = 2^{nd}$ submittal	B = Indicates resubmittal
	c c		for spec section	C = Third submittal for same item

*** SEND THIS FORM TO THE CONTRACT ADMINISTRATION COORDINATOR ***





* * * INCLUDE ARCHITECT'S PROJECT NUMBER ON ALL SUBMITTAL TRANSMITTALS

** Architect's Project No. & Name: AHUNXXXXXX - JOB NAME



Goodwyn Mills Cawood

2400 5th Avenue South Suite 200 Birmingham, AL 35233

T (205) 879-4462

www.gmcnetwork.com

Electronic File Conversion and Transfer Agreement

Goodwyn Mills Cawood, LLC. (GMC) in cooperation with its Consultants may, at its sole discretion, provide electronic document and file conversion services to the prime entity holding, or intending to enter into, an Agreement with an Owner for construction of a Project. GMC will typically accept only one request per project from one entity, typically the General Contractor.

Consultants referred to herein are all consultants to GMC for or in connection with the Project, including but not limited to those listed below.

It is acknowledged that neither GMC nor its Consultants are under any obligation to furnish electronic files to any party. The General Contractor and/or Sub-contractors should not, under any circumstances, assume they will receive any or all requested electronic files. Whether files are provided or not, the General Contractor remains completely responsible for performing all work required of the Contract Documents in full, including the preparation of accurate and detailed required shop-drawings.

When furnished, files will be transmitted electronically via FTP Site, or similar file transfer mechanism. It is the intent of GMC to furnish files in a timely manner, typically within two (2) weeks of receipt of payment of fees. However, the complexity and scale of the conversion is directly related to the requested file format and quantity of files requested. Where GMC believes a request will require additional time, we will notify the User and make reasonable effort to deliver files in phases if beneficial.

Please contact Patty Gerecht at (256) 539-3431 with any questions.

GOODWYN MILLS CAWOOD, LLC.

PROJECT

Project Name:

Project No.:

Document Issue Date:

Prime/Architect/Engineer:

GOODWYN MILLS CAWOOD, LLC.

Consultants:

Goodwyn Mills Cawood, LLC. (hereafter "GMC"), for itself and its identified Consultants, hereby grants nonexclusive use of the requested electronic files to the party (User) listed below. User accepts that GMC and its Consultants reserve the right to convey or not convey electronic files at their sole discretion. User further agrees, as a precedent to transmittal of digital files to any other party, to require written agreement of equivalent confidentiality and indemnification provisions from any party that receives the digital files. The digital information furnished under this agreement is proprietary, is the property of GMC and/or its Consultants, and is protected by applicable copyright laws.



The information provided by GMC and/or its Consultants is solely for the convenience of the recipient. Neither GMC nor its Consultants make any warranty or guarantee, express or implied, as to the suitability of the files for any specific purpose. It is understood the files are (1) digital, (2) typically have been converted electronically into a format suitable to the User, (3) are inherently capable of being manipulated and altered through intentional and unintentional means, (4) are partial and therefore inherently incomplete representations of the Contract Documents, and (5) may include inaccuracies clarified elsewhere in the Contract documents. Consequently, ONLY the COMPLETE Printed Contract Documents, as amended, shall serve as the basis for the scope, quantity, and quality of the work required for the Project. Under no circumstances whatsoever shall GMC and/or its Consultants be or become liable to anyone for the accuracy or completeness of information included in requested electronic files. The burden of, and responsibility for, determining the fitness of data included in electronic files falls solely and completely on the User.

LIMITED USE: The use of any digital file(s) is solely limited to the listed Project below. In no event shall files be utilized for any other Project, or any use beyond the use specifically listed herein. Further, under no circumstances may the General Contractor or and Sub-Contractor submit files furnished under this Agreement as required shop drawing submittals. By execution of this Agreement, the User acknowledges these limitations, and shall comply fully therewith.

CONFIDENTIALITY: User agrees to hold Project information strictly confidential, and User agrees it shall limit the use of transmitted electronic files solely to those applications necessary to perform work required for the Project.

INDEMNIFICATION: User hereby agrees to indemnify, defend, and hold harmless GMC, its directors, officers, and employees, and its Consultants, Consultant's directors, Consultants officers and employees, and the insurers, agents, and affiliates of both GMC and its Consultants, from any and all liability including claims for consequential damages or attorney's fees that may arise out of or relate in any matter to the authorized or unauthorized use, reuse, or alteration of this information by User, its employees or agents, vendors, contractors, sub-contractors, or any other party.

REVISIONS: The Contract Documents are subject to change, and revisions are not always incorporated throughout the documents. It is the User's sole responsibility to review the complete current Contract Documents, and identify inconsistencies between the electronic files and the current Contract Documents.

DIGITAL PROTOCOL: The USER is solely responsible for examination of digital files for virus contamination. Neither GMC nor its Consultants, or the directors, officers, employees, insurers, agents, or affiliates of either are responsible for damages incurred due to virus contamination, or for software version and/or file compatibility, or any similar hardware or software compliance issues.

FEE STRUCTURE: Prior to conversion of files, GMC must receive this complete Electronic File Conversion and Transfer Agreement, completed in full, and executed by a representative of the User with authorization to enter into contracts on behalf of the User.

		PER SHEET FEE
Civil	С	\$125
Architecture	A	\$150
Structural	S	\$125
Mechanical	M, P, FP	\$125
Electrical	E	\$125
Acoustical & AV	AV	\$125
Other	G, FS, etc.	\$100



USER ACCEPTANCE OF AGREEMENT

Company Name: _____

By:

Date: _____

Its:

REQUESTED FILE FORMAT

User (Select ONE)		File Format			
		Bound Auto CAD Rele	ease 2013		
		Bound Auto CAD Rele	ease 2014	 	
		Bound Auto CAD Rele	ease 2015	 	
SCHEDULE	OF REQU	JESTED FILES (To be fil	ed by User)	 1	
SHEET			INTENDED USE	FEE	
No.	Na	me.			
					\top

(PRINT ADDITIONAL FORMS AS REQUIRED)

SECTION 01 10 00 SUMMARY

PART 1 GENERAL

1.1 PROJECT

- A. Project Name: ADDITION TO DESHLER HIGH SCHOOL
- B. Owner's Name: Tuscumbia City Schools, Board of Education
- C. Architect's Name: Goodwyn Mills Cawood, LLC.
- D. The Project consists of an addition to include a new Main Entry, Administrative Suite Addition along with ancillary services, restrooms and parking.

1.2 CONTRACT DESCRIPTION

A. Contract Type: A single prime contract based on a Stipulated Price as described in Document 00 52 00 - Agreement Form.

1.3 OWNER OCCUPANCY

- A. Owner intends to occupy the Project during Substantial Completion.
- B. Cooperate with Owner to minimize conflict and to facilitate Owner's operations.
- C. Schedule the Work to accommodate Owner occupancy.

1.4 CONTRACTOR USE OF SITE AND PREMISES

- A. Construction Operations: Limited to areas noted on Drawings.
- B. Provide access to and from site as required by law and by Owner:
 - 1. Emergency Building Exits During Construction: Keep all exits required by code open during construction period; provide temporary exit signs if exit routes are temporarily altered.
 - 2. Do not obstruct roadways, sidewalks, or other public ways without permit.
- C. Utility Outages and Shutdown:
 - 1. Prevent accidental disruption of utility services to other facilities.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 20 00 PRICE AND PAYMENT PROCEDURES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Procedures for preparation and submittal of applications for progress payments.
- B. Change procedures.

1.2 RELATED REQUIREMENTS

- A. Section 01 21 00 Allowances: Payment procedures relating to allowances.
- B. Section 01 22 00 Unit Prices: Monetary values of unit prices; Payment and modification procedures relating to unit prices.

1.3 SCHEDULE OF VALUES

- A. Electronic media printout including equivalent information will be considered in lieu of standard form specified; submit draft to Architect for approval.
- B. Forms filled out by hand will not be accepted.

1.4 APPLICATIONS FOR PROGRESS PAYMENTS

- A. Payment Period: Submit at intervals stipulated in the Agreement.
- B. Use Form DCM form C-10.
- C. Electronic media printout including equivalent information will be considered in lieu of standard form specified; submit sample to Architect for approval.
- D. Forms filled out by hand will not be accepted.
- E. For each item, provide a column for listing each of the following:
 - 1. Item Number.
 - 2. Description of work.
 - 3. Scheduled Values.
 - 4. Previous Applications.
 - 5. Work in Place and Stored Materials under this Application.
 - 6. Authorized Change Orders.
 - 7. Total Completed and Stored to Date of Application.

- 8. Percentage of Completion.
- 9. Balance to Finish.
- 10. Retainage.
- F. Execute certification by signature of authorized officer.
- G. Submit one electronic and three hard-copies of each Application for Payment.
- H. Include the following with the application:
 - 1. Transmittal letter as specified for submittals in Section 01 30 00.
 - 2. Construction progress schedule, revised and current as specified in Section 01 30 00.
 - 3. Partial release of liens from major subcontractors and vendors.
- I. When Architect requires substantiating information, submit data justifying dollar amounts in question. Provide one copy of data with cover letter for each copy of submittal. Show application number and date, and line item by number and description.
- J. The period covered by each Application for Payment shall be one calendar month ending on the 25th day of the month.
- K. Applications for Payment shall show the percentage of completion of each portion of the Work as of the end of the period covered by the Application for Payment.
- L. Applications for Payment shall not include requests for payment for portions of the Work for which the Prime Contractor does not intend to pay a Subcontractor or material supplier, unless such Work has been performed by others whom the Prime Contractor intends to pay.
- M. Notwithstanding what may be stated elsewhere in the Contract Documents, the Prime Contractor shall use the pay application forms provided by or otherwise acceptable to the Owner. Refer to sections below for additional forms required with each pay application.
- N. First Application for Payment: Prime Contractor shall submit the following items to the Architect and Construction Manager, in form acceptable to Architect and Construction Manager, within the specified timeframes, but in no event later than submission of the first pay application. Failure to do so shall be a reason for withholding certification of payment:
 - 1. QA/QC Manual
 - 2. Submittal Log
 - 3. Buyout Log
 - 4. Initial Schedule
 - 5. Insurance Tracking Log

- 6. Monthly Weather Log
- 7. Monthly Cash Flow Report
- 8. Weekly & Monthly Progress Reports
- 9. Certified Weekly Payrolls (when applicable)
- O. Monthly Applications for Payment: Prime Contractor shall submit the following items to the Architect and Construction Manager, in form acceptable to Architect and Construction Manager, within the specified timeframes, but in no event less frequently than with submission of each monthly pay application. Failure to do so shall be a reason for withholding certification of payment.
 - 1. Application for Payment Checklist
 - 2. Updated Project Submittal Log
 - 3. Updated Buyout Log
 - 4. Daily Work Force Forms
 - 5. Updated Subcontractor/Vendor List
 - 6. Monthly Weather Log
 - 7. Insurance Tracking Log
 - 8. Schedule Updates
 - 9. Change Order Request Log
 - 10. Allowance Invoicing Recap (when applicable)
 - 11. ADOR Consumer Use & Sales tax report for material purchases
 - 12. Monthly Cash Flow Report
 - 13. Weekly & Monthly Progress Reports
 - 14. Certified Weekly Payrolls (when applicable)
 - 15. Lien Waivers (as required)
- P. If Prime Contractor disputes any determination by Architect or Owner with regard to all or any part of an Application for Payment or a Certification of Payment, Prime Contractor shall nevertheless expeditiously continue to prosecute the Work.
- Q. The Owner has the right to request written evidence from the Prime Contractor that the Prime Contractor has properly paid Subcontractors and material and equipment suppliers amounts paid by the Owner to the Prime Contractor for subcontracted Work. If the Prime Contractor fails to furnish such evidence within seven days, the Owner shall have the right to contact Subcontractors to ascertain whether they have been

properly paid. Neither the Owner nor Construction Manager or Architect shall have an obligation to pay or to see to the payment of money to a Subcontractor, except as may otherwise be required by law.

R. To the extent not covered by the property insurance obtained by the Owner, Prime Contractor shall obtain and maintain similar property insurance on portions of the Work stored off the site or in transit when such portions of the Work stored off the site or in transit are to be included."

1.5 MODIFICATION PROCEDURES

- A. For minor changes not involving an adjustment to the Contract Sum or Contract Time, Architect will issue instructions directly to Contractor.
- B. For other required changes, Architect will issue a document signed by Owner instructing Contractor to proceed with the change, for subsequent inclusion in a Change Order.
 - 1. The document will describe the required changes and will designate method of determining any change in Contract Sum or Contract Time.
 - 2. Promptly execute the change.
- C. For changes for which advance pricing is desired, Architect will issue a document that includes a detailed description of a proposed change with supplementary or revised drawings and specifications, a change in Contract Time for executing the change with a stipulation of any overtime work required and the period of time during which the requested price will be considered valid. Contractor shall prepare and submit a fixed price quotation within 10 days. Submit a quotation with cost adjustments to the Contract Sum and the Contract Time necessary to execute the change.
 - 1. 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.
 - 2. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
 - 3. Include costs of labor and supervision directly attributable to the change.
 - 4. Include an updated Prime 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.
 - 5. Quotation Form: Use forms provided by or otherwise acceptable to the Owner.
- D. Computation of Change in Contract Amount: As specified in the Agreement and Conditions of the Contract.
- E. Substantiation of Costs: Provide full information required for evaluation.
 - 1. Support each claim for additional costs with additional information:
 - 2. For Time and Material work, submit itemized account and supporting data after completion of change, within time limits indicated in the Conditions of the Contract.

- F. Execution of Change Orders: Architect will issue Change Orders for signatures of parties as provided in the Conditions of the Contract.
- G. After execution of Change Order, promptly revise Schedule of Values and Application for Payment forms to record each authorized Change Order as a separate line item and adjust the Contract Sum.
- H. Promptly revise progress schedules to reflect any change in Contract Time, revise sub-schedules to adjust times for other items of work affected by the change, and resubmit.
- I. Promptly enter changes in Project Record Documents.
- J. Construction Change Directive: A Construction Change Directive is a written order prepared by the Architect and / or the Construction Manager and signed by the Owner and Architect, directing a change in the Work prior to agreement on adjustment, if any, in the Contract Sum or Contract Time, or both. The Owner may by Construction Change Directive, without invalidating the Contract, order changes in the Work within the general scope of the Contract consisting of additions, deletions or other revisions, the Contract Sum and Contract Time being adjusted accordingly.
 - 1. A Construction Change Directive shall be used in the absence of total agreement on the terms of a Change Order.
 - 2. Architect or Construction Manager may issue a Construction Change Directive on form provided by or otherwise acceptable to the Owner. Construction Change Directive instructs Prime Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order.
 - a. Construction Change Directive contains a complete description of change in the Work. It also designates method to be followed to determine change in the Contract Sum or the Contract Time.
 - 3. Upon receipt of a Construction Change Directive, the Prime Contractor shall promptly proceed with the change in the Work involved.
 - 4. A Construction Change Directive signed by the Prime Contractor indicates the Prime Contractor's agreement therewith, including adjustment in Contract Sum and Contract Time or the method for determining them. Such agreement shall be effective immediately. Change Orders may be issued for all or any part of a Construction Change Directive.

1.6 APPLICATION FOR FINAL PAYMENT

- A. Prepare Application for Final Payment as specified for progress payments, identifying total adjusted Contract Sum, previous payments, and sum remaining due.
- B. Application for Final Payment will not be considered until the following have been accomplished:
 - 1. All closeout procedures specified in Section 01 70 00.
- C. Final Application for Payment: In addition to items required with monthly applications for payment, Prime Contractor shall submit the following items to the Architect and Construction Manager, in form acceptable to Architect and Construction Manager, within the specified timeframes, but in no event less

frequently than with submission of the final pay application. Failure to do so shall be a reason for withholding certification of payment. Neither final payment nor any remaining retained percentage shall become due until the Prime Contractor submits to the Architect all of the following:

- 1. An affidavit that payrolls, bills for materials and equipment, and other indebtedness connected with the Work for which the Owner or the Owner's property might be responsible or encumbered (less amounts withheld by Owner) have been paid or otherwise satisfied.
- 2. A certificate evidencing that insurance required by the Contract Documents to remain in force after final payment is currently in effect and will not be canceled or allowed to expire until at least 30 days' prior written notice has been given to the Owner.
- 3. A written statement that the Prime Contractor knows of no substantial reason that the insurance will not be renewable to cover the period required by the Contract Documents.
- 4. Consent of surety, if any, to final payment.
- 5. If required by the Owner, other data establishing payment or satisfaction of obligations, such as receipts, releases and waivers of liens, claims, security interests or encumbrances arising out of the Contract, to the extent and in such form as may be designated by the Owner. If a Subcontractor refuses to furnish a release or waiver required by the Owner, the Prime Contractor may furnish a bond satisfactory to the Owner to indemnify the Owner against such lien. If such lien remains unsatisfied after payments are made, the Prime Contractor shall refund to the Owner all money that the Owner may be compelled to pay in discharging such lien, including all costs and reasonable attorneys' fees.
- 6. Additionally, Prime Contractor shall, as a condition precedent to final payment, deliver or furnish to Owner as required by the Contract Documents:
 - a. Documentation and assignments with regard to warranties.
 - b. Drawings and record documents.
 - c. Operations and maintenance manuals, records, instructions, and data.
 - d. Keys, access cards, and any other items for access to and security of the premises.
 - e. Spare parts, overages, and maintenance materials.
 - f. Other close-out submittals or documentation.
 - g. A duly executed Affidavit of Completion in form ready for filing in the public records of the county in which the Project is located, pursuant to laws of the state in which the Project is located, signifying that the work under the Contract is complete under the applicable mechanic's lien laws."

1.7 TAX EXEMPTION PROCEDURES

- A. Prime Contractor shall follow all state laws governing administration of sales and use tax on qualifying governmental entity projects.
- B. The information provided below serves as a basic guideline for the documentation required to complete the application process and obtain the required Sales and Use Tax Certificate of Exemption for Government Entity Projects in the State of Alabama.
 - 1. Exempt Entity (Owner) must provide:
 - a. Signed application (FORM ST: EXC-01).
 - b. Copy of executed/signed Contract and/or Letter of Intent
 - 2. General Contractor must provide:
 - a. Signed application (FORM ST: EXC-01).
 - b. Copy of executed/signed Contract and/or Letter of Intent
 - c. List of all subcontractors
 - d. Alabama Board of General Contractor's License
 - e. State/County Business License (usually obtained through county probate office)
 - f. Any other municipal business licenses associated with the project
 - 3. Sub-Contractor must provide:
 - a. Signed application (FORM ST: EXC-01).
 - b. Alabama Board of General Contractor's License
 - c. State/County Business License (usually obtained through county probate office)
 - d. Any other municipal business licenses associated with the project
 - e. List of subcontractors (if any)
- C. Along with this exemption, each Prime Contractor and subcontractor is required to have a Consumers Use Tax account. Monthly returns are required to be filed where all exempt purchases for ongoing projects are reported on one return in addition to their taxable purchases. Taxpayers who do not already have a consumers use tax account will be assigned a CNU account at the time a certificate is issued.
- D. See "Instructions for Preparation of Form ST: EXC-01 Sales and Use Tax Certificate of Exemption for Government Entity Project" for additional requirements regarding this sales tax process. The form and instructions can be found at http://revenue.alabama.gov/salestax/ST-EXC-01.pdf>.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 21 00 ALLOWANCES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Contingency allowance.

1.2 RELATED REQUIREMENTS

A. Section 01 2000 - Price and Payment Procedures: Additional payment and modification procedures.

1.3 CONTINGENCY ALLOWANCE

- A. Contractor's costs for products, delivery, installation, labor, insurance, payroll, taxes, bonding, equipment rental, overhead and profit will be included in Change Orders authorizing expenditure of funds from this Contingency Allowance.
- B. Funds will be drawn from the Contingency Allowance only by Change Order.
- C. At closeout of Contract, funds remaining in Contingency Allowance will be credited to Owner by Change Order.

1.4 ALLOWANCES SCHEDULE

- A. Allowance No. 1 Allow \$50,000 for Various Work items which will be administered as directed by the Owner.
- B. Allowance No. 2 Allow \$8,000 for 4 (FOUR) Lobby and/or Vestibule Light Fixtures and associated work.
- C. Allowance No. 3 Allow \$5,000 for a Projector, Colored Lights and associated systems and work.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 2200

UNIT PRICES

PART 1 - GENERAL

1.1 <u>SUMMARY</u>:

- A. This Section specifies administrative and procedural requirements for unit prices.
 - 1. A unit price is an amount proposed by Bidders, as a price per unit of measurement for materials and/or services that will be added to or deducted from the Contract Sum by Change Order in the event the estimated quantities of Work required by the Contract Documents are increased or decreased, in accordance the General Conditions and/or other provisions of the Bid and Contract Documents.
 - 2. Unit prices shall include all necessary material, labor, fees, layout, supervision (field and home office), general expenses, insurance, bonds, overhead, profit and applicable taxes, for unit item of work in place.
 - 3. Refer to other Division 1 Sections and individual Specification Sections for construction activities requiring the establishment of unit prices. Methods of approval, verification, measurement and payment for unit prices are specified in those sections.
- B. Related work specified elsewhere includes:
 - 1. Section 01015 "Special Conditions"
 - 2. Section 02110 "Site Clearing"
 - 3. Section 02200 "Earthwork"
 - 4. Section 02520 "Portland Cement Concrete Paving"
 - 5. Section 03310 "Concrete"
- C. Schedule:
 - 1. A "Unit Price Schedule" is included at the end of this Section. Specification Sections referenced in the Schedule contain requirements for materials and methods described under each unit price.
 - 2. The Owner reserves the right to reject the Contractor's measurement of work-in-place that involves use of established unit prices, and to have this work measured by an independent surveyor acceptable to the Contractor at the Owner's expense.

PART 2 - PRODUCTS

2.1 Not Applicable.

PART 3 - EXECUTION

3.1 <u>ITEMIZED UNIT PRICE SCHEDULE</u>:

A. <u>Item No. 1</u> - Mass Earth Excavation:

- 1. Description: Remove and dispose of unsuitable earth, including earth not needed or not suitable for reuse, encountered in open excavations, in accordance with Section 02200 "Earthwork."
- 2. Unit of Measure: Cubic yard (CY) of earth excavated.

B. <u>Item No. 2</u> - Trench Earth Excavation:

- 1. Description: Remove and dispose of unsuitable earth, including earth not needed or not suitable for reuse, encountered in trenches, in accordance with Section 02200 "Earthwork."
- 2. Unit of Measure: Cubic yard (CY) of earth excavated.

C. <u>Item No. 3</u> - Hand Earth Excavation:

- 1. Description: Remove and dispose of unsuitable earth, including earth not needed or not suitable for reuse, which must be excavated by hand, in accordance with Section 02200 "Earthwork."
- 2. Unit of Measure: Cubic yard (CY) of earth excavated.

D. <u>Item No. 4</u> - Additional Soil:

1. <u>Item No. 4a</u> - Topsoil:

- a. Description: Provide additional topsoil from offsite locations, in accordance with Section 02200 "Earthwork", Section 02900 "Landscape Work", and applicable portions of other sections.
- b. Unit of Measure: Cubic yard (CY) of topsoil, in place.

2. <u>Item No. 4b</u> - General or Open Site Areas:

- a. Description: Provide acceptable earth fill in general or open site areas, compacted to meet requirements specified for the affected area, in accordance with Section 02200 "Earthwork."
- b. Unit of Measure: Cubic yard (CY) of fill, in place.

3. <u>Item No. 4c</u> - Trench Backfill:

- a. Description: Provide acceptable backfill in trenches, compacted to meet requirements specified for the affected area, in accordance with Section 02200 "Earthwork."
- b. Unit of Measure: Cubic yard (CY) of backfill, in place.

4. <u>Item No. 4d</u> - Select Fill:

- a. Description: Provide acceptable select fill obtained from offsite locations, compacted to meet the requirements specified for the affected area, in accordance with Section 02200 "Earthwork."
- b. Unit of Measure: Cubic Yard (CY) of fill, in place.

E. <u>Item No. 5</u> - Rock, Masonry, or Concrete Excavation in Trenches and Pits:

- 1. Description: Remove and dispose of rock, masonry, and/or concrete encountered in trenches and pits, below elevations indicated, in accordance with Section 02200 "Earthwork".
- 2. Unit of Measure: Cubic Yard (CY) of rock, masonry, or concrete excavated.

F. <u>Item No. 6</u> - Rock, Masonry, or Concrete Excavation in Open Excavations:

- 1. Description: Remove and dispose of rock, masonry, and/or concrete encountered in open excavations, below elevations indicated, in accordance with Section 02200 "Earthwork".
- 2. Unit of Measure: Cubic Yard (CY) of rock, masonry, or concrete excavated.

G. <u>Item No. 7</u> - Sod:

- 1. Description: Provide additional sod as directed, including fine grading, soil amendments, fertilizers, sod, maintenance, etc., in accordance with Section 02900 "Landscape Work".
- 2. Unit of Measure: Square yard (SY) of sod, in place.

H. <u>Item No. 8</u> - Concrete Mud Footings:

- 1. Description: Provide additional concrete mud footings, in addition to any mud footings indicated on the Drawings, as specified in Section 03310 "Concrete", as directed, where required by the Project Geotechnical Consultant due to any existing unsuitable soils.
- 2. Unit of Measure: Cubic yard (CY) of concrete mud footings, in place.
- 3. Note: This unit price is not applicable to cost of mud footings that are required due to over-excavation, or due to not pouring footings the same date they are excavated, or other reasons indicated in Section 02200 "Earthwork," or Section 03310 "Concrete."

END OF UNIT PRICES

SECTION 01 2300

ALTERNATES

PART 1 - GENERAL

1.1 <u>RELATED DOCUMENTS</u>:

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

1.2 <u>DESCRIPTION OF REQUIREMENTS</u>:

- A. Definition: An alternate is an amount proposed by Bidders and stated on the Bid Form that will be added to or deducted from Base Bid amount if the Owner decides to accept a corresponding change in either scope of work or in products, materials, equipment, systems or installation methods described in Contract Documents.
- B. Coordination: Coordinate related work and modify or adjust adjacent work as required to ensure that work affected by each accepted alternate is complete and fully integrated into the project.
- C. Notification: Immediately following award of Contract, prepare and distribute to each party involved, notification of the status of each alternate. Indicate whether alternates have been accepted, rejected or deferred for consideration at a later date. Include a complete description of negotiated modifications to alternates, if any.
- D. Schedule:
 - 1. A "Schedule of Alternates" is included at the end of this section. Specification sections referenced in the Schedule contain requirements for materials and methods necessary to achieve the work described under each alternate.
 - 2. Include as part of each alternate, miscellaneous devices, appurtenances and similar items incidental to or required for a complete installation whether or not mentioned as part of the alternate.

PART 2 - PRODUCTS

2.1 Not Applicable.

PART 3 - EXECUTION

3.1 <u>SCHEDULE OF ALTERNATES</u>:

A. <u>Alternate No. 1</u>: NA

END OF ALTERNATES

SECTION 01 25 00 SUBSTITUTION PROCEDURES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Procedural requirements for proposed substitutions.

1.2 RELATED REQUIREMENTS

- A. Section 01 21 00 Allowances, for cash allowances affecting this section.
- B. Section 01 22 00 Unit Prices, for additional unit price requirements.
- C. Section 01 23 00 Alternates, for product alternatives affecting this section.
- D. Section 01 30 00 Administrative Requirements: Submittal procedures, coordination.
- E. Section 01 60 00 Product Requirements: Fundamental product requirements, product options, delivery, storage, and handling.

1.3 DEFINITIONS

- A. Substitutions: Changes from Contract Documents requirements proposed by Contractor to materials, products, assemblies, and equipment.
 - 1. Substitutions for Cause: Proposed due to changed Project circumstances beyond Contractor's control.
 - a. Unavailability.
 - b. Regulatory changes.
 - 2. Substitutions for Convenience: Proposed due to possibility of offering substantial advantage to the Project.
 - a. Substitution requests offering advantages solely to the Contractor will not be considered.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.1 GENERAL REQUIREMENTS

- A. A Substitution Request for products, assemblies, materials, and equipment constitutes a representation that the submitter:
 - 1. Has investigated proposed product and determined that it meets or exceeds the quality level of the specified product, equipment, assembly, or system.

- 2. Agrees to provide the same warranty for the substitution as for the specified product.
- 3. Agrees to provide same or equivalent maintenance service and source of replacement parts, as applicable.
- 4. Agrees to coordinate installation and make changes to other work that may be required for the work to be complete, with no additional cost to Owner.
- 5. Waives claims for additional costs or time extension that may subsequently become apparent.
- 6. Agrees to reimburse Owner and Architect for review or redesign services associated with reapproval by authorities.
- B. A Substitution Request for specified installer constitutes a representation that the submitter:
 - 1. Has acted in good faith to obtain services of specified installer, but was unable to come to commercial, or other terms.
- C. Document each request with complete data substantiating compliance of proposed substitution with Contract Documents. Burden of proof is on proposer.
- D. Content: Include information necessary for tracking the status of each Substitution Request, and information necessary to provide an actionable response.
 - 1. No specific form is required. Contractor's Substitution Request documentation must include the following:
 - a. Project Information:
 - 1) Official project name and number, and any additional required identifiers established in Contract Documents.
 - 2) Owner's, Architect's, and Contractor's names.
 - b. Substitution Request Information:
 - 1) Discrete and consecutive Substitution Request number, and descriptive subject/title.
 - 2) Indication of whether the substitution is for cause or convenience.
 - 3) Issue date.
 - 4) Reference to particular Contract Document(s) specification section number, title, and article/paragraph(s).
 - 5) Description of Substitution.
 - 6) Reason why the specified item cannot be provided.
 - 7) Differences between proposed substitution and specified item.
- c. Attached Comparative Data: Provide point-by-point, side-by-side comparison addressing essential attributes specified, as appropriate and relevant for the item:
 - 1) Physical characteristics.
 - 2) In-service performance.
 - 3) Expected durability.
 - 4) Visual effect.
 - 5) Warranties.
 - 6) Include, as appropriate or requested, the following types of documentation:
 - (a) Product Data:
 - (b) Samples.
 - (c) Certificates, test, reports or similar qualification data.
- d. Impact of Substitution:
- E. Limit each request to a single proposed substitution item.

END OF SECTION

SECTION 01 30 00 ADMINISTRATIVE REQUIREMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. General administrative requirements.
- B. Electronic document submittal service.
- C. Preconstruction meeting.
- D. Progress meetings.
- E. Construction progress schedule.
- F. Coordination drawings.
- G. Submittals for review, information, and project closeout.
- H. Number of copies of submittals.
- I. Submittal procedures.

1.2 RELATED REQUIREMENTS

- A. Section 01 70 00 Execution and Closeout Requirements: Additional coordination requirements.
- B. Section 01 78 00 Closeout Submittals: Project record documents; operation and maintenance data; warranties and bonds.
- C. Section 01 91 13 General Commissioning Requirements: Additional procedures for submittals relating to commissioning.
 - 1. Where submittals are indicated for review by both Architect and the Commissioning Authority, submit one extra and route to Architect first, for forwarding to the Commissioning Authority.
 - 2. Where submittals are not indicated to be reviewed by Architect, submit directly to the Commissioning Authority; otherwise, the procedures specified in this section apply to commissioning submittals.

1.3 GENERAL ADMINISTRATIVE REQUIREMENTS

A. Comply with requirements of Section 01 70 00 - Execution and Closeout Requirements for coordination of execution of administrative tasks with timing of construction activities.

1.4 PROJECT COORDINATOR

A. Project Coordinator: Construction Manager.

- B. Cooperate with the Project Coordinator in allocation of mobilization areas of site; for field offices and sheds, for construction access, traffic, and parking facilities.
- C. During construction, coordinate use of site and facilities through the Project Coordinator.
- D. Comply with Project Coordinator's procedures for intra-project communications; submittals, reports and records, schedules, coordination drawings, and recommendations; and resolution of ambiguities and conflicts.
- E. Comply with instructions of the Project Coordinator for use of temporary utilities and construction facilities. Responsibility for providing temporary utilities and construction facilities is identified in Section 01 10 00 - Summary.
- F. Coordinate field engineering and layout work under instructions of the Project Coordinator.
- G. Make the following types of submittals to Architect through the Project Coordinator:
- H. Project Management and Coordination: This Section includes administrative provisions for coordinating construction operations on Project including, but not limited to, the following:
 - 1. Coordination
 - 2. Required Construction Management Forms
 - 3. Administrative and supervisory personnel.
- I. General: Prime Contractor shall participate in coordination requirements.
- J. Coordination of Contracts: Construction Manager should be informed of all coordination between Prime Contractor and other subcontracts in the form of coordination plans for approval.
- K. The Contractor will be allowed to stage materials, store materials, and park vehicles in the parking lot to the north of the project site.
- L. Coordination of Work: Prime Contractor shall coordinate construction operations that depend on each other and by other Subcontractors for proper installation, connection, and operation to ensure efficient and orderly installation of each part of the Work.
 - 1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
 - 2. Coordinate installation of different components with all Subcontractors to ensure maximum accessibility for required maintenance, service, and repair.
 - 3. Make adequate provisions to accommodate items scheduled for later installation.
 - 4. Where availability of space is limited, coordinate installation of different components to ensure maximum performance and accessibility for required maintenance, service, and repair of all components, including mechanical and electrical.

- M. Prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and list of attendees at meetings.
 - 1. Prepare similar memoranda for Owner, Designer of Record and separate Subcontractors if coordination of their Work is required.
- MI. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities and activities of Subcontractors to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:
 - 1. Preparation of Prime Contractor's Construction Schedule.
 - 2. Preparation of the Schedule of Values.
 - 3. Preparation of Submittal Schedule.
 - 4. Installation and removal of temporary facilities and controls.
 - 5. Delivery, scheduling and processing of submittals.
 - 6. Weekly Coordination and Progress meetings.
 - 7. Pre-installation conferences.
 - 8. Closeout inspection and "Punch list" preparation.
 - 9. Project closeout activities.
 - 10. Startup and adjustment of systems.
- MII. Conservation: Coordinate construction activities to ensure that operations are carried out with consideration given to conservation of energy, water, and materials.
- MIII. Salvage materials and equipment involved in performance of, but not actually incorporated into, the Work. Refer to Contract Documents for disposition of salvaged materials that are designated as Owner's property.
- MIV. If a Construction Manager (CM) is included in the Project Scope the following items are to be submitted to the CM. If there is no CM these items are to be submitted to the Owner/Architect as indicated by each:

The following is a list of forms that the Prime Contractor shall submit to the CM. These forms will be used to facilitate monitoring of the overall progress of the project. The Prime Contractor shall submit the following forms in format acceptable to the Owner:

 Buyout Log: This is a log that will show all material vendors/suppliers to be used for any particular scope of work. This log will help track the status of all materials that could be important to the overall project schedule. This log will show the suppliers' company name, the purchase order number, the date of release, the material need date, the lead time and finally the scheduled delivery date to the site. The Buyout Log is to be submitted to the CM for review and approval no later than ten (10) calendar days after the Prime Contractor(s) receive a notice to proceed from the owner. The CM shall review within five (5) calendar days and return for modification or record. Any changes needed shall be made and a final version sent by the Prime Contractor to the CM for final approval within five (5) calendar days from receipt. The information provided shall be used to establish the submittal schedule for the project.

- 2. Daily Work Force Form: This is a form that will be used to track the forces of any particular Prime Contractor on a daily basis. This form is to be submitted to the CM at the end of each work week.
- 3. Subcontractor/Vendor List: This is to be submitted to the CM for review prior to the awarding of the Contract. This form will also need to be updated monthly and submitted with the pay applications as part of the approval process.
- 4. Monthly Weather Log: A log tracking the daily temperature, weather conditions, rain totals and days lost to inclement weather will also be required. This form should show monthly averages on temperature and rain totals at the bottom. A comparison of this data with the local climatological data history will be required to be submitted with the pay applications.
- 5. Weekly Observation Report: Report shall be issued by the Prime Contractor documenting that the SWPPP is adequately and properly installed and maintained to meet ADEM requirements. In the case of rain events yielding rainfall of .5" or greater, within a 24 hour period, a separate report shall be issued.
- 6. Submittal Log: A log of all submittals required by the Contract Documents with data for each record to facilitate proper tracking including, but not limited to: submittal number, spec section, description, lead times, material due dates, drop dead dates, etc. The submittal log shall be coordinated with the project schedule. The initial submittal log shall be provided to the Architect and CM within ten (10) days from Notice to Proceed. An updated and current copy of the submittal log shall be included with monthly pay application submissions.
- 7. Insurance Tracking Log: A log tracking the Prime Contractor's and all of its subcontractors' insurance will also need to be updated and submitted with each pay application before the pay application will be processed. The log shall list the name of each company with columns for each type of coverage and the corresponding expiration date for each coverage listed in the columns.
- 8. Monthly Cash Flow Reports: Cash flow reports comparing projected cash flow to actual cash flow for each month. Format shall be as specified by the Construction Manager. The initial Monthly Cash Flow Report shall be provided to the CM for review and approval within ten (10) days from Notice to Proceed. Updates shall be provided with each pay application submission or by the first day of the following month if no pay application is submitted for a given month.
- 9. Weekly and Monthly Progress Reports: Weekly and monthly progress reports covering the following topics: Risk Management; Achievements; Progress Photos; Cost Report; Quality Report; Schedule Update; and other topics as may be requested by the Construction Manager. Weekly reports shall be provided by noon on each Thursday. Monthly Reports shall be provided by the first day of the following month for each month and shall be submitted with each monthly pay application. Format shall be as specified by the Construction Manager.
- 10. List of Key Personnel: Within 10 calendar days after notice to proceed, submit a list of key personnel assignments, including superintendent and other personnel in attendance at Project site.

Identify individuals and their duties and responsibilities; Identify Emergency contacts listed in priority, list addresses and telephone numbers, including home, office, cellular and/or wireless telephone numbers. Provide names, addresses, and telephone numbers of individuals assigned as standbys in the absence of individuals assigned to Project. Post copies of list in Project meeting room, in temporary field office, and by each temporary telephone. Keep list current at all times.

- 11. Other Forms: Other lists & logs as required monitoring project status and as may otherwise be required by the Contract Documents. During the progress of the project, other logs or lists may be needed to track the status of the project. The CM reserves the right to request, and the Prime Contractor agrees to provide, additional information as needed.
- R. Administrative and Supervisory Personnel: In addition to Project superintendent, Prime Contractor shall provide other administrative and supervisory personnel as required for proper performance of the Work. The Construction Manager on behalf of the Owner will have the right to request additional man power should the need for additional personnel become apparent.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.1 ELECTRONIC DOCUMENT SUBMITTAL SERVICE

- A. All documents transmitted for purposes of administration of the contract are to be in electronic (PDF, MS Word, or MS Excel) format, as appropriate to the document, and transmitted via an Internet-based submittal service that receives, logs and stores documents, provides electronic stamping and signatures, and notifies addressees via email.
 - 1. Besides submittals for review, information, and closeout, this procedure applies to Requests for Interpretation (RFIs), progress documentation, contract modification documents (e.g. supplementary instructions, change proposals, change orders), applications for payment, field reports and meeting minutes, Contractor's correction punchlist, and any other document any participant wishes to make part of the project record.
 - 2. Contractor and Architect are required to use this service.
 - 3. It is Contractor's responsibility to submit documents in allowable format.
 - 4. Subcontractors, suppliers, and Architect's consultants are to be permitted to use the service at no extra charge.
 - 5. Users of the service need an email address, internet access, and PDF review software that includes ability to mark up and apply electronic stamps (such as Adobe Acrobat, www.adobe.com, or Bluebeam PDF Revu, www.bluebeam.com), unless such software capability is provided by the service provider.
 - 6. Paper document transmittals will not be reviewed; emailed electronic documents will not be reviewed.

- 7. All other specified submittal and document transmission procedures apply, except that electronic document requirements do not apply to samples or color selection charts.
- B. Cost: The cost of the service is to be paid by Contractor; include the cost of the service in the Contract Sum.
 - 1. Within 15 days of execution of the Owner and Prime Contractor Agreement, Prime Contractor shall obtain no less than one user license. A unique user license shall be obtained for each employee of the Prime Contractor who will need to access the system.
 - 2. User licenses shall be renewed on an annual basis.
- C. Submittal Service: The selected service is:
 - 1. Procore or other similar service.
- D. Training: One, one-hour, web-based training session will be arranged for all participants, with representatives of Architect and Contractor participating; further training is the responsibility of the user of the service.
- E. Project Closeout: Architect will determine when to terminate the service for the project and is responsible for obtaining archive copies of files for Owner.

3.2 PROJECT MEETINGS

- A. General: Prime Contractor shall schedule and conduct coordination, safety, training, progress 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, Designer of Record of scheduled meeting dates and times.
 - 2. Agenda: Prepare the meeting agenda and submit to the Architect 1 day prior to the meetings.
 - 3. Minutes: Record significant discussions and agreements achieved. Distribute the meeting minutes to the attendees within three days of the meeting. The meeting attendees will have the opportunity to respond to the Prime Contractors minutes with any changes.
- B. Pre-construction Conference: After award of the construction contract and before the start of any construction work, the Architect will schedule and conduct a pre-construction conference. The conference location shall be specified by the Architect. The GC will conduct the meeting to review responsibilities and personnel assignments.
 - 1. Attendees: Authorized representatives of Owner, Designer of Record and their consultants; Prime Contractor and its superintendent; as well as representative of major

subcontractors; shall attend the conference. All participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.

- 2. Agenda: Responsible parties shall discuss items of significance that could affect progress, including but not limited to the following:
 - a. Prime Contractor's Construction Schedule Preliminary network diagram will be discussed.
 - b. Critical work sequencing and long-lead items.
 - c. Authority of the Owner's Representatives
 - d. Procedures for processing field decisions.
 - e. Contract Modifications and Administrative Procedures
 - f. Procedures for RFIs.
 - g. Procedures for testing and inspecting.
 - h. Procedures for processing Applications for Payment.
 - i. Distribution of the Contract Documents.
 - j. Prime Contractor Insurance Requirements.
 - k. Submittal procedures.
 - 1. Preparation of Record Documents.
 - m. Use of the premises.
 - n. Prime Contractor's Safety Plan
 - o. Prime Contractor's Quality Control Plan
 - p. Responsibility for temporary facilities and controls.
 - q. Construction waste management.
 - r. Prime Contractor's Environmental Protection Plan
 - s. Parking availability.
 - t. Office, work, and storage areas.
 - u. Equipment deliveries and priorities.
 - v. First aid.
 - w. Security.

- 3. Minutes: Record and distribute meeting minutes.
- C. Pre-installation Conferences: Prime Contractor shall conduct a pre installation 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 Construction Manager of scheduled meeting dates for scheduling. Architect may be present at these meetings. Every effort shall be made to schedule pre- installation conferences on the Designer of Record's regularly scheduled days for visiting the site.
 - 2. Agenda: Notification of conference and agenda shall be distributed 10 days in advance of meeting date. Review progress of other construction activities and preparations for the particular activity under consideration, including requirements for the following:
 - a. The Contract Documents.
 - b. Options.
 - c. Related RFIs.
 - d. Related Change Orders.
 - e. Purchases
 - f. Deliveries
 - g. Submittals.
 - h. Review of mockups
 - i. Possible conflicts.
 - j. Traderesponsibilities
 - k. Compatibilityproblems.
 - l. Timeschedules.
 - m. Weatherlimitations
 - n. Manufacturer'swrittenrecommendations.
 - o. Warrantyrequirements.
 - p. Compatibility of materials.
 - q. Acceptability of substrates.
 - r. Temporary facilities and controls.

- s. Space and access limitations.
- t. Regulations of authorities having jurisdiction.
- u. Testing and inspecting requirements.
- v. Installation procedures.
- w. Coordination with other work.
- x. Required performance results.
- y. Protection of adjacent work.
- z. Protection of construction and personnel.
- 3. Record significant conference discussions, agreements, and disagreements, including required corrective measures and actions.
- 4. Reporting: Prime Contractor shall distribute minutes of the meeting to the Architect within 48 hours of meeting. Prime Contractor shall maintain on site record copies of all "Minutes of Meetings".
- 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.
- 6. As part of the Pre-Construction conference, the General Contractor shall provide photographs of the existing building, areas of work, access to the site and potential lay down areas for review. These photographs shall be saved on the cloud based software for the duration of the project and archived with the Close Out Document
- D. Weekly Progress Meetings: The GC shall hold weekly meetings to update key project concerns and issues. Meeting frequency will be determined by the needs of the job and will be at the discretion of the Architect and the Owner.
 - 1. Attendees: Prime Contractor, Designer of Record, Owner, subcontractors, and suppliers are optional attendees but may attend if needed. All participants at the conference 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.
 - a. Overall Project Schedule: Review progress since the last meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to Overall Project Schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required

to ensure that current and subsequent activities will be completed within the Contract Time.

- b. Review schedule for next period.
- c. Review submittal schedule.
- d. Review present and future needs of each entity present, including the following:
 - 1) Sequence of operations.
 - 2) Status of submittals.
 - 3) Status of correction of deficient items.
 - 4) Field observations.
 - 5) RFIs.
 - 6) Status of proposal requests.
 - 7) Pending changes.
 - 8) Status of Change Orders.
 - 9) Pending claims and disputes.
 - 10) Documentation of information for payment requests.
- 3. Minutes: GC shall record the meeting minutes.
- 4. Reporting: GC shall distribute minutes of the meeting to all involved parties and maintain record copies of all "Minutes of Meetings".
- E. Monthly O/A/C Project Status Review Meeting: Prime Contractor shall provide comprehensive update on the project. This meeting will be held during the last week of each month. Prime Contractor shall reserve one working day to attend this meeting.
 - 1. Attendees: Owner, Designer of Record, Prime Contractor.
 - 2. Agenda: Prime Contractor shall provide comprehensive review of the status of the project, project documentation, finances, schedule, and any issues that could affect project time, cost, or quality.
 - 3. Minutes: Prime Contractor will record the meeting minutes.
 - 4. Reporting: Prime Contractor will distribute minutes of the meeting to each party present and to parties who should have been present."

3.3 CONSTRUCTION PROGRESS SCHEDULE - SEE SECTION 01 32 16

A. Schedule Submittal: The Prime Contractor shall within ten (10) days after award of contract, prepare and

submit to the Architect for review a practicable construction schedule informing the Designer of Record, and Owner of the order in which the Prime Contractor plans to carry out the Work contained in that Prime Contractor's scope of work within the stipulated overall duration of the project and within any stipulated milestone dates for the Project. Activities shall be broken down in sufficient detail to facilitate monitoring of the schedule on a weekly basis. This information shall be submitted to the Architect electronically in the Electronic Submittal Service (or other acceptable format) and in hard copy. This information shall include activities, activity durations, manpower/crew size, material lead time, and key predecessors for each activity. In addition: the Contractor shall include all Milestones (as indicated in Attachment D) in the Contractor's project schedule.

- B. Payment: The Owner reserves the right to reduce or withhold payments due to Prime Contractor's failure to provide the schedule information described above within the time frames indicated and for all updating requirements specified herein.
- C. Architect's Review: The Architects review of the Prime Contractor's construction schedule shall be only for compliance with the specified format, Contract Time, milestones, and suitability for monitoring progress of the Work and shall not be construed as a representation that the Architect has analyzed the schedule to form opinions of sequences or durations of time represented in the schedule.
- D. Format: The construction schedules shall be a detailed Critical Path Method schedule with both tabular and graphic activity information shown side-by-side. Prime Contractor shall show all activities necessary for the completion of the project broken down by building, area, floor, and trade. Schedule shall graphically indicate both activity bars and target bars for all activities. Indicate the following:
 - 1. Activity Number
 - 2. Activity Description
 - 3. Target Activity Duration
 - 4. Actual Activity Duration
 - 5. Remaining Activity Duration
 - 6. Percentage Complete
 - 7. Early Start
 - 8. Early Finish
 - 9. Late Start
 - 10. Late Finish
 - 11. Target Start
 - 12. Target Finish
 - 13. Actual Start

- 14. Actual Finish
- 15. Milestones
- E. Float:
 - Float time is not for the exclusive use or benefit of either Owner or Prime Contractor, but is a
 jointly owned, expiring Project resource available to both parties as needed to meet schedule
 milestones
 - and Contract completion date.
 - 2. Free float is the amount of time an activity can be delayed without adversely affecting the early start of the successor activity.
 - 3. Total float is the measure of leeway in starting or completing an activity without adversely affecting the planned Project completion date.
- F. Updating Process:
 - 1. Single-Prime Project: Prime Contractor shall update the schedule on a regular basis and provide a copy to the Architect. An updated schedule shall be provided at minimum monthly with pay applications, unless requested more frequently by the Architect. The Prime Contractor will update the schedule with remaining durations, actual start and finish dates, future planned work and any other information necessary to accurately reflect work already completed and work remaining. Any material changes to the schedule (durations, logic, etc.) shall be coordinated with the Architect.
- G. Recovery Plans: In the updating process if the Prime Contractor is found to be behind on critical path activities that could materially impact the overall completion of the Project. The Prime Contractor shall be required to produce and submit to the Architect a "Recovery Schedule" outlining the efforts that the Prime Contractor will employ (i.e. additional shifts and/or manpower, overtime, etc.) to overcome the delays and bring the project back on schedule. This includes delays for any reason or cause such as; weather, rain, material delays, labor shortages, Owner stoppages, and all other possible reasons.
- H. Prime Contractor's critical path schedule shall include time contingency periods for weather conditions that are normal for the location of the Project for the applicable period of time.
- I. Distribution: Prime Contractor is responsible for distribution of copies of approved schedule to subcontractors and vendors/material suppliers with a need-to-know schedule responsibility.
 - 1. Post copies in Project meeting rooms and temporary field offices. When revisions are made, distribute updated schedules to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in performance of construction activities.
- J. Contract Time: The work of the Prime Contractors shall progress and be completed in accordance with the Milestone Delivery Dates specified in Attachment D to the Contract and the Prime Contractor's construction schedule established after contract award.

3.4 COORDINATION DRAWINGS

- A. Provide information required by Project Coordinator for preparation of coordination drawings.
- B. Review drawings prior to submission to Architect.
- C. Coordination Drawing Submittals: The Prime Contractor is responsible for the coordination of all work and is responsible for preparation of accurate coordination drawings. Prime Contractor shall prepare Coordination Drawings if limited space availability necessitates maximum utilization of space for efficient installation of different components or if coordination is required for installation of products and materials fabricated by separate entities. Provide coordination drawings for the integration of the work in a timely manner, allowing sufficient time for review by the Designer of Record, so as not to delay the progress of work. Include information developed by the Prime Contractor during construction, and detailed information contained in related shop drawings or product data.
- D. Content: Project-specific information, drawn accurately to a scale that conveys the information in a legible form. Do not base Coordination Drawings on reproductions of the Contract Documents or standard printed data. Include the following information, as applicable:
 - 1. Indicate functional and spatial relationships of components of architectural structural, civil, mechanical, and electrical systems.
 - 2. Indicate required installation sequences.

3.5 SUBMITTALS FOR REVIEW

- A. When the following are specified in individual sections, submit them for review:
 - 1. Product data.
 - 2. Shop drawings.
 - 3. Samples for selection.
 - 4. Samples for verification.
- B. Submit to Architect for review for the limited purpose of checking for compliance with information given and the design concept expressed in Contract Documents.
- C. Samples will be reviewed for aesthetic, color, or finish selection.
- D. After review, provide copies and distribute in accordance with SUBMITTAL PROCEDURES article below and for record documents purposes described in Section 01 78 00 Closeout Submittals.

3.6 SUBMITTALS FOR INFORMATION

A. When the following are specified in individual sections, submit them for information:

- 1. Design data.
- 2. Certificates.
- 3. Test reports.
- 4. Inspection reports.
- 5. Manufacturer's instructions.
- 6. Manufacturer's field reports.
- 7. Other types indicated.
- B. Submit for Architect's knowledge as contract administrator or for Owner.

3.7 SUBMITTALS FOR PROJECT CLOSEOUT

- A. Submit Correction Punch List for Substantial Completion.
- B. Submit Final Correction Punch List for Substantial Completion.
- C. When the following are specified in individual sections, submit them at project closeout in compliance with requirements of Section 01 78 00 Closeout Submittals:
 - 1. Project record documents.
 - 2. Operation and maintenance data.
 - 3. Warranties.
 - 4. Bonds.
 - 5. Other types as indicated.
- D. Submit for Owner's benefit during and after project completion.

3.8 NUMBER OF COPIES OF SUBMITTALS

- A. Electronic Documents: Submit one electronic copy in PDF format; an electronically-marked up file will be returned. Create PDFs at native size and right-side up; illegible files will be rejected.
- B. Documents for Review:
 - 1. Small Size Sheets, Not Larger Than 8-1/2 by 11 inches: Submit the number of copies that Contractor requires, plus two copies that will be retained by Architect.
 - 2. Larger Sheets, Not Larger Than 36 by 48 inches: Submit the number of opaque reproductions that Contractor requires, plus two copies that will be retained by Architect.
- C. Documents for Information: Submit two copies.

- D. Extra Copies at Project Closeout: See Section 01 78 00.
- E. Samples: Submit the number specified in individual specification sections; one of which will be retained by Architect.
 - 1. After review, produce duplicates.
 - 2. Retained samples will not be returned to Contractor unless specifically so stated.

3.9 SUBMITTAL PROCEDURES

- A. General Requirements:
- **3.10** Physical samples of any and all colors, finish materials, etc., shall be sent to the Architect for review and approval. All finish selections shall be uploaded to the cloud service for archive.ARCHITECT'S ACTION
 - A. General: Architect will not review submittals that do not bear both the Construction Manager's and the Contractor's approval stamp and will return them without action.
 - B. Action Submittals: Architect will review each submittal, make marks to indicate corrections or modifications required, and return it. Architect will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action taken, as follows:
 - 1. On advice of counsel, select appropriate terms for action stamp and insert term and explanation of each action taken in subparagraph below. See Evaluations.
 - 2. A-Action: Submittal has been reviewed and found to be acceptable.
 - 3. B-Action: Submittal has been reviewed and found acceptable with minor noted corrections.
 - 4. C-Action: Submittal has been reviewed and found to be unacceptable.
 - C. Informational Submittals: Architect will review each submittal and will not return it, or will reject and return it if it does not comply with requirements. Architect will forward each submittal to appropriate party.
 - D. Submittals not required by the Contract Documents will not be reviewed and may be discarded.

3.11 REQUEST FOR INTERPRETATION (RFI) PROCEDURES

- A. Procedure: Immediately on discovery of the need for interpretation of the Contract Documents, and if not possible to request interpretation at Project meeting, prepare and submit an RFI in the form specified.
 - 1. RFIs shall originate with Prime Contractor. RFIs submitted by entities other than this will be returned with no response.
 - 2. Coordinate and submit RFIs in a prompt manner so as to avoid delays in Prime Contractor's work or work of subcontractors.

- 3. RFI's shall be routed to the Designer of Record with copy to other parties as directed.
- 4. Identify each page of attachments with the RFI number and sequential page number.
- B. Content of the RFI: Include a detailed, legible description of item needing interpretation and the following:
 - 1. Project name.
 - 2. Date.
 - 3. Name of Prime Contractor.
 - 4. Name of Designer of Record
 - 5. RFI number, numbered sequentially.
 - 6. Specification Section number and title and related paragraphs, as appropriate.
 - 7. Drawing number and detail references, as appropriate.
 - 8. Field dimensions and conditions, as appropriate.
 - 9. Prime Contractor's suggested solution(s). If Prime Contractor's solution(s) impact the Contract Time or the Contract Sum, Prime Contractor shall state impact in the RFI.
 - 10. Prime Contractor's signature.
- C. Attachments: Include drawings, descriptions, measurements, photos, Product Data, Shop Drawings, and other information necessary to fully describe items needing interpretation.
 - 1. Supplementary drawings prepared by Prime Contractor shall include dimensions, thicknesses, structural grid references, and details of affected materials, assemblies, and attachments.
- D. Electronic RFIs: All RFI's shall be submitted electronically via email using the form specified.
 - 1. Form and Attachments shall be electronic files in Adobe Acrobat PDF format. Unless another format is agreed upon.
 - 2. Software-generated forms with the same content as indicated above will be accepted at the discretion of the Architect.
- E. Designer of Record's Action: Designer of Record will review each RFI, determine action required, and return it. Designer of Record will prioritize responses to RFI's. Prime Contractor shall allow sufficient time for adequate review of RFIs by the Designer of Record and be submitted in a timely manner so as not to delay the progress of the work. Designer of Record's response

for each RFI. RFIs received after 1:00 p.m. will be considered as received the following working day.

- 1. Response Timeframe: Allow 10 working days for response for each RFI. RFIs received after 1:00 p.m. will be dated and considered as received the following working day.
- 2. The following RFIs will be returned without action:
 - a. Requests for approval of submittals.
 - b. Requests for approval of substitutions.
 - c. Requests for coordination information already indicated in the Contract Documents.
 - d. Requests for adjustments in the Contract Time or the Contract Sum.
 - e. Requests for interpretation of Designer of Record's actions on submittals.
 - f. Incomplete RFIs or RFIs with numerous errors.RFIs that are presented directly to Owner, Architect, Architect's Consultant's or as otherwise not submitted directly to the Architect.
- 3. Action may include a request for additional information, in which case time for response will start again.
- 4. Action on RFIs that may result in a change to the Contract Time or the Contract Sum may be eligible for Prime Contractor to submit Change Proposal according to contract modification procedures.
 - a. If Prime Contractor believes the RFI response warrants change in the Contract Time or the Contract Sum, notify Architect in writing within 10 days of receipt of the RFI response.
- 5. On receipt of Action, immediately distribute the RFI response to affected parties. Review response and notify Architect within 5 days if Prime Contractor disagrees with response.

END OF SECTION

SECTION 01 40 00 QUALITY REQUIREMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Submittals.
- B. References and standards.
- C. Testing and inspection agencies and services.
- D. Control of installation.
- E. Mock-ups.
- F. Manufacturers' field services.
- G. Defect Assessment.

1.2 RELATED REQUIREMENTS

- A. Section 01 30 00 Administrative Requirements: Submittal procedures.
- B. Section 01 60 00 Product Requirements: Requirements for material and product quality.

1.3 REFERENCE STANDARDS

- A. ASTM C1021 Standard Practice for Laboratories Engaged in Testing of Building Sealants 2008 (Reapproved 2019).
- B. ASTM C1077 Standard Practice for Agencies Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Testing Agency Evaluation 2017.
- C. ASTM C1093 Standard Practice for Accreditation of Testing Agencies for Masonry 2019.
- D. ASTM D3740 Standard Practice for Minimum Requirements for Agencies Engaged in the Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction 2019.
- E. ASTM E329 Standard Specification for Agencies Engaged in Construction Inspection, Testing, or Special Inspection 2021.
- F. ASTM E543 Standard Specification for Agencies Performing Nondestructive Testing 2021.
- G. IAS AC89 Accreditation Criteria for Testing Laboratories 2020.

1.4 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

- B. Design Data: Submit for Architect's knowledge as contract administrator for the limited purpose of assessing compliance with information given and the design concept expressed in the Contract Documents, or for Owner's information.
- C. Test Reports: After each test/inspection, promptly submit two copies of report to Architect and to Contractor.
 - 1. Test report submittals are for Architect's knowledge as contract administrator for the limited purpose of assessing compliance with information given and the design concept expressed in the Contract Documents, or for Owner's information.
- D. Certificates: When specified in individual specification sections, submit certification by the manufacturer and Contractor or installation/application subcontractor to Architect, in quantities specified for Product Data.
 - 1. Indicate material or product complies with or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.
 - 2. Certificates may be recent or previous test results on material or product, but must be acceptable to Architect.
- E. Manufacturer's Instructions: When specified in individual specification sections, submit printed instructions for delivery, storage, assembly, installation, start-up, adjusting, and finishing, for the Owner's information. Indicate special procedures, perimeter conditions requiring special attention, and special environmental criteria required for application or installation.
- F. Manufacturer's Field Reports: Submit reports for Architect's benefit as contract administrator or for Owner.
 - 1. Submit for information for the limited purpose of assessing compliance with information given and the design concept expressed in the Contract Documents.
- G. Erection Drawings: Submit drawings for Architect's benefit as contract administrator or for Owner.
 - 1. Submit for information for the limited purpose of assessing compliance with information given and the design concept expressed in the Contract Documents.

1.5 REFERENCES AND STANDARDS

- A. For products and workmanship specified by reference to a document or documents not included in the Project Manual, also referred to as reference standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.
- B. Comply with reference standard of date of issue current on date of Contract Documents, except where a specific date is established by applicable code.
- C. Obtain copies of standards where required by product specification sections.

- D. Maintain copy at project site during submittals, planning, and progress of the specific work, until Substantial Completion.
- E. Should specified reference standards conflict with Contract Documents, request clarification from Architect before proceeding.
- F. Neither the contractual relationships, duties, or responsibilities of the parties in Contract nor those of Architect shall be altered from Contract Documents by mention or inference otherwise in any reference document.

1.6 TESTING AND INSPECTION AGENCIES AND SERVICES

- A. Owner will employ and pay for services of an independent testing agency to perform specified testing.
- B. Employment of agency in no way relieves Contractor of obligation to perform Work in accordance with requirements of Contract Documents.
- C. Contractor Employed Agency:
 - 1. Testing agency: Comply with requirements of ASTM E329, ASTM E543, ASTM C1021, ASTM C1077, ASTM C1093, and ASTM D3740.
 - 2. Inspection agency: Comply with requirements of ASTM D3740 and ASTM E329.
 - 3. Laboratory Qualifications: Accredited by IAS according to IAS AC89.
 - 4. Testing Equipment: Calibrated at reasonable intervals either by NIST or using an NIST established Measurement Assurance Program, under a laboratory measurement quality assurance program.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.1 CONTROL OF INSTALLATION

- A. Monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce work of specified quality.
- B. Comply with manufacturers' instructions, including each step in sequence.
- C. Should manufacturers' instructions conflict with Contract Documents, request clarification from Architect before proceeding.
- D. Comply with specified standards as minimum quality for the work except where more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.
- E. Have work performed by persons qualified to produce required and specified quality.
- F. Verify that field measurements are as indicated on shop drawings or as instructed by the manufacturer.

- G. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, and disfigurement.
- H. Control System: The Prime Contractor shall establish and maintain a system for documenting, monitoring, inspecting, verifying, and testing of the work and that of his subcontractors to ensure that all applicable requirements of the contract documents are met. The Prime Contractor shall be diligent to ensure that the quality of workmanship is satisfactory, that the installation meets all manufacturer requirements, that dimensional requirements are met, that defective materials are not used, and that all required protection and control and laboratory testing procedures are effected. Where specific testing procedures are not stipulated, the Prime Contractor shall establish and conduct a test procedure to ensure adherence to specified quality.
- I. Chain of Control: The Prime Contractor shall plan, coordinate, execute, and examine the work to ensure the complete, workmanlike, and warrantable installation of all materials in a system or element of the construction.
 - 1. The Prime Contractor shall plan, coordinate, execute, and examine the work to ensure that all underlying, substrate, or contiguous work is installed as required to meet the tolerances and requirements for the correct installation of subsequent work.
 - 2. It is the responsibility of the Prime Contractor to advise the Designer of Record no later than the submittal phase of any discrepancies in the requirements or tolerances of materials or components in a system or element of the construction.
- J. Execution Documentation: The documentation shall be by specification section or by system or element of the construction. The documentation shall be formatted in a comprehensive and collated manner to ensure ease of use and reference. A Table of Contents shall be provided. The Prime Contractor's system shall include, but is not limited to the following:
 - 1. Pre-Installation Conference: The following topics shall be reviewed:
 - a. Inspection and Testing requirements
 - b. Correct environmental conditions for execution of the work and protection of the completed installation.
 - c. Schedule including required inspections
 - d. Requirements and tolerances of underlying, substrate, or contiguous work
 - e. Review of requirements to ensure an enforceable warranty
 - f. Manufacturers should be present whenever possible
 - 2. Specifications
 - 3. Submittals, Product Data, and Shop Drawings
 - 4. Test Results

- 5. Manufacturer's Recommendations, Requirements, and Instructions
- 6. Packaging labels from Materials where possible
- 7. Periodic, dated photos of the work being performed and any other documentation that pertains to the warranty of the material or structure
- 8. Samples of the material when reasonable
- K. Pre-Work Quality Control Meeting: The Prime Contractor shall setup a meeting with the Awarding Authority, Designer of Record, Project Superintendent, and all major trade Superintendents to review the Prime Contractor's proposed QA/QC system and requirements for compliance.
- L. Submittal of QA/QC Program:
 - 1. The Prime Contractor shall submit to Owner and Architect for review their program format within 10 (ten) days after Notice to Proceed.
 - 2. Once work has begun, the QA/QC manual must be kept up-to-date and acceptable to Owner and Architect prior to the current Pay Application being approved.
- M. Inspections: The Prime Contractor shall make an initial inspection of each phase of work as soon as a representative portion has been completed, and the Prime Contractor shall make follow-up inspections as required, to ensure that an acceptable quality of work is established and maintained.
 - 1. The Prime Contractor shall perform a pre-final inspection, prepare a punch list, and work off all items prior to A/E inspection. Prime Contractor shall provide copy of completed report, certifying it's completion to the Designer of Record and prior to the Designer of Record beginning his inspections.
 - 2. The Prime Contractor shall coordinate and plan inspections by the Designer of Record and Awarding Authority in a timely manner to ensure that all parties can be scheduled so as not to impede the flow of the work.
- N. Closeout: The documents generated through this process are to be turned in as part of the closeout documents.
 - 1. Provide a list of following for all equipment including but not limited to the following:
 - a. Model Number
 - b. Serial Number
 - c. Description
 - d. Contract Document Reference
 - 2. Provide Filter and Belt list for each air handler

3.2 MOCK-UPS

- A. Tests shall be performed under provisions identified in this section and identified in the respective product specification sections.
- B. Assemble and erect specified items with specified attachment and anchorage devices, flashings, seals, and finishes.
- C. Accepted mock-ups shall be a comparison standard for the remaining Work.
- D. Where mock-up has been accepted by Architect and is specified in product specification sections to be removed, protect mock-up throughout construction, remove mock-up and clear area when directed to do so by Architect.
- E. Mock-ups: Mock-ups shall be used to judge workmanship, execution of details, and colors for all exterior material elements. No work shall be started on any of the exterior material elements until such time the mock-up is completed by the Prime Contractor, and accepted / approved by the Owner.

3.3 TESTING AND INSPECTION

- A. See individual specification sections for testing and inspection required.
- B. Testing Agency Duties:
 - 1. Provide qualified personnel at site. Cooperate with Architect and Contractor in performance of services.
 - 2. Perform specified sampling and testing of products in accordance with specified standards.
 - 3. Ascertain compliance of materials and mixes with requirements of Contract Documents.
 - 4. Promptly notify Architect and Contractor of observed irregularities or non-compliance of Work or products.
 - 5. Perform additional tests and inspections required by Architect.
 - 6. Submit reports of all tests/inspections specified.
- C. Limits on Testing/Inspection Agency Authority:
 - 1. Agency may not release, revoke, alter, or enlarge on requirements of Contract Documents.
 - 2. Agency may not approve or accept any portion of the Work.
- D. Contractor Responsibilities:
 - 1. Deliver to agency at designated location, adequate samples of materials proposed to be used that require testing, along with proposed mix designs.
 - 2. Cooperate with laboratory personnel, and provide access to the Work and to manufacturers' facilities.

Quality Requirements 01 4000

- 3. Provide incidental labor and facilities:
 - a. To provide access to Work to be tested/inspected.
 - b. To obtain and handle samples at the site or at source of Products to be tested/inspected.
 - c. To facilitate tests/inspections.
 - d. To provide storage and curing of test samples.
- 4. Notify Architect and laboratory 24 hours prior to expected time for operations requiring testing/inspection services.
- 5. Employ services of an independent qualified testing laboratory and pay for additional samples, tests, and inspections required by Contractor beyond specified requirements.
- 6. Arrange with Owner's agency and pay for additional samples, tests, and inspections required by Contractor beyond specified requirements.
- E. Re-testing required because of non-compliance with specified requirements shall be performed by the same agency on instructions by Architect.
- F. Re-testing required because of non-compliance with specified requirements shall be paid for by Contractor.
- G. Testing and Inspections: Prime Contractor shall provide all testing and inspections specifically identified to be by Prime Contractor in the Contract Documents. Owner shall provide all testing and inspections specifically identified to be by Owner in the Contract Documents. All testing and inspections not specifically identified to be by Prime Contractor or Owner, shall be provided by Prime Contractor at Prime Contractor's expense.

3.4 MANUFACTURERS' FIELD SERVICES

- A. When specified in individual specification sections, require material or product suppliers or manufacturers to provide qualified staff personnel to observe site conditions, conditions of surfaces and installation, quality of workmanship, start-up of equipment, test, adjust, and balance equipment, as applicable, and to initiate instructions when necessary.
- B. Report observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturers' written instructions.

3.5 DEFECT ASSESSMENT

A. Replace Work or portions of the Work not complying with specified requirements.

END OF SECTION

SECTION 01 50 00 TEMPORARY FACILITIES AND CONTROLS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Temporary telecommunications services.
- B. Temporary sanitary facilities.
- C. Temporary Controls: Barriers, enclosures, and fencing.
- D. Security requirements.
- E. Vehicular access and parking.
- F. Waste removal facilities and services.
- G. Project identification sign.
- H. Field offices.

1.2 REFERENCE STANDARDS

- A. ASTM E84 Standard Test Method for Surface Burning Characteristics of Building Materials 2021a.
- B. ASTM E90 Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements 2009 (Reapproved 2016).

1.3 TEMPORARY UTILITIES

- A. Contractor will provide the following:
 - 1. Electrical powerand metering, consisting of connection to existing facilities.
 - 2. Water supply, consisting of connection to existing facilities.
- B. Contractor shall provide and pay for all electrical power, lighting, water, heating and cooling, and ventilation required for construction purposes.
- C. Existing facilities may be used.
- D. New permanent facilities may be used.

1.4 TELECOMMUNICATIONS SERVICES

- A. Provide, maintain, and pay for telecommunications services to field office at time of project mobilization.
- B. Telecommunications services shall include:

- 1. Windows-based personal computer dedicated to project telecommunications, with necessary software and laser printer.
- 2. Internet Connections: Minimum of one; DSL modem or faster.
- 3. Facsimile Service: Minimum of one dedicated fax machine/printer, with dedicated phone line.

1.5 TEMPORARY SANITARY FACILITIES

- A. Provide and maintain required facilities and enclosures. Provide at time of project mobilization.
- B. Maintain daily in clean and sanitary condition.

1.6 BARRIERS

- A. Provide barriers to prevent unauthorized entry to construction areas, to prevent access to areas that could be hazardous to workers or the public, to allow for owner's use of site and to protect existing facilities and adjacent properties from damage from construction operations and demolition.
- B. Provide barricades and covered walkways required by governing authorities for public rights-of-way and for public access to existing building.
- C. Protect non-owned vehicular traffic, stored materials, site, and structures from damage.

1.7 FENCING

A. Provide 6 foot high fence around construction site; equip with vehicular and pedestrian gates with locks.

1.8 EXTERIOR ENCLOSURES

A. Provide temporary insulated weather tight closure of exterior openings to accommodate acceptable working conditions and protection for Products, to allow for temporary heating and maintenance of required ambient temperatures identified in individual specification sections, and to prevent entry of unauthorized persons. Provide access doors with self-closing hardware and locks.

1.9 SECURITY

A. Provide security and facilities to protect Work, existing facilities, and Owner's operations from unauthorized entry, vandalism, or theft.

1.10 VEHICULAR ACCESS AND PARKING

- A. Coordinate access and haul routes with governing authorities and Owner.
- B. Provide and maintain access to fire hydrants, free of obstructions.
- C. Provide means of removing mud from vehicle wheels before entering streets.
- D. Provide temporary parking areas to accommodate construction personnel. When site space is not adequate, provide additional off-site parking.

E. All Contractor vehicles must park within the designated fenced construction limits as indicated on the drawings. All personal vehicles must park within the fenced construction area, or as otherwise defined at the Pre-Bid Conference.

1.11 WASTE REMOVAL

- A. Provide waste removal facilities and services as required to maintain the site in clean and orderly condition.
- B. Provide containers with lids. Remove trash from site periodically.
- C. If materials to be recycled or re-used on the project must be stored on-site, provide suitable noncombustible containers; locate containers holding flammable material outside the structure unless otherwise approved by the authorities having jurisdiction.
- D. Open free-fall chutes are not permitted. Terminate closed chutes into appropriate containers with lids.

1.12 PROJECT IDENTIFICATION

- A. Provide project identification sign of design and construction indicated on drawings.
- B. Erect on site at location indicated.
- C. No other signs are allowed without Owner permission except those required by law.

1.13 FIELD OFFICES

- A. Office: Weathertight, with lighting, electrical outlets, heating, cooling equipment, and equipped with sturdy furniture, drawing rack, and drawing display table.
- B. Provide space for Project meetings, with table and chairs to accommodate 6 persons.
- C. Locate offices a minimum distance of 30 feet from existing and new structures.

1.14 EQUIPMENT

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

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.1 INSTALLATION OF TEMPORARY FACILITIES

- A. General: Locate facilities where they will serve Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required by progress of the Work.
 - 1. Locate facilities to limit site disturbance. Coordinate all placements with the Architect.

- 2. Provide each facility ready for use when needed to avoid delay. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.
- B. Temporary Utilities: Make connection to Owner's existing facilities and install temporary services. Coordinate with Owner and make site inspections as necessary to fully ascertain requirements. Arrange with utility company, Owner, and existing users for time when service can be interrupted, if necessary, to make connections for temporary services.
 - 1. Water Service: Install water service and distribution piping in sizes and pressures adequate for construction. Clean and maintain water service facilities in a condition acceptable to Owner. Prior to Substantial Completion, restore these facilities to condition existing before initial use.
 - 2. Electric Power Service: Provide electric power service and distribution system of sufficient size, capacity, and power characteristics required for construction operations. Install electric power service underground unless otherwise indicated.
- C. Temporary Lighting: Provide temporary lighting with local switching that provides adequate illumination for construction operations, observations, inspections, and traffic conditions.
 - 1. Install and operate temporary lighting that fulfills security and protection requirements without operating entire system and shall meet OSHA minimum illumination requirements.
 - 2. Install lighting for Project identification sign.
- D. Temporary Roads and Paved Areas: Locate temporary roads and paved areas in same location as permanent roads and paved areas. Construct and maintain temporary roads and paved areas adequate for construction operations. Extend temporary roads and paved areas, within construction limits indicated, as necessary for construction operations.
 - 1. Coordinate elevations of temporary roads and paved areas with permanent roads and paved areas.
 - 2. Prepare subgrade and install sub-base and base for temporary roads and paved areas.
 - 3. Recondition base after temporary use, including removing contaminated material, regrading, proof-rolling, compacting, and testing.
- E. 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.
 - 3. City Road Improvement Coordination: Prime Contractor shall be responsible for coordination with City Road Improvements when applicable.
- F. Dewatering Facilities and Drains: Comply with requirements of authorities having jurisdiction. Maintain Project site, excavations, and construction free of water.

- 1. Dispose of rainwater in a lawful manner that will not result in flooding Project or adjoining properties or endanger permanent Work or temporary facilities.
- G. Waste Disposal Facilities: Provide waste-collection containers in sizes adequate to handle waste from construction operations. Comply with requirements of authorities having jurisdiction.
- H. Temporary Use of Permanent Stairs: Use of new stairs for construction traffic will be permitted, provided stairs are protected and finishes restored to new condition at time of Substantial Completion.
- I. 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.
- J. Temporary Egress: Maintain temporary egress from existing occupied facilities as indicated and as required by authorities having jurisdiction.
- K. Temporary Fire Protection: Install and maintain temporary fire-protection facilities of types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 241; manage fire-prevention program.
 - 1. Prohibit smoking in construction areas.
 - 2. Supervise welding operations, combustion-type temporary heating units, and similar sources of fire ignition according to requirements of authorities having jurisdiction.
 - 3. Develop and supervise an overall fire-prevention and -protection program for personnel at Project site. Review needs with local fire department and establish procedures to be followed. Instruct personnel in methods and procedures. Post warnings and information.
 - 4. Provide temporary standpipes and hoses for fire protection. Hang hoses with a warning sign stating that hoses are for fire-protection purposes only and are not to be removed. Match hose size with outlet size and equip with suitable nozzles.

3.2 MAINTENANCE AND REMOVAL OF TEMPORARY FACILITIES

- A. Supervision: Enforce strict discipline in use of temporary facilities. To minimize waste and abuse, limit availability of temporary facilities to essential and intended uses.
- B. Maintenance: Maintain facilities in good operating condition until removal.
 - 1. Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation, and similar facilities on a 24-hour basis where required to achieve indicated results and to avoid possibility of damage.
- C. Temporary Facility Changeover: Do not change over from using temporary security and protection facilities to permanent facilities until Substantial Completion.
- D. Termination and Removal: Remove each temporary facility when need for its service has ended, when it has been replaced by authorized use of a permanent facility, or no later than Substantial Completion.

Complete or, if necessary, restore permanent construction that may have been delayed because of interference with temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.

- 1. Materials and facilities that constitute temporary facilities are property of Prime Contractor. Owner reserves right to take possession of Project identification signs.
- 2. Remove temporary roads and paved areas not intended for or acceptable for integration into permanent construction. Where area is intended for landscape development, remove soil and aggregate fill that do not comply with requirements for fill or subsoil. Remove materials contaminated with road oil, asphalt and other petrochemical compounds, and other substances that might impair growth of plant materials or lawns. Repair or replace street paving, curbs, and sidewalks at temporary entrances, as required by authorities having jurisdiction.
- 3. At Substantial Completion, repair, renovate, and clean permanent facilities used during construction period."

END OF SECTION

SECTION 01 60 00 PRODUCT REQUIREMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. General product requirements.
- B. Transportation, handling, storage and protection.
- C. Product option requirements.
- D. Substitution limitations.
- E. Maintenance materials, including extra materials, spare parts, tools, and software.

1.2 RELATED REQUIREMENTS

- A. Section 01 25 00 Substitution Procedures: Substitutions made during procurement and/or construction phases.
- B. Section 01 40 00 Quality Requirements: Product quality monitoring.
- C. Section 01 74 19 Construction Waste Management and Disposal: Waste disposal requirements potentially affecting product selection, packaging and substitutions.

1.3 SUBMITTALS

- A. Product Data Submittals: Submit manufacturer's standard published data. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturers' standard data to provide information specific to this Project.
- B. Shop Drawing Submittals: Prepared specifically for this Project; indicate utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.
- C. Sample Submittals: Illustrate functional and aesthetic characteristics of the product, with integral parts and attachment devices. Coordinate sample submittals for interfacing work.
 - 1. For selection from standard finishes, submit samples of the full range of the manufacturer's standard colors, textures, and patterns.

PART 2 PRODUCTS

2.1 NEW PRODUCTS

- A. Provide new products unless specifically required or permitted by Contract Documents.
- B. Use of products having any of the following characteristics is not permitted:

Product Requirements 01 60 00

- 1. Made outside the United States, its territories, Canada, or Mexico.
- 2. Made using or containing CFC's or HCFC's.
- 3. Made of wood from newly cut old growth timber.
- 4. Containing lead, cadmium, or asbestos.
- C. Where other criteria are met, Contractor shall give preference to products that:
 - 1. Are extracted, harvested, and/or manufactured closer to the location of the project.
 - 2. Have longer documented life span under normal use.
 - 3. Result in less construction waste. See Section 01 74 19
 - 4. Are made of vegetable materials that are rapidly renewable.
 - 5. Are made of recycled materials.

2.2 PRODUCT OPTIONS

- A. Products Specified by Reference Standards or by Description Only: Use any product meeting those standards or description.
- B. Products Specified by Naming One or More Manufacturers: Use a product of one of the manufacturers named and meeting specifications, no options or substitutions allowed.
- C. Products Specified by Naming One or More Manufacturers with a Provision for Substitutions: Submit a request for substitution for any manufacturer not named.

2.3 MAINTENANCE MATERIALS

- A. Furnish extra materials, spare parts, tools, and software of types and in quantities specified in individual specification sections.
- B. Deliver to Project site; obtain receipt prior to final payment.

PART 3 EXECUTION

3.1 SUBSTITUTION LIMITATIONS

A. See Section 01 25 00 - Substitution Procedures.

3.2 TRANSPORTATION AND HANDLING

- A. Package products for shipment in manner to prevent damage; for equipment, package to avoid loss of factory calibration.
- B. If special precautions are required, attach instructions prominently and legibly on outside of packaging.

- C. Coordinate schedule of product delivery to designated prepared areas in order to minimize site storage time and potential damage to stored materials.
- D. Transport and handle products in accordance with manufacturer's instructions.
- E. Transport materials in covered trucks to prevent contamination of product and littering of surrounding areas.
- F. Promptly inspect shipments to ensure that products comply with requirements, quantities are correct, and products are undamaged.
- G. Provide equipment and personnel to handle products by methods to prevent soiling, disfigurement, or damage, and to minimize handling.
- H. Arrange for the return of packing materials, such as wood pallets, where economically feasible.

3.3 STORAGE AND PROTECTION

- A. Designate receiving/storage areas for incoming products so that they are delivered according to installation schedule and placed convenient to work area in order to minimize waste due to excessive materials handling and misapplication. See Section 01 74 19.
- B. Store and protect products in accordance with manufacturers' instructions.
- C. Store with seals and labels intact and legible.
- D. Store sensitive products in weathertight, climate-controlled enclosures in an environment favorable to product.
- E. For exterior storage of fabricated products, place on sloped supports above ground.
- F. Protect products from damage or deterioration due to construction operations, weather, precipitation, humidity, temperature, sunlight and ultraviolet light, dirt, dust, and other contaminants.
- G. Comply with manufacturer's warranty conditions, if any.
- H. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to prevent condensation and degradation of products.
- I. Prevent contact with material that may cause corrosion, discoloration, or staining.
- J. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.
- K. Arrange storage of products to permit access for inspection. Periodically inspect to verify products are undamaged and are maintained in acceptable condition.

END OF SECTION

SECTION 01 7000

EXECUTION AND PROJECT CLOSEOUT

PART 1 - GENERAL

1.1 <u>RELATED DOCUMENTS</u>:

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division-1 Specification sections, apply to work of this section.

1.2 <u>DESCRIPTION OF REQUIREMENTS</u>:

- A. Definitions:
 - 1. Project closeout is the term used to describe certain collective project requirements, indicating completion of the Work that are to be fulfilled near the end of the Contract time in preparation for final acceptance and occupancy of the Work by the Owner, as well as final payment to the Contractor and the normal termination of the Contract.
 - 2. Specific requirements for individual units of work are included in the appropriate sections in Divisions 2 through 16.
 - 3. Time of closeout is directly related to "Substantial Completion"; therefore, the time of closeout may be either a single time period for the entire Work or a series of time periods for individual elements of the Work that have been certified as substantially complete at different dates, if the Work is to be completed in phases. This time variation, if any, shall be applicable to the other provisions of this section.

1.3 PREREQUISITES TO SUBSTANTIAL COMPLETION:

- A. General: Complete the following before requesting the Architect/Engineer's inspection for certification of substantial completion, either for the entire Work or for portions of the Work, if the Work is to be completed in phases. List known exceptions in the request.
 - 1. Inspection Procedures:
 - a. The CONTRACTOR shall conduct their own complete Prefinal Inspections, distribute punchlists to all trades, the Owner, Architect and their Consultants, and complete all resulting work items, prior to any Final Inspection by the Architect or their Consultants.
 - b. Following the Contractor's completion of work resulting from their own inspection(s), and upon receipt of the Contractor's request for inspection, the Architect/Engineer will either proceed with inspection or advise the Contractor of unfilled prerequisites.
 - c. Following the initial inspection, the Architect/Engineer will either prepare the certificate of substantial completion, or will advise the Contractor of work which must be performed before the certificate will be issued. The Architect/Engineer will repeat the inspection when requested and when assured that the Work has been substantially completed.
 - d. Results of the completed inspection will form the initial "punch-list" for "final acceptance".

- 2. In the progress payment request that coincides with, or is the first request following, the date substantial completion is claimed, show either 100% completion for the portion of the Work claimed as "substantially complete", or list incomplete items, the value of incomplete work, and reasons for the Work being incomplete.
- 3. Submit a statement showing an accounting of changes to the Contract Sum.
- 4. Submit specific warranties, workmanship/maintenance bonds, maintenance agreements, final certifications and similar documents.
- 5. Obtain and submit releases enabling the Owner's unrestricted use of the Work and access to services and utilities. Where required, include occupancy permits, operating certificates, and other similar releases.
- 6. Deliver tools, spare parts, extra stock of material, and similar physical items to the Owner.
- 7. Make the final change-over of locks and transmit the keys to the Owner. Advise the Owner's personnel of the change-over in security provisions.
- 8. Complete start-up testing of systems, and instruction of the Owner's operating and maintenance personnel. Discontinue or change over and remove temporary facilities and services from the project site, along with construction tools and facilities, mock-ups, and similar elements.

1.4 **<u>PREREQUISITES TO FINAL ACCEPTANCE</u>**:

- A. General: Complete the following before requesting the Architect/Engineer's final inspection for certification of final acceptance, and final payment as required by the General Conditions. List known exceptions, if any, in the request.
 - 1. Submit the final payment request with final releases and supporting documentation not previously submitted and accepted. Include certificates of insurance for products and completed operations where required.
 - 2. Submit an updated final statement, accounting for final additional changes to the Contract Sum.
 - 3. Submit a certified copy of the Architect/Engineer's final punch-list of itemized work to be completed or corrected, stating that each item has been completed or otherwise resolved for acceptance, and which has been endorsed and dated by the Architect/Engineer.
 - 4. Submit final meter readings for utilities, a measured record of stored fuel, and similar date either as of the date of substantial completion, or else when the Owner or subsequent Contractor took possession of and responsibility for corresponding elements of the Work.
 - 5. Submit consent of surety.
 - 6. Submit evidence of final, continuing insurance coverage complying with insurance requirements.
 - 7. Include supporting documentation for completion as indicated in these contract documents.
 - 8. Include certified "Advertisement of Completion," including dates run and paid-in-full invoice for same.
- B. Reinspection Procedure:
 - 1. The Architect/Engineer will reinspect the Work upon receipt of the Contractor's notice that the Work, including punch-list items resulting from earlier inspections, has been completed, except for these items whose completion has been delayed because of circumstances that are acceptable to the Architect/Engineer.
 - 2. Upon completion of reinspection, the Architect/Engineer will either prepare a certificate of final acceptance, or will advise the Contractor of work that is incomplete or of obligations that have not been fulfilled, but are required for final acceptance.
 - 3. If necessary, the reinspection procedure will be repeated.
1.5 <u>RECORD DOCUMENT SUBMITTALS</u>:

- A. General:
 - 1. Specific requirements for record documents are indicated in the individual sections of these specifications. Other requirements are indicated in the General Conditions. General submittal requirements are indicated in the various "submittals" sections.
 - 2. Do not use record documents for construction purposes; protect from deterioration and loss in a secure, fire-resistant location; provide access to record documents for the Architect/Engineer's reference during normal working hours.
- B. Record Drawings:
 - 1. Maintain a record set of blue or black line white-prints of contract drawings and shop drawings in a clean, undamaged condition. Mark-up the set of record documents to show the actual installation where the installed work varies substantially from the work as originally shown. Mark whichever drawing is most capable of showing the actual "field" condition fully and accurately; however, where shop drawings are used for mark-up, record a cross-reference at the corresponding location on the working drawings. Give particular attention to concealed work that would be difficult to measure and record at a later date.
 - 2. Mark record sets with red erasable pencil and, where feasible, use other colors to distinguish between variations in separate categories of work.
 - 3. Mark-up new information which is know to be important to the Owner, but for same reason was not shown on either contract drawings or shop drawings.
 - 4. Note related change-order numbers where applicable.
 - 5. Organize record drawing sheets into manageable sets, bind with durable paper cover sheets, and print suitable titles, dates and other identification on the cover of each set.
- C. Record Specifications: Maintain one complete copy of the Project Manual, including specifications and addenda(s), and one copy of other written construction documents such as change orders and similar modifications issued in printed for during construction. Mark these documents to show substantial variations in the actual work performed in comparison with the text of the specifications and modifications as issued. Give particular attention to substitutions, selection of options and similar information on work where it is concealed or cannot otherwise be readily discerned at a later date by direct observation. Note related record drawing information and product data, where applicable.
 - 1. Upon completion of the Work, submit record specifications to the Architect/Engineer for the Owner's records.
- D. Record Sample Submitted: Immediately prior to the date or dates of substantial completion, the Contractor will meet at the site with the Architect/Engineer and the Owner's personnel, if desired, to determine which, if any, of the submitted samples that have been maintained by the Contractor during progress of the Work, are to be transmitted to the Owner for record purposes. Comply with delivery to the Owner's sample storage area.
- E. Miscellaneous Record Submittals: Refer to other sections of these specifications for requirements of miscellaneous record-keeping and submittals in connection with the actual performance of the Work. Immediately prior to the date or dates of substantial completion, complete miscellaneous records and place in good order, properly identified and bound or filed, ready for continued use and reference. Submit to the Architect/Engineer for the Owner's records.

- F. Maintenance Manuals, Warranties, and Guarantees:
 - 1. Unless indicated otherwise, submit one (1) original and one (1) copy of each item required by the Project Manual.
 - 2. Furnish to Architect for review, and then to Owner, in two (2) separate sets bound in threering binders, permanently and clearly identifying the project and contents on front and edge.

PART 2 - PRODUCTS

Not Applicable.

PART 3 - EXECUTION

3.1 <u>CLOSEOUT PROCEDURES</u>:

- A. General Operating and Maintenance Instructions:
 - 1. Arrange for each installer of operating equipment and other work that requires regular or continuing maintenance, to meet at the site with the Owner's personnel to provide necessary basic instruction in the proper operation and maintenance of the entire Work. Where installers are not experienced in the required procedures, include instruction by the manufacturer's representatives.
 - 2. As part of this instruction, provide a detailed review of the following items:
 - a. Maintenance manuals
 - b. Record documents
 - c. Spare parts and materials
 - d. Tools
 - e. Identification systems
 - f. Control sequences
 - g. Cleaning procedures
 - h. Warranties, bonds, maintenance agreements, and similar continuing commitments.
 - 3. As a part of this instruction for operating equipment, demonstrate the following procedures:
 - a. Start-up
 - b. Shut-down
 - c. Emergency operations
 - d. Noise and vibration adjustments
 - e. Safety procedures
 - f. Economy and efficiency adjustments
 - g. Effective energy utilization.

3.2 <u>FINAL CLEANING</u>:

- A. General: Special cleaning requirements for specific units of Work are included in the appropriate sections of Divisions 2 through 16. General Cleaning during the regular progress of the Work is required by the General Conditions and is included under section "Temporary Facilities".
- B. Cleaning: Provide final cleaning of the Work at the time indicated. Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit of work to the condition expected from a normal, commercial building cleaning and maintenance program. Comply with the manufacturer's instructions for operations.
- C. Complete the following cleaning operations before requesting the Architect/Engineer's inspection for certification of substantial completion:
 - 1. Clean the project site, including landscape development areas, of rubbish, litter and other foreign substances. Sweep paved areas to a broom clean condition; remove stains, spills and other foreign deposits. Rake grounds that are neither paved nor planted, to a smooth even-textured surface.
- D. Removal of Protection: Except as otherwise indicated or requested by the Architect/Engineer, remove temporary protection devices and facilities which were installed during the course of the work to protect previously completed work during the remainder of the construction period.
- E. Compliance:
 - 1. Comply with safety standards and governing regulations for cleaning operations. Do not burn waste materials at the site. Do not bury debris or excess materials on the Owner's property. Do not discharge volatile or other harmful or dangerous materials into drainage systems. Remove waste materials from the site and dispose of in a lawful manner.
 - 2. Where extra materials of value remaining after completion of associated work have become the Owner's property, dispose of these materials to the Owner's best advantage as directed.

END OF PROJECT CLOSEOUT

SECTION 01 7419

CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

PART 1 GENERAL

1.01 WASTE MANAGEMENT REQUIREMENTS

- A. Owner requires that this project generate the least amount of trash and waste possible.
- B. Employ processes that ensure the generation of as little waste as possible due to error, poor planning, breakage, mishandling, contamination, or other factors.
- C. Minimize trash/waste disposal in landfills; reuse, salvage, or recycle as much waste as economically feasible.
- D. Contractor shall submit periodic Waste Disposal Reports; all landfill disposal, incineration, recycling, salvage, and reuse must be reported regardless of to whom the cost or savings accrues; use the same units of measure on all reports.
- E. Methods of trash/waste disposal that are not acceptable are:
 - 1. Burning on the project site.
 - 2. Burying on the project site.
 - 3. Dumping or burying on other property, public or private.
 - 4. Other illegal dumping or burying.
- F. Regulatory Requirements: Contractor is responsible for knowing and complying with regulatory requirements, including but not limited to Federal, state and local requirements, pertaining to legal disposal of all construction and demolition waste materials.

1.02 RELATED REQUIREMENTS

- A. Section 01 3000 Administrative Requirements: Additional requirements for project meetings, reports, submittal procedures, and project documentation.
- B. Section 01 5000 Temporary Facilities and Controls: Additional requirements related to trash/waste collection and removal facilities and services.
- C. Section 01 6000 Product Requirements: Waste prevention requirements related to delivery, storage, and handling.
- D. Section 01 7000 Execution and Closeout Requirements: Trash/waste prevention procedures related to demolition, cutting and patching, installation, protection, and cleaning.

1.03 DEFINITIONS

- A. Clean: Untreated and unpainted; not contaminated with oils, solvents, caulk, or the like.
- B. Construction and Demolition Waste: Solid wastes typically including building materials, packaging, trash, debris, and rubble resulting from construction, remodeling, repair and demolition operations.
- C. Hazardous: Exhibiting the characteristics of hazardous substances, i.e., ignitibility, corrosivity, toxicity or reactivity.
- D. Nonhazardous: Exhibiting none of the characteristics of hazardous substances, i.e., ignitibility, corrosivity, toxicity, or reactivity.
- E. Nontoxic: Neither immediately poisonous to humans nor poisonous after a long period of exposure.
- F. Recyclable: The ability of a product or material to be recovered at the end of its life cycle and remanufactured into a new product for reuse by others.
- G. Recycle: To remove a waste material from the project site to another site for remanufacture into a new product for reuse by others.

- H. Recycling: The process of sorting, cleansing, treating and reconstituting solid waste and other discarded materials for the purpose of using the altered form. Recycling does not include burning, incinerating, or thermally destroying waste.
- I. Return: To give back reusable items or unused products to vendors for credit.
- J. Reuse: To reuse a construction waste material in some manner on the project site.
- K. Salvage: To remove a waste material from the project site to another site for resale or reuse by others.
- L. Sediment: Soil and other debris that has been eroded and transported by storm or well production runoff water.
- M. Source Separation: The act of keeping different types of waste materials separate beginning from the first time they become waste.
- N. Toxic: Poisonous to humans either immediately or after a long period of exposure.
- O. Trash: Any product or material unable to be reused, returned, recycled, or salvaged.
- P. Waste: Extra material or material that has reached the end of its useful life in its intended use. Waste includes salvageable, returnable, recyclable, and reusable material.

1.04 SUBMITTALS

- A. See Section 01 3000 Administrative Requirements, for submittal procedures.
- B. Waste Disposal Reports: Submit at specified intervals, with details of quantities of trash and waste, means of disposal or reuse, and costs; show both totals to date and since last report.
 - 1. Submit updated Report with each Application for Progress Payment; failure to submit Report will delay payment.
 - 2. Submit Report on a form acceptable to Owner.
 - 3. Landfill Disposal: Include the following information:
 - a. Identification of material.
 - b. Amount, in tons or cubic yards, of trash/waste material from the project disposed of in landfills.
 - c. State the identity of landfills, total amount of tipping fees paid to landfill, and total disposal cost.
 - d. Include manifests, weight tickets, receipts, and invoices as evidence of quantity and cost.
 - 4. Incinerator Disposal: Include the following information:
 - a. Identification of material.
 - b. Amount, in tons or cubic yards, of trash/waste material from the project delivered to incinerators.
 - c. State the identity of incinerators, total amount of fees paid to incinerator, and total disposal cost.
 - d. Include manifests, weight tickets, receipts, and invoices as evidence of quantity and cost.
 - 5. Recycled and Salvaged Materials: Include the following information for each:
 - a. Identification of material, including those retrieved by installer for use on other projects.
 - b. Amount, in tons or cubic yards, date removed from the project site, and receiving party.
 - c. Transportation cost, amount paid or received for the material, and the net total cost or savings of salvage or recycling each material.
 - d. Include manifests, weight tickets, receipts, and invoices as evidence of quantity and cost.
 - e. Certification by receiving party that materials will not be disposed of in landfills or by incineration.
 - 6. Material Reused on Project: Include the following information for each:
 - a. Identification of material and how it was used in the project.

- b. Amount, in tons or cubic yards.
- c. Include weight tickets as evidence of quantity.
- 7. Other Disposal Methods: Include information similar to that described above, as appropriate to disposal method.

PART 2 PRODUCTS

2.01 PRODUCT SUBSTITUTIONS

- A. See Section 01 6000 Product Requirements for substitution submission procedures.
- B. For each proposed product substitution, submit the following information in addition to requirements specified in Section 01 6000:
 - 1. Relative amount of waste produced, compared to specified product.
 - 2. Cost savings on waste disposal, compared to specified product, to be deducted from the Contract Sum.
 - 3. Proposed disposal method for waste product.
 - 4. Markets for recycled waste product.

PART 3 EXECUTION

3.01 WASTE MANAGEMENT PROCEDURES

- A. See Section 01 3000 for additional requirements for project meetings, reports, submittal procedures, and project documentation.
- B. See Section 01 5000 for additional requirements related to trash/waste collection and removal facilities and services.
- C. See Section 01 6000 for waste prevention requirements related to delivery, storage, and handling.
- D. See Section 01 7000 for trash/waste prevention procedures related to demolition, cutting and patching, installation, protection, and cleaning.

3.02 WASTE MANAGEMENT PLAN IMPLEMENTATION

- A. Manager: Designate an on-site person or persons responsible for instructing workers and overseeing and documenting results of the Waste Management Plan.
- B. Communication: Distribute copies of the Waste Management Plan to job site foreman, each subcontractor, Owner, and Architect.
- C. Instruction: Provide on-site instruction of appropriate separation, handling, and recycling, salvage, reuse, and return methods to be used by all parties at the appropriate stages of the project.
- D. Meetings: Discuss trash/waste management goals and issues at project meetings.
 - 1. Prebid meeting.
 - 2. Preconstruction meeting.
 - 3. Regular job-site meetings.
 - 4. Job safety meetings.
- E. Facilities: Provide specific facilities for separation and storage of materials for recycling, salvage, reuse, return, and trash disposal, for use by all contractors and installers.
 - 1. As a minimum, provide:
 - a. Separate area for storage of materials to be reused on-site, such as wood cut-offs for blocking.
 - b. Separate dumpsters for each category of recyclable.
 - c. Recycling bins at worker lunch area.
 - 2. Provide containers as required.
 - 3. Provide temporary enclosures around piles of separated materials to be recycled or salvaged.

- 4. Provide materials for barriers and enclosures that are nonhazardous, recyclable, or reusable to the maximum extent possible; reuse project construction waste materials if possible.
- 5. Locate enclosures out of the way of construction traffic.
- 6. Provide adequate space for pick-up and delivery and convenience to subcontractors.
- 7. If an enclosed area is not provided, clearly lay out and label a specific area on-site.
- 8. Keep recycling and trash/waste bin areas neat and clean and clearly marked in order to avoid contamination of materials.
- F. Hazardous Wastes: Separate, store, and dispose of hazardous wastes according to applicable regulations.
- G. Recycling: Separate, store, protect, and handle at the site identified recyclable waste products in order to prevent contamination of materials and to maximize recyclability of identified materials. Arrange for timely pickups from the site or deliveries to recycling facility in order to prevent contamination of recyclable materials.
- H. Reuse of Materials On-Site: Set aside, sort, and protect separated products in preparation for reuse.
- I. Salvage: Set aside, sort, and protect products to be salvaged for reuse off-site.

END OF SECTION

SECTION 01 7800

CLOSEOUT SUBMITTALS

PART 1 - GENERAL

1.1 <u>RELATED DOCUMENTS</u>:

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division 1 Specification sections, apply to work of this section.

1.2 <u>DOCUMENTS</u>:

A. Maintain at least one (1) copy of all drawings, specifications, addenda, approved shop drawings, change orders, filed orders, other contract modifications and other reviewed documents submitted by the Contractor in compliance with various sections of the specifications.

1.3 IDENTIFICATION AND MAINTENANCE:

A. Each of these project record documents shall be clearly marked "Project Record Copy," maintained in good condition, available for inspection by the Architect or Owner, and not used for construction purposes.

1.4 <u>RECORDS</u>:

- A. Mark up the most appropriate documents with permanent red ink pen or red pencil to show:
 - 1. Significant changes made during the construction progress.
 - 2. Significant detail not shown in the original contract documents.
- B. The information given shall include, but not be limited to: The location of underground utilities and appurtenances, referenced to permanent surface improvements by dimensions(s) and description(s).
- C. Keep project record documents current. Do not permanently conceal any work until the required information has been recorded.
- D. As-built Drawings: At completion of project, the Contractor shall submit to Architect complete sets of marked-up Project Record Drawings, as follows:
 - 1. One (1) Original Set.
 - 2. One (1) set, blueline or blackline prints or copies.
 - 3. Two (2) sets of digital copies in latest edition of ISO/Adobe compliant "Portable Document Format" ("PDF") saved as "Read Only" on compact discs (CD's), clearly and permanently labeled as to their contents. MINIMUM RESOLUTION shall be 300 dpi for small format documents and 600 dpi for large format documents ("large format" is defined as larger than 11" x 17"). Original documents which include color, colored markings, etc., shall be scanned and saved as color documents. Documents may be saved in a non-proprietary ISO compliant self-extracting compressed file format, and no documents shall be password protected. Deliver in standard CD cases or sleeves which are free of any PVC content, also clearly and permanently labeled.

E. As-built Project Manual and Specifications: At completion of project, the Contractor shall submit to Architect complete sets of marked-up Project Record Specifications, in same quantities and formats as required for the As-built Drawings.

1.5 <u>SUBMITTALS</u>:

A. Submit project record documents and as-built drawings within ten (10) days of acceptance of the entire completed project.

END OF SECTION

SECTION 02 30 00

SUBSURFACE INVESTIGATION

PART 1 - GENERAL

1.1 GENERAL

- A. Subsurface investigation was conducted by the Owner.
- B. Requests to review or obtain a copy of the Report should be made to the Owner.
- C. The report is not part of the Contract Documents.
- D. Interpretation:
 - 1. Bidders shall make their own investigation of subsurface conditions, for neither the Owner nor the Architect assumes responsibility for the accuracy or completeness of the information contained in the report, nor will the Owner or the Architect be responsible for the additional compensation for work performed on the basis of Bidders' assumptions based on the report.
 - 2. Note however, that it is expected that Contractors will utilize the Owner's "Report of Subsurface Exploration" much the same as have the Architect and Engineers. However, as indicated, neither the Owner nor the Architect accept any responsibility whatsoever for the information contained in the report, nor for any interpretations others make based on the information contained therein.
 - a. In the event of unforeseen existing conditions encountered during the Work of the project, there are provisions within the Contract Documents to compensate the Contractor for any required and properly authorized additional work.
- E. Refer to other Sections of the Project Manual and the Drawings for additional information and requirements.

PART 2 - PRODUCTS

2.01 Not applicable to this Section.

PART 3 - EXECUTION

3.01 Not applicable to this Section.

END OF SECTION

SECTION 02 4100 SELECTIVE DEMOLITION

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Selective demolition of built site elements.
- B. Selective demolition of building elements for alteration purposes.
- C. Abandonment and removal of existing utilities and utility structures.
- D. Protection of existing work to remain.

1.2 RELATED REQUIREMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
- B. Section 01 5000 TEMPORARY FACILITIES and CONTROLS: Site fences, security, protective barriers, and waste removal.
- C. Section 01 6000 PRODUCT REQUIREMENTS: Handling and storage of items removed for salvage and relocation.
- D. Section 01 7000 EXECUTION and CLOSEOUT REQUIREMENTS: Project conditions; protection of bench marks, survey control points, and existing construction to remain; reinstallation of removed products; temporary bracing and shoring.
- E. Section 02 4520 Asbestos and Lead Paint Abatement.

13 REFERENCE STANDARDS

- A. 29 CFR 1926 Safety and Health Regulations for Construction Current Edition.
- B. NFPA 241 Standard for Safeguarding Construction, Alteration, and Demolition Operations 2019.

1.4 SUBMITTALS

- A. See Section 01 3000 ADMINISTRATIVE REQUIREMENTS, for submittal procedures.
- B. Site Plan: Showing:

- 1. Vegetation to be protected.
- 2. Areas for temporary construction and field offices.
- 3. Areas for temporary and permanent placement of removed materials.
- C. Demolition Plan: Submit demolition plan as specified by OSHA and local authorities.
 - 1. Indicate extent of demolition, removal sequence, bracing and shoring, and location and construction of barricades and fences.
 - 2. Identify demolition firm and submit qualifications.

15 QUALITY ASSURANCE

- A. Demolition Firm Qualifications:
 - 1. Company specializing in the type of work required.
 - 2. Minimum of 3 years of documented experience.
 - 3. Engage an experienced firm that has successfully completed at least five verifiable demolition projects similar to that indicated for this Project.
- B. Regulatory Requirements: Comply with governing EPA notification regulations before starting demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.
 - 1. Where required by local Health Department or other authorities having jurisdiction, provide certificate of pest and rodent eradication and subsequent inspection completed prior to and after building demolition.
- C. Predemolition Conference: Demolition will be reviewed at required Preconstruction Conference for the Project.
 - 1. In addition, conduct predemolition conferences at Project site with Owner's representatives, to provide final notice to and coordination with Owner's representatives and on-site personnel.
- D. Notices: Contractor shall provide all notices required by Code, applicable regulations, ordinances and/or local and other authorities having jurisdiction.
 - 1. All notices shall be in writing, with copies provided to the Owner and Architect.

PART 2 EXECUTION

3.1 SCOPE

- A. Extent of demolition is indicated on Demolition Plans.
- B. Remove items indicated.
- C. Salvage, relocate, or recycle as directed and as applicable.

32 GENERAL PROCEDURES AND PROJECT CONDITIONS

- A. Comply with applicable codes and regulations for demolition operations and safety of adjacent structures and the public.
 - 1. Obtain required permits.
 - 2. Comply with applicable requirements of NFPA 241.
 - 3. Use of explosives is not permitted.
 - 4. Take precautions to prevent catastrophic or uncontrolled collapse of structures to be removed; do not allow worker or public access within range of potential collapse of unstable structures.
 - 5. Provide, erect, and maintain temporary barriers and security devices.
 - 6. Use physical barriers to prevent access to areas that could be hazardous to workers or the public.
 - 7. Conduct operations to minimize effects on and interference with adjacent structures and occupants.
 - 8. Do not close or obstruct roadways or sidewalks without permit.
 - 9. Conduct operations to minimize obstruction of public and private entrances and exits; do not obstruct required exits at any time; protect persons using entrances and exits from removal operations.
 - 10. Obtain written permission from owners of adjacent properties when demolition equipment will traverse, infringe upon or limit access to their property.

- B. Do not begin removal until receipt of Notification To Proceed from Owner.
- C. Do not begin removal until built elements to be salvaged or relocated have been removed.
- D. Do not begin removal until vegetation to be relocated has been removed and specified measures have been taken to protect vegetation to remain.
- E. Protect existing structures and other elements that are not to be removed.
 - 1. Provide bracing and shoring.
 - 2. Prevent movement or settlement of adjacent structures.
 - 3. Stop work immediately if adjacent structures appear to be indanger.
- F. Minimize production of dust due to demolition operations; do not use water if that will result in ice, flooding, sedimentation of public waterways or storm sewers, or other pollution.
- G. If hazardous materials are encountered during demolition or removal operations, comply with applicable regulations, laws, and ordinances concerning removal, handling, and protection against exposure or environmental pollution.
- H. If hazardous materials are discovered during demolition or removal operations, stop work and notify Architect and Owner; hazardous materials include regulated asbestos-containing materials, lead, PCB's, and mercury.
 - 1. Removal of asbestos shall be subject to state and local regulatory requirements.
- I. Perform demolition in a manner that maximizes salvage and recycling of materials.
 - 1. Dismantle existing construction and separate materials.
 - 2. Set aside reusable, recyclable, and salvageable materials; store and deliver to collection point or point of reuse.

33 EXISTING UTILITIES

- A. Protect existing utilities to remain from damage.
- B. Do not disrupt public utilities without permit from authority having jurisdiction.
- C. Do not close, shut off, or disrupt existing life safety systems that are in use without at least 7 days prior written notification to Owner.
- D. Do not close, shut off, or disrupt existing utility branches or take-offs that are in use without at least 3 days prior written notification to Owner.

E. Remove exposed piping, valves, meters, equipment, supports, and foundations of disconnected and abandoned utilities.

3.4 SELECTIVE DEMOLITION FOR ALTERATIONS

- A. Drawings showing existing construction and utilities are based on casual field observation and existing record documents only.
 - 1. Report discrepancies to Architect or Engineer before disturbing existing installation.
 - 2. Beginning of demolition work constitutes acceptance of existing conditions that would be apparent upon examination prior to starting demolition.
- B. Maintain weatherproof exterior building enclosure except for interruptions required for replacement or modifications; take care to prevent water and humidity damage.
- C. Remove existing work as indicated and as required to accomplish newwork.
 - 1. Remove items indicated on drawings.
- D. Services (Including but not limited to HVAC, Plumbing, Fire Protection, Electrical, and Telecommunications): Remove existing systems and equipment as indicated.
 - 1. Maintain existing active systems that are to remain in operation; maintain access to equipment and operational components.
 - 2. Where existing active systems serve occupied facilities but are to be replaced with new services, maintain existing systems in service until new systems are complete and ready for service.
 - 3. Verify that abandoned services serve only abandoned facilities before removal.
- E. Protect existing work to remain.
 - 1. Prevent movement of structure; provide shoring and bracing if necessary.
 - 2. Perform cutting to accomplish removals neatly and as specified for cutting new work.
 - 3. Repair adjacent construction and finishes damaged during removal work.
 - 4. Patch as specified for patching new work.

3.5 DEBRIS AND WASTE REMOVAL

- A. Remove debris, junk, and trash and legally dispose of off-site.
- B. Remove from site all materials not to be reused on site; comply with requirements of Section 01 7419 Construction Waste Management and Disposal..
- C. Leave site in clean condition, ready for subsequent work.
- D. Clean up spillage and wind-blown debris from public and private lands.

END OF SECTION 02 4100



05/6/22

FOR SPECIFICATION SECTIONS 01 4100, 03 300, 05 1200 AND 05 3100

SECTION 03 3000

CONCRETE

PART 1 - GENERAL

1.1 <u>SUMMARY</u>:

- A. Section Includes:
 - 1. Formwork.
 - 2. Reinforcing.
 - 3. Cast-in place concrete including mix design, placement procedures, and finishes.
- B. Cast-in-place concrete includes the following:
 - 1. Foundations and footings.
 - 2. Slabs-on-grade.
 - 3. Slabs on steel deck.
 - 4. Equipment pads and bases.
- C. Related Documents: Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
- D. Related Sections: The following Sections contain requirements that relate to this Section:
 - 1. Section 022000, "Earthwork": Drainage fill under slabs on grade.
 - 2. Section 025140, "Portland Cement Concrete Paving": Concrete paving and walks.
 - 3. Section 042000, "Unit Masonry": Concrete fill for masonry lintels.
 - 4. Section 055000, "Metal Fabrications": Metal items to be built into concrete.
 - 5. Section 079000, "Sealants and Joint Fillers": Sealants and joint fillers in concrete work.
 - 6. Section 096206, "Resilient Athletic Flooring"
 - 7. Respective Sections of Division 15 and 16, as applicable, for furnishing of inserts, anchorage and erection items required for mechanical and electrical work..
 - 8. Divisions 15 and 16, as applicable, for furnishing and setting of conduit, pipes and sleeves for mechanical and electrical equipment.

1.2 <u>SUBMITTALS</u>:

- A. General: Submit the following according to Conditions of the Contract and Division 1 Specification Sections.
- B. Product data for proprietary materials and items, including reinforcement and forming accessories, admixtures, patching compounds, waterstops, joint systems, curing compounds, dry-shake finish materials, and others if requested by Architect.
- C. Shop drawings for reinforcement detailing fabricating, bending, and placing concrete reinforcement. Comply with ACI 315 "Manual of Standard Practice for Detailing Reinforced Concrete Structures" showing bar schedules, stirrup spacing, bent bar diagrams, and arrangement of concrete reinforcement. Include special reinforcing required for openings through concrete structures.

- D. Samples of materials as requested by Architect, including names, sources, and descriptions, as follows:
 - 1. Color finishes.
 - 2. Normal weight aggregates.
 - 3. Reglets.
 - 4. Waterstops.
 - 5. Vapor retarder/barrier.
- E. Laboratory test reports for concrete materials and mix design test.
- F. Minutes of pre-installation conference.

1.3 **QUALITY ASSURANCE**:

- A. Codes and Standards: Comply with provisions of the following codes, specifications, and standards, except where more stringent requirements are shown or specified:
 - 1. ACI 301, "Specifications for Structural Concrete for Buildings".
 - 2. ACI 302, "Guide for Concrete Floor and Slab Construction".
 - 3. ACI 304, "Recommended Practice for Measuring, Mixing, Transporting and Placing Concrete".
 - 4. ACI 305, "Hot Weather Concreting".
 - 5. ACI 306, "Cold Weather Concreting".
 - 6. ACI 309, "Guide for Consolidation of Concrete".
 - 7. ACI 311, "Recommended Practice for Concrete Inspection".
 - 8. ACI 318, "Building Code Requirements for Reinforced Concrete".
 - 9. ACI 347, "Recommended Practice for Concrete Formwork".
 - 10. Concrete Reinforcing Steel Institute (CRSI), "Manual of Standard Practice."
 - 11. American Welding Society, AWS D1.4 "Structural Welding Code Reinforcing Steel".
- B. Concrete Testing Service: Engage a testing agency acceptable to Architect to perform material evaluation tests and to design concrete mixes.
- C. Materials and installed work may require testing and retesting at any time during progress of Work. Tests, including retesting of rejected materials for installed Work, shall be done at Contractor's expense.
- D. Preinstallation Conference: Conduct conference at Project site to comply with requirements of Division 1 Section "Project Meetings" and the following:
 - 1. At least 35 days prior to submitting design mixes, conduct a meeting to review detailed requirements for preparing concrete design mixes and to determine procedures for satisfactory concrete operations. Review requirements for submittals, status of coordinating work, and availability of materials. Establish preliminary work progress schedule and procedures for materials inspection, testing, and certifications. Require representatives of each entity directly concerned with cast-in-place concrete to attend conference, including, but not limited to, the following:
 - a. Contractor's superintendent.

- b. Agency responsible for concrete design mixes.
- c. Agency responsible for field quality control.
- d. Ready-mix concrete producer.
- e. Concrete subcontractor.
- f. Primary admixture manufacturers.

PART 2 - PRODUCTS

2.1 FORM MATERIALS:

- A. Forms for Exposed Finish Concrete: Plywood, metal, metal-framed plywood faced, or other acceptable panel-type materials to provide continuous, straight, smooth, exposed surfaces. Furnish in largest practicable sizes to minimize number of joints and to conform to joint system shown on drawings.
 - 1. Use overlaid plywood complying with U.S. Product Standard PS-1 "A-C or B-B High Density Overlaid Concrete Form," Class I.
 - 2. Use plywood complying with U.S. Product Standard PS-1 "B-B (Concrete Form) Plywood," Class I, Exterior Grade or better, mill-oiled and edge-sealed, with each piece bearing legible inspection trademark.
- B. Forms for Unexposed Finish Concrete: Plywood, lumber, metal, or another acceptable material. Provide lumber dressed on at least two edges and one side for tight fit.
- C. Form Release Agent: Provide commercial formulation form release agent with a maximum of 350 g/L volatile organic compounds (VOCs) that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces.
- D. Form Ties: Factory-fabricated, adjustable-length, removable or snap-off metal form ties designed to prevent form deflection and to prevent spalling of concrete upon removal. Provide units that will leave no metal closer than 1-1/2 inches to the plane of the exposed concrete surface.
- E. Provide ties that, when removed, will leave holes not larger than 1 inch in diameter in the concrete surface.

2.2 <u>REINFORCING MATERIALS</u>:

- A. <u>Reinforcing Bars</u>: ASTM A 615, Grade 60, deformed.
- B. <u>Steel Wire</u>: ASTM A 82, plain, cold-drawn steel.
- C. <u>Welded Wire Fabric</u>: ASTM A 185, welded steel wire fabric.
- D. <u>Deformed-Steel Welded Wire Fabric</u>: ASTM A 497.
- E. <u>Supports for Reinforcement</u>: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire fabric in place. Use wire bar-type supports complying with CRSI specifications.

- 1. <u>For slabs-on-grade</u>, use supports with sand plates or horizontal runners where base material will not support chair legs.
- 2. <u>For exposed-to-view concrete</u> surfaces where legs of supports are in contact with forms, provide supports with legs that are protected by plastic (CRSI, Class 1) or stainless steel (CRSI, Class 2).
- F. <u>Threaded Dowels</u>: Continuous threaded high-strength steel bars equal to "Lasstud" by Richmond Screw Anchor Co., Inc. Provide inserts compatible with dowels, designed for ultimate pull-out force indicated on the drawings.
- G. <u>Mechanical Splices</u>: Equal to "Cadweld Rebar Splices", as manufactured by Erico Products, Inc., "C" Series, for developing 125% of minimum ASTM specified yield strengths, unless otherwise noted on drawings.
- H. <u>Steel Shapes, Plates and Rods</u>: Conform to ASTM A 36, "Specification for Structural Steel".
- I. <u>Do Not Weld Reinforcing Steel</u>: Unless specifically noted on drawings. If welding is shown, conform to latest revision of AWS D12.1, "Reinforcing Steel Welding Code of the American Welding Society". Perform all welding with certified welders qualified per AWS.

2.3 <u>CONCRETE MATERIALS</u>:

- A. Portland Cement: ASTM C 150, Type I.
 - 1. Use one brand of cement throughout Project unless otherwise acceptable to Architect.
- B. Fly Ash: ASTM C 618, Type F or C.
 - 1. Limit use of fly ash to not exceed 20 percent of cement content by weight.
- C. Normal-Weight Aggregates: ASTM C 33 and as specified. Provide aggregates from a single source for exposed concrete.
 - 1. For exposed exterior surfaces, do not use fine or coarse aggregates that contain substances that cause spalling.
 - 2. Local aggregates not complying with ASTM C 33 that have been shown to produce concrete of adequate strength and durability by special tests or actual service may be used when acceptable to Architect.
- D. Water: Potable.
- E. Admixtures, General: Provide concrete admixtures that contain not more than 0.1 percent chloride ions.
- F. Air-Entraining Admixture: ASTM C 260, certified by manufacturer to be compatible with other required admixtures.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Air-Tite, Cormix Construction Chemicals.
 - b. Air-Mix or Perma-Air, Euclid Chemical Co.
 - c. Darex AEA or Daravair, W.R. Grace & Co.

- d. MB-VR or Micro-Air, Master Builders, Inc.
- e. Sealtight AEA, W.R. Meadows, Inc.
- f. Sika AER, Sika Corp.
- G. Water-Reducing Admixture: ASTM C 494, Type A.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. PSI N, Cormix Construction Chemicals.
 - b. Eucon WR-75, Euclid Chemical Co.
 - c. WRDA, W.R. Grace & Co.
 - d. Pozzolith Normal or Polyheed, Master Builders, Inc.
 - e. Plastocrete 161, Sika Corp.
- H. High-Range Water-Reducing Admixture: ASTM C 494, Type F or Type G.
 - 1. Products: Subject to compliance with requirements, provide one of the following: a. Eucon 37, Euclid Chemical Co.
 - b. WRDA 19 or Daracem, W.R. Grace & Co.
 - c. Rheobuild or Polyheed, Master Builders, Inc.
 - d. Sikament 300, Sika Corp.
- I. Water-Reducing, Accelerating Admixture: ASTM C 494, Type E.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Accelguard 80, Euclid Chemical Co.
 - b. Daraset, W.R. Grace & Co.
 - c. Pozzutec 20, Master Builders, Inc.
- J. Water-Reducing, Retarding Admixture: ASTM C 494, Type D.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Eucon Retarder 75, Euclid Chemical Co.
 - b. Daratard-17, W.R. Grace & Co.
 - c. Pozzolith R, Master Builders, Inc.
 - d. Protard, Prokrete Industries.
 - e. Plastiment, Sika Corporation.

2.4 <u>RELATED MATERIALS</u>:

- A. Reglets: Where sheet flashing or bituminous membranes are terminated in reglets, provide reglets of not less than 0.0217-inch-thick (26-gage) galvanized sheet steel. Fill reglet or cover face opening to prevent intrusion of concrete or debris.
- B. Vapor Barrier:
 - 1. Vapor Barrier, General Use (except as indicated below):
 - a. Product: Plastic vapor barrier. Include manufacturer's recommended adhesive or pressure-sensitive tape for sealing joints, laps and penetrations, preformed boots for penetrations, and all other components required for a complete, proper and vaporproof installation in accordance with ASTM E1643.

- 1) Classification: Must exceed ASTM E 1745 Class "A".
- 2) Permeance: ASTM E96: 0.02 perms or less.
- 3) Thickness: Not less than 15 mils.
- b. Manufacturer/Product:
 - 1) "Moistop Ultra 15 mil", Fortifiber Building Systems Group.
 - 2) "Perminator 15 mil", W.R. Meadows
 - 3) "Griffolyn Type-105", Reef Industries, Inc.
 - 4) "Stego Wrap 15 mil", Stego Industries, LLC.
 - 5) "VaporBlock VB15", Raven Inc.
 - 6) "Husky Yellow Guard 15 mil", Poly-America, L.P.
- c. "Locations for Use: Continuous below all new and opened building slabs, and other structural slabs, porches, stoops, pads, covered (below roofs) areas, etc., on grade, and turned-down to tops of footings.
- 2. Vapor Barrier, **Below Wood Flooring**: <u>Provide below and 5'-0" beyond all wood</u> <u>flooring</u>: Premolded seven-ply membrane consisting of reinforced core and carrier sheet with fortified bitumen layers, protective weathercoating, and plastic anti-stick sheet. Provide manufacturer's recommended mastics and gusset tape.
 - a. Product/Manufacturer: Subject to compliance with requirements, provide "Premoulded Membrane Vapor Seal with Plasmatic Core," as manufactured by W.R. Meadows, Inc.; Austell, GA.
 - b. Locations for Use: Continuous below and 5'-0" beyond all wood flooring.
- C. Nonslip Aggregate Finish: Provide fused aluminum oxide granules or crushed emery as the abrasive aggregate for a nonslip finish, with emery aggregate containing not less than 50 percent aluminum oxide and not less than 25 percent ferric oxide. Use material that is factory-graded, packaged, rustproof, nonglazing, and unaffected by freezing, moisture, and cleaning materials.
- D. Colored Wear-Resistant Finish: Packaged dry combination of materials consisting of portland cement, graded quartz aggregate, coloring pigments, and plasticizing admixture. Use coloring pigments that are finely ground nonfading mineral oxides interground with cement. Color as selected by Architect from manufacturers' standards, unless otherwise indicated.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Quartz Tuff, Dayton-Superior.
 - b. Surflex, Euclid Chemical Co.
 - c. Colorundum, A.C. Horn, Inc.
 - d. Quartz Plate, L&M Construction Chemicals, Inc.
 - e. Colorcron, Master Builders, Inc.
 - f. Lithochrome Color Hardener, L.M. Scofield Co.
 - g. Harcol Redi-Mix, Sonneborn-Chemrex.
 - h. Hard Top, Symons Corp.
- E. Absorptive Cover: Burlap cloth made from jute or kenaf, weighing approximately 9 oz. per sq. yd., complying with AASHTO M 182, Class 2.
- F. Moisture-Retaining Cover: One of the following, complying with ASTM C 171.

- 1. Waterproof paper.
- 2. Polyethylene film.
- 3. Polyethylene-coated burlap.
- G. Liquid Membrane-Forming Curing Compound: Liquid-type membrane-forming curing compound complying with ASTM C 309, Type I, Class A. Moisture loss not more than 0.55 kg/sq. meter when applied at 200 sq. ft./gal.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Spartan-Cote, The Burke Co.
 - b. Day-Chem Cure and Seal, Dayton Superior Corp.
 - c. Eucocure, Euclid Chemical Co.
 - d. Horn Clear Seal, A.C. Horn, Inc.
 - e. L&M Cure R, L&M Construction Chemicals, Inc.
 - f. Masterkure, Master Builders, Inc.
 - g. CS-309, W.R. Meadows, Inc.
 - h. Kure-N-Seal, Sonneborn-Chemrex.
- H. Water-Based Acrylic Membrane Curing Compound: ASTM C 309, Type I, Class B.
 - 1. Provide material that has a maximum volatile organic compound (VOC) rating of 350 g/L.
 - 2. Products: Subject to compliance with requirements, provide one of the following:
 - a. Sealco VOC, Cormix Construction Chemicals.
 - b. Safe Cure and Seal, Dayton Superior Corp.
 - c. Aqua-Cure, Euclid Chemical Co.
 - d. Dress & Seal WB, L&M Construction Chemicals, Inc.
 - e. Masterkure 100W, Master Builders, Inc.
 - f. Vocomp-20, W.R. Meadows, Inc.
- I. V.O.C. Compliant Acrylic Curing and Sealing Type (30 Percent): Liquid type membraneforming curing compound complying with ASTM C 309, Type 1, Class A and B. Provide 30 percent solids minimum, for surfaces indicated to be sealed.
- J. Safe Cure and Seal: 30 percent (J-19), Dayton Superior Inc.
- K. Evaporation Control:
 - 1. Monomolecular film-forming compound applied to exposed concrete slab surfaces for temporary protection from rapid moisture loss.
 - a. Products: Subject to compliance with requirements, provide one of the following:
 - 1. Eucobar, Euclid Chemical Co.
 - 2. E-Con, L&M Construction Chemicals, Inc.
 - 3. Confilm, Master Builders, Inc.
- L. V.O.C. Compliant Evaporation Control: Sure Film (J-74), Dayton Superior Inc.
- M. Underlayment Compound: Free-flowing, self-leveling, pumpable, cement-based compound for applications from 1 inch thick to feathered edges.

- 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. K-15, Ardex, Inc.
 - b. LevelLayer II, Dayton Superior Corp.
 - c. Flo-Top, Euclid Chemical Co.
 - d. Gyp-Crete, Gyp-Crete Corp.
 - e. Levelex, L&M Construction Chemicals, Inc.
 - f. Underlayment 110, Master Builders, Inc.
 - g. Thoro Underlayment Self-Leveling, Thoro System Products.
- N. Bonding Agent: Polyvinyl acetate or acrylic base.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Polyvinyl Acetate (Interior Only):
 - 1. Superior Concrete Bonder, Dayton Superior Corp.
 - 2. Euco Weld, Euclid Chemical Co.
 - 3. Weld-Crete, Larsen Products Corp.
 - 4. Everweld, L&M Construction Chemicals, Inc.
 - 5. Ready Bond, Symons Corp.
 - b. Acrylic or Styrene Butadiene:
 - 1. Acrylic Bondcrete, The Burke Co.
 - 2. Day-Chem Ad Bond, Dayton Superior Corp.
 - 3. SBR Latex, Euclid Chemical Co.
 - 4. Daraweld C, W.R. Grace & Co.
 - 5. Hornweld, A.C. Horn, Inc.
 - 6. Everbond, L&M Construction Chemicals, Inc.
 - 7. Acryl-Set, Master Builders Inc.
 - 8. Intralok, W.R. Meadows, Inc.
 - 9. Sonocrete, Sonneborn-Chemrex.
- O. Epoxy Adhesive: ASTM C 881, two-component material suitable for use on dry or damp surfaces. Provide material type, grade, and class to suit Project requirements.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Resi-Bond (J-58), Dayton Superior.
 - b. Euco Epoxy System #452 or #620, Euclid Chemical Co.
 - c. Epoxtite Binder 2390, A.C. Horn, Inc.
 - d. Epabond, L&M Construction Chemicals, Inc.
 - e. Concresive Standard Liquid, Master Builders, Inc.
 - f. Rezi-Weld 1000, W.R. Meadows, Inc.
 - g. Sikadur 32 Hi-Mod, Sika Corp.
- P. Interior Epoxy Sealer: Use a maximum 35 percent type.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Epoxy-Plus; Dayton Superior Inc.
 - b. Eucopoxy 1; Euclid Chemical
 - c. Oauerseal 30E; Non-Crete, Inc.
 - d. Rescon R117; Symons Corp.

- e. Son-No-Mar; Sonneborn, Div./Chem Rex Inc.
- f. Super Seal 35; L & M Const. Chem. Co.
- Q. V.O.C. Compliant Urethane Sealer:
 - 1. Day Chem Urethane V.O.C. (J-39); Dayton Superior Inc.

2.5 **PROPORTIONING AND DESIGNING MIXES:**

- A. Prepare design mixes for each type and strength of concrete by either laboratory trial mixtures or field experience methods as specified in ACI 318-14 Section 5.3. If trial mixtures method used, use an independent testing facility acceptable to Architect for preparing and reporting proposed mix designs. The testing facility shall not be the same as used for field quality control testing, unless otherwise acceptable to Architect.
- B. Trial mix designs and strength tests, made by qualified independent material laboratory, in accordance with ACI 318-14 Section 5.3 are required for the following types of concrete:
 - 1. Normal weight concrete with specified strength in excess of 4000 psi.
 - 2. All concrete designs for which a suitable experience record is not available.
- C. Mix design based on a record of past performance in accordance with ACI 318-14 Section 5.3, may be provided by qualified concrete supplier or precast concrete manufacturer for concrete designs. Mix design shall be certified by an independent testing laboratory.
- D. All concrete mix designs shall include the following information:
 - 1. Proportions of cement, fine and coarse aggregate and water.
 - 2. Water/cement ratio, design strength, slump and air content.
 - 3. Type of cement and aggregates.
 - 4. Type and dosage of all admixtures.
 - 5. Type, color and dosage of integral coloring compounds, where applicable.
 - 6. Special requirements for pumping.
 - 7. Any special characteristics of the mix which require precautions in the mixing, placing or finishing techniques to achieve the finished product specified.
- E. Submit written reports to Architect of each proposed mix for each class of concrete at least 15 days prior to start of Work. Do not begin concrete production until proposed mix designs have been reviewed by Architect.
- F. Concrete for exposed slab on grade and slab on deck shall be a mix with 50% slag and 50% gray cement. Samples shall be submitted to Architect for review with concrete mix design submittal.
- G. Water-Cement Ratio: Provide concrete for following conditions with maximum water-cement (W/C) ratios as follows:
 - 1. Subjected to freezing and thawing: W/C 0.45.
 - 2. Subjected to deicers/watertight: W/C 0.40.
 - 3. Subjected to brackish water, salt spray, or deicers: W/C 0.40.

- H. Slump Limits: Proportion and design mixes to result in concrete slump at point of placement as follows:
 - 1. Ramps and sloping surfaces: Not more than 3 inches.
 - 2. Reinforced foundation systems: Not less than 1 inch and not more than 3 inches.
 - 3. Concrete containing high-range water-reducing admixture (superplasticizer): Not more than 8 inches after adding admixture to site-verified 2-to-3-inch slump concrete.
 - 4. Other concrete: Not less than 3 inches and not more than 5 inches.

2.6 <u>ADMIXTURES</u>:

- A. Use water-reducing admixture or high-range water-reducing admixture (superplasticizer) in concrete, as required, for placement and workability.
- B. Use accelerating admixture in concrete slabs placed at ambient temperatures below 50 deg.F (10 deg.C).
- C. Use high-range water-reducing admixture in pumped concrete, concrete for heavy-use industrial slabs, architectural concrete, parking structure slabs, concrete required to be watertight, and concrete with water-cement ratios below 0.50.
- D. Use air-entraining admixture in exterior exposed concrete unless otherwise indicated. Add airentraining admixture at manufacturer's prescribed rate to result in concrete at point of placement having total air content with a tolerance of plus or minus 1-1/2 percent within the following limits:
 - 1. Concrete structures and slabs exposed to freezing and thawing, deicer chemicals, or hydraulic pressure:
 - a. 4.5 percent (moderate exposure); 5.5 percent (severe exposure) for 1-1/2-inch maximum aggregate.
 - b. 4.5 percent (moderate exposure); 6.0 percent (severe exposure) for 1-inch maximum aggregate.
 - c. 5.0 percent (moderate exposure); 6.0 percent (severe exposure) for 3/4-inch maximum aggregate.
 - d. 5.5 percent (moderate exposure); 7.0 percent (severe exposure) for 1/2-inch maximum aggregate.
 - 2. Other concrete not exposed to freezing, thawing, or hydraulic pressure, or to receive a surface hardener: 2 to 4 percent air.
- E. Use admixtures for water reduction and set accelerating or retarding in strict compliance with manufacturer's directions.

2.7 <u>CONCRETE MIXING</u>

- A. Ready-Mixed Concrete: Comply with requirements of ASTM C 94, and as specified.
 - 1. When air temperature is between 85 deg.F (30 deg.C) and 90 deg.F (32 deg.C), reduce mixing and delivery time from 1-1/2 hours to 75 minutes, and when air temperature is above 90 deg.F (32 deg.C), reduce mixing and delivery time to 60 minutes.

PART 3 - EXECUTION

3.1 <u>GENERAL</u>:

A. Coordinate the installation of joint materials, vapor retarder/barrier, and other related materials with placement of forms and reinforcing steel.

3.2 <u>FORMS</u>:

- A. General: Design, erect, support, brace, and maintain formwork to support vertical, lateral, static, and dynamic loads that might be applied until concrete structure can support such loads. Construct formwork so concrete members and structures are of correct size, shape, alignment, elevation, and position. Maintain formwork construction tolerances and surface irregularities complying with the following ACI 347 limits:
 - 1. Provide Class A tolerances for concrete surfaces exposed to view.
 - 2. Provide Class C tolerances for other concrete surfaces.
- B. Construct forms to sizes, shapes, lines, and dimensions shown and to obtain accurate alignment, location, grades, level, and plumb work in finished structures. Provide for openings, offsets, sinkages, keyways, recesses, moldings, rustications, reglets, chamfers, blocking, screeds, bulkheads, anchorages and inserts, and other features required in the Work. Use selected materials to obtain required finishes. Solidly butt joints and provide backup at joints to prevent cement paste from leaking.
- C. Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush plates or wrecking plates where stripping may damage cast concrete surfaces. Provide top forms for inclined surfaces where slope is too steep to place concrete with bottom forms only. Kerf wood inserts for forming keyways, reglets, recesses, and the like for easy removal.
- D. Provide temporary openings for clean-outs and inspections where interior area of formwork is inaccessible before and during concrete placement. Securely brace temporary openings and set tightly to forms to prevent losing concrete mortar. Locate temporary openings in forms at inconspicuous locations.
- E. Chamfer exposed corners and edges as indicated, using wood, metal, PVC, or rubber chamfer strips fabricated to produce uniform smooth lines and tight edge joints.
- F. Provisions for Other Trades: Provide openings in concrete formwork to accommodate work of other trades. Determine size and location of openings, recesses, and chases from trades providing such items. Accurately place and securely support items built into forms.
- G. Cleaning and Tightening: Thoroughly clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, or other debris just before placing concrete. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.

3.3 <u>VAPOR RETARDER/BARRIER INSTALLATION:</u>

- A. General: Place vapor retarder/barrier sheeting in position with longest dimension parallel with direction of pour.
- B. Lap vapor barrier over footings and/or seal to foundation walls.
- C. Lap joints 6 inches and seal with manufacturer's recommended mastic or pressure-sensitive tape.
- D. Seal all penetrations (including pipes) per manufacturer's instructions.
- E. No penetration of the vapor barrier is allowed except for reinforcing steel and permanent utilities.
- F. Repair damaged areas by cutting patches of vapor barrier, overlapping damaged area 6 inches and taping all sides with tape.

3.4 PLACING REINFORCEMENT:

- A. General: Comply with Concrete Reinforcing Steel Institute's recommended practice for "Placing Reinforcing Bars," for details and methods of reinforcement placement and supports and as specified.
 - 1. Avoiding cutting or puncturing vapor retarder/barrier during reinforcement placement and concreting operations. Repair damages before placing concrete.
- B. Clean reinforcement of loose rust and mill scale, earth, ice, and other materials that reduce or destroy bond with concrete.
- C. Accurately position, support, and secure reinforcement against displacement. Locate and support reinforcing by metal chairs, runners, bolsters, spacers, and hangers, as approved by Architect.
- D. Place reinforcement to maintain minimum coverages as indicated for concrete protection. Arrange, space, and securely tie bars and bar supports to hold reinforcement in position during concrete placement operations. Set wire ties so ends are directed into concrete, not toward exposed concrete surfaces.
- E. Install welded wire fabric in lengths as long as practicable. Lap adjoining pieces at least one full mesh and lace splices with wire. Offset laps of adjoining widths to prevent continuous laps in either direction.

3.5 <u>JOINTS</u>:

- A. Construction Joints: Locate and install construction joints so they do not impair strength or appearance of the structure, as acceptable to Architect.
- B. Provide keyways at least 1-1/2 inches deep in construction joints in walls and slabs and between walls and footings. Bulkheads designed and accepted for this purpose may be used for slabs.
- C. Place construction joints perpendicular to main reinforcement. Continue reinforcement across construction joints except as indicated otherwise. Do not continue reinforcement through sides of strip placements.

- D. Use bonding agent on existing concrete surfaces that will be joined with fresh concrete.
- E. Isolation Joints in Slabs-on-Grade: Construct isolation joints in slabs-on-grade at points of contact between slabs-on-grade and vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.
 - 1. Joint fillers and sealants are specified in Section 07900, "Sealants and Joint Fillers".
- F. Contraction (Control) Joints in Slabs-on-Grade: Construct contraction joints in slabs-on-grade to form panels of patterns as shown. Use saw cuts 1/8 inch wide by one-fourth of slab depth or inserts 1/4 inch wide by one-fourth of slab depth, unless otherwise indicated.
 - 1. Form contraction joints by inserting premolded plastic, hardboard, or fiberboard strip into fresh concrete until top surface of strip is flush with slab surface. Tool slab edges round on each side of insert. After concrete has cured, remove inserts and clean groove of loose debris.
 - 2. Contraction joints in unexposed floor slabs may be formed by saw cuts as soon as possible after slab finishing as may be safely done without dislodging aggregate.
 - 3. If joint pattern is not shown, provide joints not exceeding 15 feet in either direction and located to conform to bay spacing wherever possible (at column centerlines, half bays, third bays).
 - 4. Joint fillers and sealants are specified in Division 7 Section "Joint Sealants."

3.6 <u>INSTALLING EMBEDDED ITEMS</u>:

- A. General: Set and build into formwork anchorage devices and other embedded items required for other work that is attached to or supported by cast-in-place concrete. Use setting drawings, diagrams, instructions, and directions provided by suppliers of items to be attached.
- B. Install reglets to receive top edge of foundation sheet waterproofing and to receive through-wall flashings in outer face of concrete frame at exterior walls, where flashing is shown at lintels, relieving angles, and other conditions.
- C. Install dovetail anchor slots in concrete structures as indicated on drawings.
- D. Forms for Slabs: Set edge forms, bulkheads, and intermediate screed strips for slabs to achieve required elevations and contours in finished surfaces. Provide and secure units to support screed strips using strike-off templates or compacting-type screeds.

3.7 <u>PREPARING FORM SURFACES</u>:

- A. General: Coat contact surfaces of forms with an approved, nonresidual, low-VOC, formcoating compound before placing reinforcement.
- B. Do not allow excess form-coating material to accumulate in forms or come into contact with inplace concrete surfaces against which fresh concrete will be placed. Apply according to manufacturer's instructions.
 - 1. Coat steel forms with a nonstaining, rust-preventative material. Rust-stained steel formwork is not acceptable.

3.8 <u>CONCRETE PLACEMENT</u>:

- A. Inspection: Before placing concrete, inspect and complete formwork installation, reinforcing steel, and items to be embedded or cast in. Notify other trades to permit installation of their work.
- B. General: Comply with ACI 304, "Guide for Measuring, Mixing, Transporting, and Placing Concrete," and as specified.
- C. Deposit concrete continuously or in layers of such thickness that no new concrete will be placed on concrete that has hardened sufficiently to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as specified. Deposit concrete to avoid segregation at its final location.
- D. Placing Concrete in Forms: Deposit concrete in forms in horizontal layers no deeper than 24 inches and in a manner to avoid inclined construction joints. Where placement consists of several layers, place each layer while preceding layer is still plastic to avoid cold joints.
 - 1. Consolidate placed concrete by mechanical vibrating equipment supplemented by handspading, rodding, or tamping. Use equipment and procedures for consolidation of concrete complying with ACI 309.
 - 2. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations no farther than the visible effectiveness of the machine. Place vibrators to rapidly penetrate placed layer and at least 6 inches into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to set. At each insertion, limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing mix to segregate.
- E. Placing Concrete Slabs: Deposit and consolidate concrete slabs in a continuous operation, within limits of construction joints, until completing placement of a panel or section.
 - 1. Consolidate concrete during placement operations so that concrete is thoroughly worked around reinforcement, other embedded items and into corners.
 - 2. Bring slab surfaces to correct level with a straightedge and strike off. Use bull floats or darbies to smooth surface free of humps or hollows. Do not disturb slab surfaces prior to beginning finishing operations.
 - 3. Maintain reinforcing in proper position on chairs during concrete placement.
- F. Cold-Weather Placement: Comply with provisions of ACI 306 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.
- G. When air temperature has fallen to or is expected to fall below 40 deg.F (4 deg.C), uniformly heat water and aggregates before mixing to obtain a concrete mixture temperature of not less than 50 deg.F (10 deg.C) and not more than 80 deg.F (27 deg.C) at point of placement.
 - 1. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.

- 2. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise accepted in mix designs.
- H. Hot-Weather Placement: When hot weather conditions exist that would impair quality and strength of concrete, place concrete complying with ACI 305 and as specified.
 - 1. Cool ingredients before mixing to maintain concrete temperature at time of placement to below 90 deg.F (32 deg.C). Mixing water may be chilled or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
 - 2. Cover reinforcing steel with water-soaked burlap if it becomes too hot, so that steel temperature will not exceed the ambient air temperature immediately before embedding in concrete.
 - 3. Fog spray forms, reinforcing steel, and subgrade just before placing concrete. Keep subgrade moisture uniform without puddles or dry areas.
 - 4. Use water-reducing retarding admixture when required by high temperatures, low humidity, or other adverse placing conditions, as acceptable to Architect.

3.9 <u>FINISHING FORMED SURFACES</u>:

- A. Rough-Formed Finish: Provide a rough-formed finish on formed concrete surfaces not exposed to view in the finished Work or concealed by other construction. This is the concrete surface having texture imparted by form-facing material used, with the holes and defective areas repaired and patched, and fins and other projections exceeding 1/4 inch in height rubbed down or chipped off.
- B. Smooth-Formed Finish: Provide a smooth-formed finish on formed concrete surfaces exposed to view or to be covered with a coating material applied directly to concrete, or a covering material applied directly to concrete, such as waterproofing, dampproofing, veneer plaster, painting, or another similar system. This is an as-cast concrete surface obtained with selected form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Repair and patch defective areas with fins and other projections completely removed and smoothed.
- C. Smooth-Rubbed Finish: Provide smooth-rubbed finish on scheduled concrete surfaces that have received smooth-formed finish treatment not later than 1 day after form removal.
 - 1. Moisten concrete surfaces and rub with carborundum brick or another abrasive until producing a uniform color and texture. Do not apply cement grout other than that created by the rubbing process.
- D. Related Unformed Surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike-off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces unless otherwise indicated.

3.10 MONOLITHIC SLAB FINISHES:

A. Scratch Finish: Apply scratch finish to monolithic slab surfaces to receive concrete floor topping or mortar setting beds for tile, portland cement terrazzo, and other bonded applied cementitious finish flooring material, and where indicated.

- 1. After placing slabs, finish surface to tolerances specified in Section 3.11. Slope surfaces uniformly to drains where required. After leveling, roughen surface before final set with stiff brushes, brooms, or rakes.
- B. Float Finish: Apply float finish to monolithic slab surfaces to receive trowel finish and other finishes as specified; slab surfaces to be covered with membrane or elastic waterproofing, membrane or elastic roofing, or sand-bed terrazzo; and where indicated.
 - 1. After screeding, consolidating, and leveling concrete slabs, do not work surface until ready for floating. Begin floating, using float blades or float shoes only, when surface water has disappeared, or when concrete has stiffened sufficiently to permit operation of power-driven floats, or both. Consolidate surface with power-driven floats or by hand-floating if area is small or inaccessible to power units. Finish surfaces to tolerances specified in Section 3.11. Cut down high spots and fill low spots. Uniformly slope surfaces to drains. Immediately after leveling, refloat surface to a uniform, smooth, granular texture.
- C. Trowel Finish: Apply a trowel finish to monolithic slab surfaces exposed to view and slab surfaces to be covered with resilient flooring, carpet, ceramic or quarry tile, paint, or another thin film-finish coating system.
 - 1. After floating, begin first trowel-finish operation using a power-driven trowel. Begin final troweling when surface produces a ringing sound as trowel is moved over surface. Consolidate concrete surface by final hand-troweling operation, free of trowel marks, uniform in texture and appearance, and finish surfaces to tolerances specified in Section 3.11. Grind smooth any surface defects that would telegraph through applied floor covering system.
- D. Trowel and Fine Broom Finish: Where ceramic or quarry tile is to be installed with thin-set mortar, apply a trowel finish as specified, then immediately follow by slightly scarifying the surface with a fine broom.
- E. Nonslip Broom Finish: Apply a nonslip broom finish to exterior concrete platforms, steps, and ramps, and elsewhere as indicated.
 - 1. Immediately after float finishing, slightly roughen concrete surface by brooming with fiber-bristle broom perpendicular to main traffic route. Coordinate required final finish with Architect before application.
- F. Colored Wear-Resistant Finish: Apply a colored wear-resistant finish to monolithic slab surface indicated.
 - 1. Apply dry shake materials for the colored wear-resistant finish at a rate of 100 lb per 100 sq. ft., unless a greater amount is recommended by material manufacturer.
 - 2. Cast a trial slab approximately 10 feet square to determine actual application rate, color, and finish, as acceptable to Architect.
 - 3. Immediately following the first floating operation, uniformly distribute with mechanical spreader approximately two-thirds of the required weight of the dry shake material over the concrete surface, and embed by power floating. Follow floating operation with second shake application, uniformly distributing remainder of dry shake material with

overlapping applications to ensure uniform color, and embed by power floating.

4. After broadcasting and floating, apply a trowel finish as specified. Cure slab surface with a curing compound recommended by the dry shake material manufacturer. Apply the curing compound immediately after the final finishing.

3.11 <u>FLOOR FLATNESS/LEVELNESS REQUIREMENTS:</u>

A. After placing slabs, finish surface to the following tolerances of F(F) (floor flatness) and F(L) (floor levelness) measured according to ASTM E 1155:

FINISH	SLAB-ON-GRADE			FRAMED FLOOR		
	OVERALL LOCAL			OVERALL LOCAL		
	FF	FL	FF	FL	FF	FF
Scratch Finish	18	15	15	13	25	22
Float Finish	20	17	18	15	25	22
Trowel Finish	25	22	20	17	25	22

Specified overall F-numbers apply to the whole floor, taken as one. Minimum local F-numbers apply to each slab, bounded by construction joints.

3.12 <u>MISCELLANEOUS CONCRETE ITEMS</u>:

- A. Filling In: Fill in holes and openings left in concrete structures for passage of work by other trades, unless otherwise shown or directed, after work of other trades is in place. Mix, place, and cure concrete as specified to blend with in-place construction. Provide other miscellaneous concrete filling shown or required to complete Work.
- B. Curbs: Provide monolithic finish to interior curbs by stripping forms while concrete is still green and by steel-troweling surfaces to a hard, dense finish with corners, intersections, and terminations slightly rounded.
- C. Equipment Bases and Foundations: Provide machine and equipment bases and foundations as shown on drawings. Set anchor bolts for machines and equipment to template at correct elevations, complying with diagrams or templates of manufacturer furnishing machines and equipment.

3.13 <u>CONCRETE CURING AND PROTECTION</u>:

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. In hot, dry, and windy weather protect concrete from rapid moisture loss before and during finishing operations with an evaporation-control material. Apply according to manufacturer's instructions after screeding and bull floating, but before power floating and troweling.
- B. No curing agents or sealers are to be applied to the concrete slab where Resilient Athletic Flooring is scheduled.
- C. Start initial curing as soon as free water has disappeared from concrete surface after placing and finishing. Weather permitting, keep continuously moist for not less than 7 days.
- D. Curing Methods: Cure concrete by curing compound, by moist curing, by moisture-retaining

cover curing, or by combining these methods, as specified.

- 1. Provide moisture curing by the following methods:
 - a. Keep concrete surface continuously wet by covering with water.
 - b. Use continuous water-fog spray.
 - c. Cover concrete surface with specified absorptive cover, thoroughly saturate cover with water, and keep continuously wet. Place absorptive cover to provide coverage of concrete surfaces and edges, with a 4-inch lap over adjacent absorptive covers.
- 2. Provide moisture-retaining cover curing as follows:
 - a. Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width with sides and ends lapped at least 3 inches and sealed by waterproof tape or adhesive. Immediately repair any holes or tears during curing period using cover material and waterproof tape.
- 3. Apply curing compound on exposed interior slabs and on exterior slabs, walks, and curbs as follows:
 - Apply curing compound to concrete slabs as soon as final finishing operations are complete (within 2 hours and after surface water sheen has disappeared). Apply uniformly in continuous operation by power spray or roller according to manufacturer's directions. Recoat areas subjected to heavy rainfall within 3 hours after initial application. Maintain continuity of coating and repair damage during curing period.
 - b. Use membrane curing compounds that will not affect surfaces to be covered with finish materials applied directly to concrete.
- E. Curing Formed Surfaces: Cure formed concrete surfaces, including underside of beams, supported slabs, and other similar surfaces, by moist curing with forms in place for the full curing period or until forms are removed. If forms are removed, continue curing by methods specified above, as applicable.
- F. Curing Unformed Surfaces: Cure unformed surfaces, including slabs, floor topping, and other flat surfaces, by applying the appropriate curing method.
 - 1. Final cure concrete surfaces to receive finish flooring with a moisture-retaining cover, unless otherwise directed.

3.14 <u>REMOVING FORMS</u>:

- A. General: Formwork not supporting weight of concrete, such as sides of beams, walls, columns, and similar parts of the work, may be removed after cumulatively curing at not less than 50 deg.F (10 deg.C) for 24 hours after placing concrete, provided concrete is sufficiently hard to not be damaged by form-removal operations, and provided curing and protection operations are maintained.
- B. Formwork supporting weight of concrete, such as beam soffits, joists, slabs, and other structural elements, may not be removed in less than 14 days or until concrete has attained at least 75 percent of design minimum compressive strength at 28 days. Determine potential compressive strength of in-place concrete by testing field-cured specimens representative of concrete location or members.

C. Form-facing material may be removed 4 days after placement only if shores and other vertical supports have been arranged to permit removal of form-facing material without loosening or disturbing shores and supports.

3.15 <u>REUSING FORMS</u>:

- A. Clean and repair surfaces of forms to be reused in the Work. Split, frayed, delaminated, or otherwise damaged form-facing material will not be acceptable for exposed surfaces. Apply new form-coating compound as specified for new formwork.
- B. When forms are extended for successive concrete placement, thoroughly clean surfaces, remove fins and laitance, and tighten forms to close joints. Align and secure joint to avoid offsets. Do not use patched forms for exposed concrete surfaces except as acceptable to Architect.

3.16 <u>CONCRETE SURFACE REPAIRS</u>:

- A. Patching Defective Areas: Repair and patch defective areas with cement mortar immediately after removing forms, when acceptable to Architect.
- B. Mix dry-pack mortar, consisting of one part portland cement to 2-1/2 parts fine aggregate passing a No. 16 mesh sieve, using only enough water as required for handling and placing.
 - 1. Cut out honeycombs, rock pockets, voids over 1/4 inch in any dimension, and holes left by tie rods and bolts down to solid concrete but in no case to a depth less than 1 inch. Make edges of cuts perpendicular to the concrete surface. Thoroughly clean, dampen with water, and brush-coat the area to be patched with bonding agent. Place patching mortar before bonding agent has dried.
 - 2. For surfaces exposed to view, blend white portland cement and standard portland cement so that, when dry, patching mortar will match surrounding color. Provide test areas at inconspicuous locations to verify mixture and color match before proceeding with patching. Compact mortar in place and strike-off slightly higher than surrounding surface.
- C. Repairing Formed Surfaces: Remove and replace concrete having defective surfaces if defects cannot be repaired to satisfaction of Architect. Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycomb, rock pockets, fins and other projections on the surface, and stains and other discolorations that cannot be removed by cleaning. Flush out form tie holes and fill with dry-pack mortar or precast cement cone plugs secured in place with bonding agent.
 - 1. Repair concealed formed surfaces, where possible, containing defects that affect the concrete's durability. If defects cannot be repaired, remove and replace the concrete.
- D. Repairing Unformed Surfaces: Test unformed surfaces, such as monolithic slabs, for smoothness and verify surface tolerances specified for each surface and finish. Correct low and high areas as specified. Test unformed surfaces sloped to drain for trueness of slope and smoothness by using a template having the required slope.
 - 1. Repair finished unformed surfaces containing defects that affect the concrete's durability. Surface defects include crazing and cracks in excess of 0.01 inch wide or
that penetrate to the reinforcement or completely through nonreinforced sections regardless of width, spalling, popouts, honeycombs, rock pockets, and other objectionable conditions.

- 2. Correct high areas in unformed surfaces by grinding after concrete has cured at least 14 days.
- 3. Correct low areas in unformed surfaces during or immediately after completing surface finishing operations by cutting out low areas and replacing with patching mortar. Finish repaired areas to blend into adjacent concrete. Proprietary underlayment compounds may be used when acceptable to Architect.
- 4. Repair defective areas, except random cracks and single holes not exceeding 1 inch in diameter, by cutting out and replacing with fresh concrete. Remove defective areas with clean, square cuts and expose reinforcing steel with at least 3/4-inch clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding agent. Mix patching concrete of same materials to provide concrete of same type or class as original concrete. Place, compact, and finish to blend with adjacent finished concrete. Cure in same manner as adjacent concrete.
- E. Perform structural repairs with prior approval of Architect for method and procedure, using specified epoxy adhesive and mortar.
- F. Repair methods not specified above may be used, subject to acceptance of Architect.

3.17 <u>QUALITY CONTROL TESTING DURING CONSTRUCTION</u>:

- A. General: The Owner will employ a testing agency to perform tests and to submit test reports.
- B. Sampling and testing for quality control during concrete placement may include the following, as directed by Architect.
 - 1. Sampling Fresh Concrete: ASTM C 172, except modified for slump to comply with ASTM C 94.
 - a. Slump: ASTM C 143; one test at point of discharge for each day's pour of each type of concrete; additional tests when concrete consistency seems to have changed.
 - b. Air Content: ASTM C 173, volumetric method for lightweight or normal weight concrete; ASTM C 231, pressure method for normal weight concrete; one for each day's pour of each type of air-entrained concrete.
 - c. Concrete Temperature: ASTM C 1064; one test hourly when air temperature is 40 deg.F (4 deg.C) and below, when 80 deg.F (27 deg.C) and above, and one test for each set of compressive-strength specimens.
 - d. Compression Test Specimen: ASTM C 31; one set of four standard cylinders for each compressive-strength test, unless otherwise directed. Mold and store cylinders for laboratory-cured test specimens except when field-cured test specimens are required.
- C. Compressive-Strength Tests: ASTM C 39; one set for each day's pour exceeding 5 cu. yd. plus additional sets for each 50 cu. yd. more than the first 25 cu. yd. of each concrete class placed in any one day, or for each 5000 sq ft of surface are placed; one specimen tested at 7 days, two specimens tested at 28 days, and one specimen retained in reserve for later testing if required.
 - 1. Any additional cylinder required by the Contractor for early strength gain tests for form

stripping or post-tensioning are Contractor's responsibility and shall be paid for by Contractor.

- 2. When frequency of testing will provide fewer than five strength tests for a given class of concrete, conduct testing from at least five randomly selected batches or from each batch if fewer than five are used.
- 3. When total quantity of a given class of concrete is less than 50 cu. yd., Architect may waive strength testing if adequate evidence of satisfactory strength is provided.
- 4. When strength of field-cured cylinders is less than 85 percent of companion laboratorycured cylinders, evaluate current operations and provide corrective procedures for protecting and curing the in-place concrete.
- 5. Strength level of concrete will be considered satisfactory if averages of sets of three consecutive strength test results equal or exceed specified compressive strength and no individual strength test result falls below specified compressive strength by more than 500 psi.
- 6. Test results will be reported in writing to Architect, Structural Engineer, ready-mix producer, and Contractor within 24 hours after tests. Reports of compressive strength tests shall contain the Project identification name and number, date of concrete placement, name of concrete testing service, concrete type and class, location of concrete batch in structure, design compressive strength at 28 days, concrete mix proportions and materials, compressive breaking strength, and type of break for both 7-day tests and 28-day tests.
- 7. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted but shall not be used as the sole basis for acceptance or rejection.
- 8. Additional Tests: The testing agency will make additional tests of in-place concrete when test results indicate specified concrete strengths and other characteristics have not been attained in the structure, as directed by Architect. Testing agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42, or by other methods as directed.

END OF CONCRETE

SECTION 05 2100

STEEL JOISTS

PART 1 - GENERAL

1.1 <u>SUMMARY:</u>

- A. Section Includes:
 - 1. K-series open-web steel joists.
 - 2. LH-series long span steel joists.
 - 3. Joist accessories.
- B. Related Documents: Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
- C. Related Sections: The following Sections contain requirements that relate to this Section:
 - 1. Section 01 4100, "Testing and Inspection Services General": Independent testing agency procedures and administrative requirements.
 - 2. Section 03 3000," Concrete": Installing anchors set in concrete.
 - 3. Section 04 2000, "Unit Masonry": Installing anchors set in unit masonry.
 - 4. Section 05 1200, "Structural Steel": Field quality-control procedures
 - 5. Section 05 5000, "Metal Fabrications": Loose, steel bearing plates and miscellaneous steel framing.
 - 6. Section 09 9000, "Painting": Surface preparation and prime painting.

1.2 **PERFORMANCE REQUIREMENTS:**

- A. Structural Performance: Engineer, fabricate, and erect joists and connections to withstand design loads within limits and under conditions required.
 - 1. Design Loads: As indicated.
 - Design joists to withstand design loads without deflections greater than the following:
 a. Roof Joists: Vertical deflection of 1/360 of the span.
- B. Engineering Responsibility: Engage a joist manufacturer who utilizes a qualified professional engineer to prepare design calculations, shop drawings, and other structural data for steel joists.

1.3 <u>SUBMITTALS:</u>

- A. General: Submit each item in this Article according to the Conditions of the Contract and Division 1 Specification Sections.
- B. Product Data for each type of joist, accessory, and product specified.
- C. Shop Drawings showing layout, mark, number, type, location, and spacing of joists. Include joining and anchorage details, bracing, bridging, accessories, splice and connection details, and attachment to other units of Work.

- 1. Indicate locations and details of anchorage devices and bearing plates to be embedded in other construction.
- 2. For joists indicated to comply with certain design loadings, include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
- D. Design calculations submit for record one copy of design calculations, sealed by an engineer registered in the state where the project is located, for joist and joist girders with cantilevers or concentrated loads or joist sizes for which standard load tables are not applicable.
- E. Material certificates signed by joist manufacturer certifying that joists comply with SJI's "Specifications."
- F. Mill certificates signed by manufacturers of bolts certifying that their products comply with specified requirements.
- G. Welder certificates signed by Contractor certifying that welders comply with requirements specified under the "Quality Assurance" Article.
- H. Qualification data for firms and persons specified in the "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.
- I. Research reports or evaluation reports of the model code organization acceptable to authorities having jurisdiction that evidence joists' compliance with building code in effect for Project.

1.4 **QUALITY ASSURANCE:**

- A. Manufacturer Qualifications: Engage a firm experienced in manufacturing joists similar to those indicated for this Project and that have a record of successful in-service performance.
 - 1. Manufacturer must be certified by SJI to manufacture joists conforming to SJI standard specifications and load tables.
- B. SJI Design Standard: Comply with recommendations of SJI's "Standard Specifications Load Tables and Weight Tables for Steel Joists and Joist Girders," applicable to types of joists indicated.
- C. Welding Standards: Comply with applicable provisions of AWS D1.1 "Structural Welding Code--Steel" and AWS D1.3 "Structural Welding Code--Sheet Steel."
 - 1. Certify that each welder has satisfactorily passed AWS qualification tests for welding processes involved and, if pertinent, has undergone recertification.
- D. Professional Engineer Qualifications: A professional engineer who is legally authorized to practice in the jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of joists that are similar to those indicated for this Project in material, design,

and extent.

E. Inspection: Inspect joists and girders in accordance with SJI "Specifications."

1.5 <u>DELIVERY, STORAGE, AND HANDLING:</u>

- A. Deliver, store, and handle joists as recommended in SJI's "Specifications."
- B. Protect joists from corrosion, deformation, and other damage during delivery, storage, and handling.

1.6 <u>SEQUENCING:</u>

A. Deliver steel bearing plates and other devices to be built into concrete and masonry construction.

PART 2 - PRODUCTS

2.1 <u>MATERIALS:</u>

- A. Steel: Comply with requirements of SJI's "Specifications" for chord and web section material.
- B. Steel Bearing Plates: ASTM A 36 (ASTM A 36M).
- C. Carbon-Steel Bolts and Threaded Fasteners: ASTM A 307, Grade A (ASTM F 568, Property Class 4.6), carbon-steel, hex-head bolts and threaded fasteners; carbon-steel nuts; and flat, unhardened steel washers.
 - 1. Finish:
 - a. Plain, noncoated.
- D. High-Strength Bolts and Nuts: ASTM A 325 (ASTM A 325M), Type 1, heavy hex steel structural bolts, heavy hex carbon-steel nuts, and hardened carbon-steel washers.
 - 1. Finish:
 - a. Plain, noncoated.
- E. Welding Electrodes: Comply with AWS standards.

2.2 **PRIMERS**:

A. Steel Prime Paint: Manufacturer's standard.

2.3 <u>STEEL JOISTS:</u>

- A. Manufacture joists according to SJI's "Specifications," with steel angle top and bottom chord members, of joist types, end arrangements, and top chord arrangements indicated.
- B. Manufacture joists according to SJI's "Specifications," with steel angle top and bottom chord members, and as follows:

- 1. Joist Type:
 - a. K-series steel joists.
 - b. LH-series steel joists.
- 2. End Arrangement:
 - a. Underslung.
 - b. Underslung with bottom chord extensions.
- 3. Top Chord Arrangement:
 - a. Parallel.
 - b. Top chord single pitched
- C. Comply with AWS requirements and procedures for shop welding, appearance, quality of welds, and methods used in correcting welding work.
- D. Provide holes in chord members where shown for securing other work to steel joists. However, deduct area of holes from the area of chord when calculating strength of member.
- E. Extend top chords of joists with SJI Type S top chord extensions where indicated, complying with SJI's "Specifications" and load tables.
- F. Extend bearing ends of joists with SJI Type R extended ends where indicated, complying with SJI's "Specifications" and load tables.
- G. Camber K-series steel joists according to SJI's "Specifications."
- H. Equip bearing ends of joists with manufacturer's standard beveled ends or sloped shoes when joist slope exceeds 1/4 inch in 12 inches (1:48).

2.4 JOIST ACCESSORIES:

- A. Bridging: Provide bridging anchors and number of rows of horizontal or diagonal bridging of material, size, and type required by SJI's "Specifications" for type of joist, chord size, spacing, and span.
 - 1. Supply additional bridging to ensure stability of structure during construction period.
- B. Fabricate steel bearing plates with integral anchorage's as indicated and finish as follows:
 - 1. Finish: Shop prime paint.
- C. Steel bearing plates with integral anchorages are specified in Section 05500, "Metal Fabrications."
- D. Supply miscellaneous accessories, including splice plates and bolts required by the joist manufacturer to complete the joist installation.

2.5 <u>SHOP PAINTING:</u>

A. Clean and remove loose scale, heavy rust, and other foreign materials from fabricated joists and accessories to be primed as follows:

- 1. Surface Preparation:
 - a. Either hand tool cleaning, SSPC-SP 2, or power tool cleaning, SSPC-SP 3.
- B. Apply one shop coat of primer to joists and joist accessories to be primed to provide a continuous, dry paint film thickness of not less than 1 mil (0.025 mm).

PART 3 - EXECUTION

3.1 **EXAMINATION:**

A. Examine supporting substrates, embedded bearing plates, and abutting structural framing, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of joists. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 **INSTALLATION:**

- A. Do not install joists until supporting construction is in place and secured.
- B. Install joists and accessories plumb, square, and true to line; securely fasten to supporting construction according to SJI's "Specifications," joist manufacturer's recommendations, and the requirements of this Section.
- C. Before installation, splice joists delivered to Project site in more than one piece.
- D. Space, adjust, and align joists accurately in location before permanently fastening.
- E. Install temporary bracing and bridging, connections, and anchors to ensure joists are stabilized during construction.
- F. Anchors: Furnish anchor bolts, steel bearing plates, and other devices to be built into concrete masonry construction.
- G. Provide unfinished threaded fasteners for anchor bolts, unless high strength bolts indicated.
- H. Field weld joists to supporting steel framework and steel bearing plates. Coordinate welding sequence and procedure with placing of joists.
- I. Comply with AWS requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.
- J. Bolt joists to supporting steel framework using carbon-steel bolts, unless otherwise indicated.
- K. Comply with the Research Council on Structural Connections' (RCSC) "Specification for Structural Joints Using ASTM A 325 or ASTM A 490 Bolts" for high-strength structural bolt installation and tightening requirements.
- L. Comply with the Research Council on Structural Connections' (RCSC) "Load and Resistance Factor Design Specification for Structural Joints Using ASTM A 325 or ASTM A 490 Bolts"

for high-strength structural bolt installation and tightening requirements.

M. Install and connect bridging concurrently with joist erection, before construction loads are applied. Anchor ends of bridging lines at top and bottom chords where terminating at walls or beams.

3.3 FIELD QUALITY CONTROL:

- A. Testing Laboratory Responsibility: The Owner's Testing Laboratory will perform field special inspections and tests on and to prepare test reports as follows:
 - 1. Testing Laboratory shall also approve welding certificates. Contractor shall submit three (3) copies of welding certificates and procedures for each welder involved in the Work.
 - 2. Testing Laboratory shall conduct and interpret tests, certificates and procedures and state in each report whether tested Work complies with or deviates from requirements.
- B. Testing and verification procedures will be required of high-strength bolted connections and field welds per Special Inspection requirements per 2012 IBC. Refer to Special Inspection Schedule in Construction Documents.
- C. Correct deficiencies in Work that inspections and test reports have indicated are not in compliance with specified requirements.
- D. Additional testing will be performed to determine compliance of corrected Work with specified requirements.

3.2 <u>REPAIRS AND PROTECTION:</u>

- A. Touch Up Painting: Following installation, promptly clean, prepare, and prime or reprime field connections, rust spots, and abraded surfaces of prime-painted joists, accessories, bearing plates, and abutting structural steel.
 - 1. Clean and prepare surfaces by hand tool cleaning, SSPC-SP 2, or power tool cleaning, SSPC-SP 3.
 - 2. Apply a compatible primer of the same type as the shop primer used on adjacent surfaces.
- B. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, that ensure that joists and accessories are without damage or deterioration at the time of Substantial Completion.

END OF STEEL JOISTS

SECTION 05 1200

STRUCTURAL STEEL

PART 1 – GENERAL

1.1 <u>SUMMARY</u>:

- A. Section Includes:
 - 1. Structural steel work including schedules, notes and details showing size and location of members, typical connections, and type of steel required.
 - 2. Structural steel is that work defined in American Institute of Steel Construction (AISC) "Code of Standard Practice" and as otherwise shown on drawings.
 - 3. Related work specified elsewhere:
 - a. Miscellaneous Metal Fabrications are specified elsewhere in Division 5
 - b. Refer to Division 3 for anchor bolt installation in concrete, Division 4 for anchor bolt installation in masonry.
- B. Related Documents: Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
- C. Related Sections: The following Sections contain requirements that relate to this Section:
 - 1. Section 05500, "Metal Fabrications": Loose steel bearing plates and miscellaneous steel framing.

1.2 <u>PERFORMANCE REQUIREMENTS</u>:

- A. Structural Performance: Engineer structural steel members and connections required by the Contract Documents to be selected or completed by the fabricator to withstand design loadings indicated.
- B. Design of Members and Connections: Details shown are typical, similar details apply to similar conditions, unless otherwise indicated. Verify dimensions at site whenever possible without causing delay in the work.

1.3 <u>SUBMITTALS</u>:

- A. General: Submit each item in this Article according to the Conditions of the Contract and Division 1 Specification Sections.
 - 1. Submit all shop drawings on one reproducible print (sepia) and two blue line prints only. The reproducible print will be returned. All blue line prints required by the contractor are the responsibility of the Contractor and shall be made after reproducible is returned.
- B. Product Data or manufacturer's specifications and installation instructions for following products. Include laboratory test reports and other data to show compliance with specifications (including specified standards). This data is submitted for information only.

- 1. Structural steel (each type), including certified copies of mill reports covering chemical and physical properties.
- 2. High-strength bolts (each type), including nuts and washers.
 - a. Include Direct Tension Indicators if used.
- 3. Structural steel primer paint.
- 4. Shrinkage-resistant grout.
- 5. Welder's certificates
- 6. Submit evidence of fabricator and erector qualifications.
- C. <u>Shop Drawings</u> prepared under the supervision of, signed and sealed by a Licensed Professional Engineer, including complete details and schedules for fabrication and assembly of structural steel members, procedures and diagrams.
 - 1. Include details of cuts, connections, camber, holes, and other pertinent data.
 - 2. <u>Welds</u>: Indicate welds by standard AWS A2.1 and A2.4 symbols. Distinguishing between shop and field welds, and show size, length, and type of each weld.
 - 3. <u>Bolts</u>: Indicate type, size, and length of bolts, distinguishing between shop and field bolts. Identify high-strength bolted slip-critical, direct-tension, or tensioned shear/bearing connections.
 - 4. <u>Setting Drawings</u>: Provide setting drawings, templates, and directions for installation of anchor bolts and other anchorage's to be installed by others.
 - 5. <u>Erection Drawings</u>: Prepare and furnish to the Architect for review, erection drawings, detailed shop drawings and connection design calculations for all structural steel. Manufacturing of any material or performing of any work before final review of shop drawings will be entirely at risk.
 - 6. Contract documents shall not be used for shop drawing, including erection plans or details.
 - 7. All shop drawings which are resubmitted for any reason shall have all revised items clouded or identified for each submittal.
 - 8. Fabrication, assembly and erection shall conform to reviewed shop drawings.
- D. <u>Connection Calculations</u>:
 - 1. All structural steel connections not specifically detailed on the drawings shall be designed to resist forces indicated, by the Contractor, under the direct supervision of a professional engineer registered in the State of Alabama.
 - 2. Design calculations for the connections designed by the Contractor shall be submitted for the files of the Architect and Engineer. Calculations shall bear the seal of a professional engineer registered in the State of Alabama. Shop drawings containing connections for which calculations have not been received will be returned unchecked as an incomplete submittal.
 - 3. For each connection, the following shall be noted on the shop drawings:
 - 4. Required design reaction.
 - 5. Calculation sheet number for design.
 - 6. Capacity of detailed connection.
- E. Qualification data for firms and persons specified in the "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.

- F. Mill test reports signed by manufacturers certifying that their products, including the following, comply with requirements.
 - 1. Structural steel, including chemical and physical properties.
 - 2. Bolts, nuts, and washers, including mechanical properties and chemical analysis.
 - 3. Direct-tension indicators.
 - 4. Shear stud connectors.
 - 5. Shop primers.
 - 6. Nonshrink grout.

1.4 **QUALITY ASSURANCE**:

- A. Erector Qualifications: Engage an experienced Erector who has completed structural steel work similar in material, design, and extent to that indicated for this Project and with a record of successful in-service performance.
- B. Fabricator Qualifications: Engage a firm experienced in fabricating structural steel similar to that indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to fabricate structural steel without delaying the Work.
- C. Codes and Standards: Comply with provisions of following, except as otherwise indicated:
 - 1. AISC's "Specification for Structural Steel Buildings—Allowable Stress Design and Plastic Design."
 - 2. AISC's "Load and Resistance Factor Design (LFRD) Specification for Structural Steel Buildings."
 - 3. AISC "Specifications for Structural Steel Buildings, Section 10, Architecturally Exposed Structural Steel."
 - 4. AISC's "Specification for Allowable Stress Design of Single-Angle Members."
 - 5. AISC's "Specification for Load and Resistance Factor Design of Single-Angle Members."
 - 6. AISC's "Seismic Provisions for Structural Steel Buildings."
 - 7. American Institute of Steel Construction (AISC) "Code of Standard Practice for Steel Buildings and Bridges", dated June 10, 1992
 - a. General:AISC "Code of Standard Practice" shall apply except to the extend that references are made to the responsibility of the Owner and/or Architect or Engineer in which event those references shall have no applicability. Where a conflict exists between the Code of Standard Practice and the Contract Documents, the Contract Documents shall govern.
 - b. Paragraph 3.1:Add the following: "3.1.8 Include in the bid price for the work structural steel members shown on drawings, but not identified as to size, section, and material grade by assuming sizes, sections, and material grades shown for similarly loaded members having approximately the same overall length except on areas that are noted on the drawings as incomplete. Identify such members and their associated cost in the bid for the work".
 - c. Paragraph 3.3:Delete the first sentence, "In case of discrepancies between plans and specifications for buildings, the specifications govern", and insert the following in its place, "In case of discrepancies between drawings and specifications for buildings, the drawings govern".

- d. Paragraph 3.4:In the first sentence, delete the phrase "and made to a scale not less than 1.8" to the foot".
- e. Paragraph 5.1:Delete the first sentence, "When the fabricator receives 'released for construction' plans and specifications, the fabricator may immediately place orders for the material necessary for fabrication". and insert the following in its place "when the fabricator receives 'issued for structural steel mill order of wide flange beams, girders and columns only' plans and specifications, the fabricator may immediately place orders for the material necessary for fabrication. Delete the second sentence, "The contract documents must note any materials or areas which should not be ordered due to a design which is incomplete or subject to revision".
- 8. ASTM A 6 (ASTM A 6M) "Specification for General Requirements for Rolled Steel Plates, Shapes, Sheet Piling, and Bars for Structural Use."
- 9. Research Council on Structural Connections' (RCSC) "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."
- 10. Research Council on Structural Connections' (RCSC) "Load and Resistance Factor Design Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."
- D. Welding Standards: Comply with applicable provisions of AWS D1.1 "Structural Welding Code—Steel."
- E. Present evidence that each welder has satisfactorily passed AWS qualification tests for welding processes involved and, if pertinent, has undergone recertification in the past year.

1.5 <u>DELIVERY, STORAGE, AND HANDLING</u>:

- A. Deliver structural steel to Project site in such quantities and at such times to ensure continuity of installation.
- B. Store materials to permit easy access for inspection and identification. Keep steel members off ground by using pallets, platforms, or other supports. Protect steel members and packaged materials from erosion and deterioration.
 - 1. Store fasteners in a protected place. Clean and relubricate bolts and nuts that become dry or rusty before use.
 - 2. Do not store materials on structure in a manner that might cause distortion or damage to members or supporting structures. Repair or replace damaged materials or structures as directed.

1.6 <u>SEQUENCING:</u>

A. Supply anchorage items to be embedded in or attached to other construction without delaying the Work. Provide setting diagrams, templates, instructions, and directions, as required, for installation.

1.7 <u>TESTING SERVICES</u>:

- A. Provide the Testing Laboratory with the following:
 - 1. A complete set of shop and erection drawings reviewed by the Architect.
 - 2. Mill test reports, cutting lists, order sheets, material bills and welder's certificates.
 - 3. Full and ample means and assistance for testing all material.

- 4. Proper facilities, including scaffolding, temporary work platforms, hoisting facilities, etc., for inspection of the work in the mills, shop and field.
- B. Propose procedures, acceptable to the Architect, to correct deficiencies in structural steel work which inspections and laboratory test reports have indicated to be not in compliance with requirements.
- C. Provide additional tests, by the Quality Control Testing Laboratory, as may be necessary, to reconfirm any noncompliance of the original work, and as may be necessary to show compliance off corrected work.

PART 2 – PRODUCTS

2.1 <u>STEEL MATERIALS:</u>

- A. Metal Surfaces, General: For fabrication of work that will be exposed to view, use only materials that are smooth and free of surface blemishes including pitting, rust and scale seam marks, roller marks, rolled trade names, and roughness. Remove such blemishes by grinding, or by welding and grinding, prior to cleaning, treating, and applying surface finishes.
- B. Structural Steel Shapes, Plates, and Bars: As follows:
 - 1. Carbon Steel: ASTM A 36 (ASTM A 36M).
 - 2. High-Strength, Low-Alloy Columbium-Vanadium Steel: ASTM A 572 (ASTM A 572M), Grade 50.
- C. Cold-Formed Structural Steel Tubing: ASTM A 500, Grade B.
- D. Hot-Formed Structural Steel Tubing: ASTM A 501.
- E. Steel Pipe: ASTM A 53, Type E or S, Grade B.
 - 1. Finish: Black, except where indicated to be galvanized.
- F. Connection Material: Unless noted otherwise on the drawings, stiffener plates, doubler plates, gusset plates and the connecting plates shall be the same grade of steel as members being connected.
 - 1. Finish: Black, except where indicated to be galvanized.
- G. Shear Connectors: ASTM A 108, Grade 1015 through 1020, headed-stud type, cold-finished carbon steel, AWS D1.1, Type B.
- H. Anchor Rods, Bolts, Nuts, and Washers: As follows:
 - 1. Unheaded Rods: ASTM A 36 (ASTM A 36M).
 - 2. Headed Bolts: ASTM A 307, Grade A (ASTM F 568, Property Class 4.6); carbonsteel, hex-head bolts; and carbon-steel nuts.
 - 3. Washers: ASTM A 36 (ASTM A 36M).
- I. High-Strength Bolts, Nuts, and Washers: ASTM A 325 (ASTM A 325M), Type 1, heavy hex steel structural bolts, heavy hex carbon-steel nuts, and hardened carbon-steel washers.

- 1. Finish: Plain, uncoated.
- J. Welding Electrodes: Comply with AWS requirements.

2.2 **<u>PRIMER</u>**:

A. Primer: SSPC-Paint 15, Type I, red oxide.

2.3 <u>GROUT</u>:

- A. Nonmetallic, Shrinkage-Resistant Grout: Premixed, nonmetallic, noncorrosive, nonstaining grout containing selected silica sands, portland cement, shrinkage compensating agents, plasticizing and water-reducing agents, complying with ASTM C 1107, of consistency suitable for application, and a 30-minute working time. Subject to compliance with requirements, provide one of the following:
 - 1. High Performance (Non-Metallic):
 - a. "Masterflow 928"; Master Builders.
 - b. "Crystex"; L & M Const. Chemical Co.
 - 2. Construction Grade (Non-Metallic):
 - a. "Set Grout"; Master Builders.
 - b. "Euco-NS Grout"; Euclid Chemical Co.
 - c. "Duragrout"; L & M Const. Chemical Co.
 - d. "Horn Non-Corrosive Non-Shrink Grout"; A.C. Horn, Inc.
 - e. "588 Grout"; W.R. Meadows, Inc.
 - f. "Five Stair Grout"; Five Star Products, Inc.

2.4 **FABRICATION:**

- A. Fabricate and assemble structural steel in shop to greatest extent possible. Fabricate structural steel according to AISC specifications referenced in this Section and in Shop Drawings.
 - 1. Camber structural steel members where indicated.
 - 2. Identify high-strength structural steel according to ASTM A 6 (ASTM A 6M) and maintain markings until steel has been erected.
 - 3. Mark and match-mark materials for field assembly.
 - 4. Fabricate for delivery a sequence that will expedite erection and minimize field handling of structural steel.
 - 5. Complete structural steel assemblies, including welding of units, before starting shoppriming operations.
 - 6. Comply with fabrication tolerance limits of AISC's "Code of Standard Practice for Steel Buildings and Bridges" for structural steel.
 - 7. Piping and/or cracks in flanges or webs of all rolled shapes or plates are to be removed and welded solid by AISC procedures.
- B. Thermal Cutting: Perform thermal cutting by machine to greatest extent possible.
 - 1. Plane thermally cut edges to be welded.
- C. Finishing: Accurately mill ends of columns and other members transmitting loads in bearing.

- D. Shear Connectors: Prepare steel surfaces as recommended by manufacturer of shear connectors. Use automatic end welding of headed-stud shear connectors according to AWS D1.1 and manufacturer's printed instructions.
- E. Steel Wall Framing: Select true and straight members for fabricating steel wall framing to be attached to structural steel framing. Straighten as required to provide uniform, square, and true members in completed wall framing.
- F. Welded Door Frames: Build up welded door frames attached to structural steel framing. Weld exposed joints continuously and grind smooth. Plug-weld fixed steel bar stops to frames. Secure removable stops to frames with countersunk, cross-recessed head machine screws, uniformly spaced not more than 10 inches (250 mm) o.c., unless otherwise indicated.
- G. Holes: Provide holes required for securing other work to structural steel framing and for passage of other work through steel framing members, as shown on Shop Drawings.
 - 1. Cut, drill, or punch holes perpendicular to metal surfaces. Do not flame-cut holes or enlarge holes by burning. Drill holes in bearing plates.
 - 2. Weld threaded nuts to framing and other specialty items as indicated to receive other work.
- H. Assemble and weld built-up sections by methods which will produce true alignment of axes without warp.
- I. Shear Connectors: Prepare steel surfaces as recommended by manufacturer of shear connectors. Shop weld shear connectors, spaced as shown, to beams and girders in composite construction. Use automatic end welding of headed stud shear connectors in accordance with manufacturer's printed instructions.

2.5 <u>SHOP CONNECTIONS</u>:

- A. Simple Beam Connections: Standard double angle framed beam connections using bolts as specified.
 - 1. Seated Beam Connections and Stiffened Seated Beam Connections shall not be used unless indicated on the drawings or unless Engineer approval is obtained to verify capacity of supporting member for the resulting eccentricity. The fabricator must verify and bear responsibility that the use of such connections does not interfere with architectural or MEP requirements.
- B. Shop install and tighten high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."
 - 1. Connection Type: Snug tightened, unless indicated as slip-critical, direct-tension, or tensioned shear/bearing connections.
- C. Weld Connections: Comply with AWS D1.1 for procedures, appearance and quality of welds, and methods used in correcting welding work.

1. Assemble and weld built-up sections by methods that will maintain true alignment of axes without warp.

2.6 <u>SHOP PRIMING</u>:

- A. Shop prime steel surfaces, except the following:
 - 1. Surfaces embedded in concrete or mortar. Extend priming of partially embedded members to a depth of 2 inches (50 mm).
 - 2. Surfaces to be field welded.
 - 3. Surfaces to be high-strength bolted with slip-critical connections.
 - 4. Surfaces to receive sprayed-on fireproofing, [unless otherwise specified].
 - 5. Galvanized surfaces.
- B. Surface Preparation: Clean surfaces to be painted. Remove loose rust, loose mill scale, and spatter, slag, or flux deposits. Prepare surfaces according to SSPC specifications as follows:
 - 1. SSPC-SP 2 "Hand Tool Cleaning."

2.7 <u>SOURCE QUALITY CONTROL</u>:

- A. Independent Testing and Inspecting Laboratory: Owner will engage an Independent Testing and Inspecting Laboratory to perform shop inspections and tests and to prepare test reports.
 - 1. Testing laboratory will conduct and interpret tests and state in each report whether test specimens comply with or deviate from requirements.
 - 2. Provide testing laboratory with access to places where structural steel work is being fabricated or produced so required inspection and testing can be accomplished.
- B. Correct deficiencies in or remove and replace structural steel that inspections and test reports indicate do not comply with specified requirements.
- C. Additional testing, at Contractor's expense, will be performed to determine compliance of corrected Work with specified requirements.
- D. Shop-bolted connections will be tested and inspected according to RCSC's "Specification for Structural Joints Using ASTM A325 or A 490 Bolts".
- E. In addition to visual inspection, shop-welded connections will be inspected and tested according to AWS D1.1 and the inspection procedures listed below, at testing laboratory's option.
 - 1. Magnetic Particle Inspection: ASTM E 709; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration will not be accepted.
 - 2. Ultrasonic Inspection:ASTM E 164.

PART 3 - EXECUTION:

3.1 <u>INSPECTION</u>:

A. Before erection proceeds, and with the steel erector present, verify elevations of concrete [and masonry bearing surfaces] and locations of anchorage's for compliance with requirements.

B. Do not proceed with erection until unsatisfactory conditions have been corrected.

3.2 **PREPARATION:**

- A. Provide temporary shores, guys, braces, and other supports during erection to keep structural steel secure, plumb, and in alignment against temporary construction loads and loads equal in intensity to design loads. Remove temporary supports when permanent structural steel, connections, and bracing are in place, unless otherwise indicated.
 - 1. Do not remove temporary shoring supporting composite deck construction until cast-inplace concrete has attained its design compressive strength.
- B. Temporary Planking: Provide temporary planking and working platforms as necessary to effectively complete work.

3.3 <u>ERECTION</u>:

- A. Set structural steel accurately in locations and to elevations indicated and according to AISC specifications referenced in this Section.
- B. Base and Bearing Plates: Clean concrete and masonry bearing surfaces of bond-reducing materials and roughen surfaces prior to setting base and bearing plates. Clean bottom surface of base and bearing plates.
 - 1. Set base and bearing plates for structural members on wedges, shims, or setting nuts as required.
 - 2. Tighten anchor bolts after supported members have been positioned and plumbed. Do not remove wedges or shims but, if protruding, cut off flush with edge of base or bearing plate prior to packing with grout.
 - 3. Pack grout solidly between bearing surfaces and plates so no voids remain. Finish exposed surfaces, protect installed materials, and allow to cure.
 - a. Comply with manufacturer's instructions for proprietary grout materials.
- C. Maintain erection tolerances of structural steel within AISC's "Code of Standard Practice for Steel Buildings and Bridges."
- D. Align and adjust various members forming part of complete frame or structure before permanently fastening. Before assembly, clean bearing surfaces and other surfaces that will be in permanent contact. Perform necessary adjustments to compensate for discrepancies in elevations and alignment.
 - 1. Level and plumb individual members of structure.
 - 2. Establish required leveling and plumbing measurements on mean operating temperature of structure. Make allowances for difference between temperature at time of erection and mean temperature at which structure will be when completed and in service.
- E. Splice members only where indicated.
- F. Remove erection bolts on welded, architecturally exposed structural steel; fill holes with plug welds; and grind smooth at exposed surfaces.

- G. Do not use thermal cutting during erection.
- H. Do not enlarge unfair holes in members by burning or by using drift pins. Ream holes that must be enlarged to admit bolts.

3.4 FIELD CONNECTIONS:

- A. Install and tighten nonhigh-strength bolts, except where high-strength bolts are indicated.
- B. Install and tighten high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."
- C. Weld Connections: Comply with AWS D1.1 for procedures, appearance and quality of welds, and methods used in correcting welding work.
 - 1. Comply with AISC specifications referenced in this Section for bearing, adequacy of temporary connections, alignment, and removal of paint on surfaces adjacent to field welds.
 - 2. Verify that weld sizes, fabrication sequence, and equipment used for architecturally exposed structural steel will limit distortions to allowable tolerances. Prevent surface bleeding of back-side welding on exposed steel surfaces. Grind smooth exposed fillet welds ½ inch (13 mm) and larger. Grind flush butt welds. Dress exposed welds.
- D. Shear Connectors: Prepare steel surfaces as recommended by manufacturer of shear connectors. Weld shear connectors in field, spaced as shown, to beams and girders in composite construction. Use automatic end welding of headed stud shear connectors in accordance with manufacturer's printed instructions.

3.5 <u>FIELD QUALITY CONTROL</u>:

- A. Testing Laboratory Responsibility: The Owner's Testing Laboratory will perform field special inspections and tests on and to prepare test reports as follows:
 - 1. Testing Laboratory shall also approve welding certificates. Contractor shall submit three (3) copies of welding certificates and procedures for each welder involved in the Work.
 - 2. Testing Laboratory shall conduct and interpret tests, certificates and procedures and state in each report whether tested Work complies with or deviates from requirements.
- B. Quantity of Required Inspections and Tests: Testing Laboratory shall perform inspections or tests in accordance with AISC specification:
 - 1. Shop Bolted Connections: Special Inspection requirements per 2012 IBC. Refer to Special Inspection Schedule in Construction Documents.
 - 2. Shop Welded Connections: Special Inspection requirements per 2012 IBC. Refer to Special Inspection Schedule in Construction Documents.
 - 3. Field-Bolted Connections: Special Inspection requirements per 2012 IBC. Refer to Special Inspection Schedule in Construction Documents.
 - 4. Field Welding: Special Inspection requirements per 2012 IBC. Refer to Special Inspection Schedule in Construction Documents.

- 5. Other Inspections as required by AISC and indicated on Special Inspection Schedule in Construction Documents.
- C. Provide access for Testing Laboratory to places where structural steel work is being fabricated or produced so that required inspection and testing can be accomplished.
- D. Deficiencies: Correct deficiencies in or remove and replace structural steel that inspections and test reports indicate do not comply with specified requirements.
- E. Field Inspections and Tests: check steel as received in the field for possible shipping damage workmanship, piece making and verification of required camber.
- F. Additional testing, at Contractor's expense, will be performed to determine compliance of corrected Work with specified requirements.

3.6 <u>CLEANING</u>

- A. Touch up Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint. Apply paint to exposed areas using same material as used for shop painting.
 - 1. Apply by brush or spray to provide a minimum dry film thickness of 1.5 mils (0.038 mm).
- B. Touch up Painting: Cleaning and touch up painting of field welds, bolted connections, and abraded areas of shop paint on structural steel are included in Section 09900, "Painting."

END OF STRUCTURAL STEEL

SECTION 05 3100

STEEL DECK

PART 1 - GENERAL

1.1 <u>SUMMARY:</u>

- A. Section Includes:
 - 1. Steel roof deck.
- B. Related Documents: Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this section.
- C. Related Sections: The following Sections contain requirements that relate to this Section:
 - 1. Section 03 3000, "Concrete":
 - 2. Section 05 1200, "Structural Steel": Shop-welded shear connectors.
 - 3. Section 05 5000, "Metal Fabrications": Framing openings with miscellaneous steel shapes.
 - 4. Section 05 2100, "Steel Joists".
 - 5. Section 07 8150, "Sprayed-On Fireproofing".
 - 6. Section 09 9000, "Painting":
 - a. Touch-up and repair painting of deck.
 - b. Touch-up and repair of special deck coatings.

1.2 <u>SUBMITTALS:</u>

- A. General: Submit each item in this Article according to the Conditions of the Contract and Division 1 Specification Sections.
- B. Submit all shop drawings on one reproducible print (sepia) and one blue line print only. The reproducible print will be returned. All blue line prints required by the Contractor will be the responsibility of the Contractor and shall be made after reproducible is returned.
- C. Product data for each type of deck, accessory, and product specified.
 - 1. Provide test data for mechanical fasteners used in lieu of welding for fastening deck to supporting structures.
- D. Shop drawings showing layout and types of deck panels, anchorage details, reinforcing channels, pans, cut openings, closure strips, deck openings, special jointing, accessories, and attachment to other construction.
- E. Welder certificates signed by Contractor certifying that welders comply with requirements specified under the "Quality Assurance" Article.

- F. Product test reports from qualified independent testing agencies evidencing compliance with requirements of the following based on comprehensive testing:
 - 1. Mechanical fasteners.
- G. Research reports or evaluation reports of the model code organization acceptable to authorities having jurisdiction that evidence steel deck's compliance with the building code in effect for the Project.

1.3 **QUALITY ASSURANCE:**

- A. Codes and Standards: Comply with provisions of the following codes and standards, except as otherwise indicated:
 - 1. American Iron and Steel Institute (AISC), "Specification for the Design of Cold-Formed Steel Structural Members".
 - 2. American Welding Society (AWS), D1.3 "Structural Welding Code Sheet Steel".
 - 3. Steel Deck Institute (SDI), "Design Manual for Composite Decks, Form Decks and Roof Decks".
- B. Installer Qualifications: Engage an experienced Installer who has completed steel deck similar in material, design, and extent to that indicated for this Project and with a record of successful in-service performance.
- C. Welding Standards: Comply with applicable provisions of AWS D1.1 "Structural Welding Code-Steel" and AWS D1.3 "Structural Welding Code-Sheet Steel."
 - 1. Certify that each welder has satisfactorily passed AWS qualification tests for welding processes involved and, if pertinent, has undergone recertification.
- D. Welded decking in place is subject to inspection and testing. Owner will bear expense of removing and replacing portions of decking for testing purposes if welds are found to be satisfactory. Remove work found to be defective and replace with new acceptable work.
- E. Fire-Test-Response Characteristics: Where indicated, provide steel deck panels identical to those tested as part of an assembly for fire resistance per ASTM E 119 by a testing and inspection agency performing testing and follow-up services, that is acceptable to authorities having jurisdiction.
- F. Fire-Resistance Ratings: As indicated by design designations listed in UL "Fire Resistance Directory," or by Warnock Hersey or another testing and inspecting agency.
- G. Labeling: Identify steel deck with appropriate markings of applicable testing and inspecting agency.
- H. Installation Tolerances: Conform to the installation tolerances specified in Part 3.

1.4 <u>DELIVERY, STORAGE, AND HANDLING:</u>

- A. Protect steel deck from corrosion, deformation, and other damage during delivery, storage, and handling.
- B. Stack steel deck on platforms or pallets and slope to provide drainage. Protect with a waterproof covering and ventilate to avoid condensation.

1.5 <u>COORDINATION:</u>

A. Coordinate installation of sound-absorbing insulation strips in acoustic deck ribs with related units of Work specified in other Sections to ensure that the insulation is protected against damage from effects of the weather and other causes.

PART 2 - PRODUCTS

2.1 <u>MANUFACTURERS:</u>

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Steel Roof Deck:
 - a. Bowman Metal Deck Armco, Inc.
 - b. Epic Metals Corp.
 - c. Centria/Robertson.
 - d. Vulcraft Div. of Nucor Corp.
 - e. Wiremold/Walker.
 - f. Wheeling Corrugating Co., Div. of Wheeling-Pittsburgh Steel Corp.

2.2 <u>ROOF DECK:</u>

- A. Steel Roof Deck: Fabricate panels without top-flange stiffening grooves conforming to SDI Publication No. 28 "Specifications and Commentary for Steel Roof Deck" and the following:
 - 1. Galvanized-Steel Sheet: ASTM A 446, Grade A, G 60 (ASTM A 446M, Grade A, Z 180) zinc coated according to ASTM A 525 (ASTM A 525M).
 - 2. Deck Profile:
 - a. Type WR, wide rib.
 - 3. Profile Depth:
 - a. 1-1/2 inches.
 - 4. Design Uncoated-Steel Thickness:
 - a. 0.0295 inch.
 - 5. Span Condition:
 - a. Triple span or more.
 - 6. Side Joints:
 - a. Overlapped or interlocking seam at Contractor's option.

2.3 FABRICATION AND ACCESSORIES:

- A. General: Form deck units in lengths of three or more spans, with flush, telescoped, or nested 2inch laps at ends and interlocking or nested side laps, unless noted. End laps shall occur over a support.
- B. Roof Deck Units: Provide deck configurations that comply with SDI "Specifications and Commentary for Steel Roof Deck".
- C. Cant Strips: Fabricate cant strips of not less than 20 gage galvanized sheet steel of same quality as the deck units. Bend cant strips to form a 45 degree cant not less than 5 inches wide with top and bottom flanges not less than 2 inches wide, unless noted. Provide cant strips in 10 foot lengths where possible.
- D. Ridge and Valley Plates: Fabricate ridge and valley plates of not less than 20 gage galvanized sheet steel of the same quality as deck units. Bend to provide tight-fitting closure with deck units. Each leg of bend shall not be less than 3 inches. Provide plates in 10 foot lengths where possible.
- E. Accessories: Provide accessory materials for steel deck that comply with requirements indicated and recommendations of the steel deck manufacturer.
- F. Mechanical Fasteners: Manufacturer's standard, corrosion-resistant, low-velocity, powder-actuated or pneumatically driven carbon steel fasteners; or self-drilling, self-threading screws.
- G. Side Lap Fasteners: Manufacturer's standard, corrosion-resistant, hexagonal washer head; self-drilling, carbon steel screws, No. 10 (4.8 mm) minimum diameter.
- H. Rib Closure Strips: Manufacturer's standard vulcanized, closed-cell, synthetic rubber.
- I. Miscellaneous Roof Deck Accessories: Steel sheet, 0.0359-inch (0.91-mm) thick minimum ridge and valley plates, finish strips, and reinforcing channels, of same material as roof deck.
- J. Column Closures, End Closures, Z-Closures, and Cover Plates: Steel sheet, of same material and thickness as deck panels, unless otherwise indicated.
- K. Weld Washers: Manufacturer's standard uncoated-steel sheet weld washers, shaped to fit deck rib, 0.0598 inch (1.5 mm) thick with 3/8-inch (9.5-mm) minimum diameter prepunched hole.
- L. Recessed Sump Pans: Manufacturer's standard size, single piece steel sheet 0.071-inch-(1.8-mm-) thick minimum, of same material as deck panels, with 1-1/2-inch- (38-mm-) minimum deep level recessed pans and 3-inch- (76-mm-) wide flanges. Cut holes for drains in the field.
- M. Flat Receiver Pan: Manufacturer's standard size, single-piece steel sheet, 0.071-inch- (1.8-mm-) thick minimum units, of same material as deck panels. Cut holes for drains in the field.

- N. Shear Connectors: ASTM A 108, Grade 1010 through 1020 headed stud type, cold-finished carbon steel, AWS D1.1, Type B.
- O. Steel Sheet Accessories: ASTM A 446, G 60 (ASTM A 446M, Z 180) coating class, galvanized according to ASTM A 525 (ASTM A 525M).
- P. Galvanizing Repair Paint: SSPC-Paint 20 or DOD-P-21035, with dry film containing a minimum of 94 percent zinc dust by weight.

PART 3 - EXECUTION

3.1 **EXAMINATION:**

A. Examine supporting framing and field conditions for compliance with requirements for installation tolerances and other conditions affecting performance of steel deck.

3.2 **PREPARATION:**

- A. Do not place deck panels on concrete supporting structure until concrete has cured and is dry.
- B. Locate decking bundles to prevent overloading of supporting members.

3.3 INSTALLATION, GENERAL:

- A. Install deck panels and accessories according to applicable specifications and commentary of SDI Publication No. 28, manufacturer's recommendations, and requirements of this Section.
- B. Install temporary shoring before placing deck panels when required to meet deflection limitations.
- C. Place deck panels on supporting framing and adjust to final position with ends accurately aligned and bearing on supporting framing before being permanently fastened. Do not stretch or contract side lap interlocks.
 - 1. Do not place deck units on concrete supporting structure until concrete has cured and is dry.
 - 2. Coordinate and cooperate with structural steel erector in locating decking bundles to prevent overloading of structural members.
 - 3. Do not use deck units for storage or working platforms until permanently secured.
 - 4. Place deck panels flat and square and fasten to supporting framing without warp or deflection.
 - 5. Cut and neatly fit deck panels and accessories around openings and other work projecting through or adjacent to the decking.
 - 6. Provide additional reinforcement and closure pieces at openings as required for strength, continuity of decking, and support of other work.
 - 7. Comply with AWS requirements and procedures for manual shielded metal arc welding, appearance and quality of welds, and methods used in correcting welding work.

- 8. Mechanical fasteners may be used in lieu of welding to fasten deck. Locate mechanical fasteners and install according to deck manufacturer's instructions.
- D. Deck Edge Tolerances: Perimeter deck edges shall be within =/-1/2 inch of the indicated lines.

3.4 <u>ROOF DECK INSTALLATION:</u>

- A. Fasten roof deck panels to steel supporting members by arc spot (puddle) welds of the surface diameter indicated or arc seam welds with an equal perimeter, but not less than 1-1/2 inches (38 mm) long, and as follows:
 - 1. Comply with AWS requirements and procedures for manual shielded metal arc welding, appearance and quality of welds, and methods used in correcting welding work.
 - 2. Weld Diameter:
 - a. 5/8 inch (16 mm), nominal.
 - 3. Weld Spacing: Space and locate welds as indicated.
 - 4. Weld Washers: Install weld washers at each weld location.
 - 5. Side Lap and Perimeter Edge Fastening: Fasten side laps and perimeter edges of panels between supports, at intervals not exceeding 36 inches (910 mm), using one of the following methods:
 - a. Mechanically fasten with self-drilling No. 10- (4.8-mm-) diameter or larger carbon steel screws.
- B. End Bearing: Install deck ends over supporting framing with a minimum end bearing of 1-1/2 inches (38 mm), with end joints as follows:
 - 1. End Joints:
 - a. Lapped 2 inches (51 mm) minimum.
- C. Uplift Loading: Install and anchor roof deck units to resist gross uplift loading of 45 psf at eave overhang and 30 psf for other roof areas.
- D. Reinforcement at Openings: Provide additional metal reinforcement and closure pieces as required for strength, continuity of decking, and support of other work shown.
- E. Roof Sump Pans and Sump Plates: Install over openings provided in roof decking, and weld flanges to top of deck. Space welds not more than 12 inches (305 mm) apart with at least one weld at each corner.
- F. Miscellaneous Roof Deck Accessories: Install ridge and valley plates, finish strips, cover plates, end closures, and reinforcing channels according to deck manufacturer's recommendations. Weld to substrate to provide a complete deck installation.

3.5 FIELD QUALITY CONTROL:

- A. Quantity of Required Inspections and Tests: Testing Laboratory shall perform inspections or tests in accordance with AISC specification:
 - 1. Field welds and screwed deck attachment will be subject to Special Inspection

requirements per 2012 IBC. Refer to Special Inspection Schedule in Construction Documents.

- B. Testing Agency will report test results promptly and in writing to Contractor and Architect.
- C. Remove and replace work that does not comply with specified requirements.
- D. Additional testing will be performed to determine compliance of corrected work with specified requirements.

3.6 <u>REPAIRS AND PROTECTION:</u>

A. Galvanizing Repairs: Prepare and repair damaged galvanized coatings on both surfaces with galvanized repair paint according to ASTM A 780 and the manufacturer's instructions.

END OF STEEL DECK

SECTION 04 20 00 UNIT MASONRY

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Concrete block.
- B. Clay facing brick.
- C. Mortar and grout.
- D. Reinforcement and anchorage.
- E. Flashings.
- F. Lintels.
- G. Accessories.

1.02 RELATED REQUIREMENTS

- A. Section 03 10 00 Concrete Forming and Accessories: Dovetail slots for masonry anchors.
- B. Section 03 20 00 Concrete Reinforcing: Reinforcing steel for grouted masonry.
- C. Section 03 30 00 Cast-in-Place Concrete: Installation of dovetail slots for masonry anchors.
- D. Section 05 50 00 Metal Fabrications: Loose steel lintels.
- E. Section 06 10 00 Rough Carpentry: Nailing strips built into masonry.
- F. Section 07 11 13 Bituminous Dampproofing: Dampproofing parged masonry surfaces.
- G. Section 07 21 00 Thermal Insulation: Insulation for cavity spaces.
- H. Section 07 25 00 Weather Barriers: Water-resistive barriers or air barriers applied to the exterior face of the backing sheathing or masonry.
- I. Section 07 62 00 Sheet Metal Flashing and Trim: Through-wall masonry flashings.
- J. Section 07 92 00 Joint Sealants: Sealing control and expansion joints.

1.03 REFERENCE STANDARDS

- A. ASTM A153/A153M Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2016a.
- B. ASTM A615/A615M Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement; 2018.
- C. ASTM A641/A641M Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire; 2009a (Reapproved 2014).
- D. ASTM A951/A951M Standard Specification for Steel Wire for Masonry Joint Reinforcement; 2016.
- E. ASTM A1064/A1064M Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete; 2018a.
- F. ASTM C67/C67M Standard Test Methods for Sampling and Testing Brick and Structural Clay Tile; 2018.
- G. ASTM C90 Standard Specification for Loadbearing Concrete Masonry Units; 2016a.
- H. ASTM C91/C91M Standard Specification for Masonry Cement; 2012.
- I. ASTM C129 Standard Specification for Nonloadbearing Concrete Masonry Units; 2017.
- J. ASTM C140/C140M Standard Test Methods of Sampling and Testing Concrete Masonry Units and Related Units; 2017a.

- K. ASTM C144 Standard Specification for Aggregate for Masonry Mortar; 2018.
- L. ASTM C150/C150M Standard Specification for Portland Cement; 2018.
- M. ASTM C207 Standard Specification for Hydrated Lime for Masonry Purposes; 2018.
- N. ASTM C216 Standard Specification for Facing Brick (Solid Masonry Units Made From Clay or Shale); 2017a.
- O. ASTM C270 Standard Specification for Mortar for Unit Masonry; 2014a.
- P. ASTM C404 Standard Specification for Aggregates for Masonry Grout; 2018.
- Q. ASTM C476 Standard Specification for Grout for Masonry; 2018.
- R. ASTM C780 Standard Test Method for Preconstruction and Construction Evaluation of Mortars for Plain and Reinforced Unit Masonry; 2018a.
- S. ASTM C1072 Standard Test Method for Measurement of Masonry Flexural Bond Strength; 2013, with Editorial Revision (2014).
- T. ASTM C1148 Standard Test Method for Measuring the Drying Shrinkage of Masonry Mortar; 1992a (Reapproved 2014).
- U. ASTM C1314 Standard Test Method for Compressive Strength of Masonry Prisms; 2018.
- V. ASTM D226/D226M Standard Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing; 2017.
- W. ASTM E514/E514M Standard Test Method for Water Penetration and Leakage Through Masonry; 2014a.
- X. BIA Technical Notes No. 7 Water Penetration Resistance Design and Detailing; 2017.
- Y. BIA Technical Notes No. 13 Ceramic Glazed Brick Exterior Walls; 2017.
- Z. ICC-ES AC380 Acceptance Criteria for Termite Physical Barrier Systems; 2014, with Editorial Revision (2017).

AA. TMS 402/602 - Building Code Requirements and Specification for Masonry Structures; 2016.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Preinstallation Meeting: Convene a preinstallation meeting one week before starting work of this section; require attendance by all relevant installers.

1.05 SUBMITTALS

- A. See Section 01 30 00 Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data for masonry units, fabricated wire reinforcement, mortar, and masonry accessories.
- C. Shop Drawings: Indicate pertinent dimensions, materials, anchorage, size and type of fasteners, and accessories for brickwork support system.
- D. Manufacturer's Certificate: Certify that masonry units meet or exceed specified requirements.
- E. Manufacturer's Certificate: Certify that water repellent admixture manufacturer has certified masonry unit manufacturer as an approved user of water repellent admixture in the manufacture of concrete block.
- F. Installer's Qualification Statement.

1.06 QUALITY ASSURANCE

A. Comply with provisions of TMS 402/602, except where exceeded by requirements of Contract Documents.

- B. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section with minimum three years of documented experience.
- C. Installer Qualifications: Company specializing in performing work of the type specified and with at least three years of documented experience.

1.07 MOCK-UP

- A. Construct a masonry wall as a mock-up panel sized 8 feet (2.4 m) long by 6 feet (1.8 m) high; include mortar, accessories, structural backup, and flashings (with lap joint, corner, and end dam) in mock-up.
- B. Locate where directed.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Deliver, handle, and store masonry units by means that will prevent mechanical damage and contamination by other materials.

PART 2 PRODUCTS

2.01 CONCRETE MASONRY UNITS

- A. Concrete Block: Comply with referenced standards and as follows:
 - 1. Size: Standard units with nominal face dimensions of 16 by 8 inches (400 by 200 mm) and nominal depth of 8 inches (200 mm).
 - Special Shapes: Provide non-standard blocks configured for corners.
 a. Provide bullnose units for outside corners.
 - 3. Load-Bearing Units: ASTM C90, normal weight.
 - a. Hollow block, as indicated.
 - 4. Non-Loadbearing Units: ASTM C129.
 - a. Hollow block, as indicated.
 - 5. Units with Integral Water Repellent: Concrete block units as specified in this section with polymeric liquid admixture added to concrete masonry units at the time of manufacture.
 - a. Performance of Units with Integral Water Repellent:
 - 1) Water Permeance: When tested per ASTM E514/E514M and for a minimum of 72 hours.
 - (a) No water visible on back of wall above flashing at the end of 24 hours.
 - (b) No flow of water from flashing equal to or greater than 0.032 gallons per hour (0.05 L per hour) at the end of 24 hours.
 - (c) No more than 25 percent of wall area above flashing visibly damp at end of test.
 - 2) Flexural Bond Strength: ASTM C1072; minimum 10 percent increase.
 - 3) Compressive Strength: ASTM C1314; maximum 5 percent decrease.
 - 4) Drying Shrinkage: ASTM C1148; maximum 5 percent increase in shrinkage.
 - b. Use only in combination with mortar that also has integral water repellent admixture.
 - c. Use water repellent admixtures for masonry units and mortar by a single manufacturer.

2.02 BRICK UNITS

- A. Manufacturers:
 - 1. Carolina Ceramics.
 - 2. Taylor Clay Products, Inc..
 - 3. Palmetto Brick Company
 - 4. Substitutions: See section 01 60 00 Product Requirements.
- B. Facing Brick: ASTM C216, Type FBS Smooth, Grade SW.
 - 1. Color and texture to match Architect's sample.
 - a. Color 1: TBD
 - b. Color 2: TBD

- c. Color 3 -TBD
- 2. Utility size: As indicated on drawings.
- 3. Special shapes: Molded units as required by conditions indicated, unless standard units can be sawn to produce equivalent effect.
- 4. Compressive strength: As indicated on drawings, measured in accordance with ASTM C67/C67M.

2.03 MORTAR AND GROUT MATERIALS

- A. Masonry Cement: ASTM C91/C91M, Type N.
 - 1. Colored Mortar: Premixed cement as required to match Architect's color sample.
- B. Portland Cement: ASTM C150/C150M, Type I; color as required to produce approved color sample.
- C. Hydrated Lime: ASTM C207, Type S.
- D. Grout Aggregate: ASTM C404.

2.04 REINFORCEMENT AND ANCHORAGE

- A. Manufacturers:
 - 1. Blok-Lok Limited: www.blok-lok.com/#sle.
 - 2. Hohmann & Barnard, Inc; X-Seal Anchor: www.h-b.com/#sle.
 - 3. WIRE-BONDwww.wirebond.com/#sle.
 - 4. Substitutions: See Section 01 60 00 Product Requirements.
- B. Single Wythe Joint Reinforcement: ASTM A951/A951M.
 - 1. Type: Truss or ladder.
 - 2. Material: ASTM A1064/A1064M steel wire, mill galvanized to ASTM A641/A641M, Class 3.
 - 3. Size: 0.1483 inch (3.8 mm) side rods with 0.1483 inch (3.8 mm) cross rods; width as required to provide not less than 5/8 inch (16 mm) of mortar coverage on each exposure.
- C. Multiple Wythe Joint Reinforcement: ASTM A951/A951M.
 - 1. Type: Truss.
 - 2. Material: ASTM A1064/A1064M steel wire, mill galvanized to ASTM A641/A641M, Class 3.
 - 3. Size: 0.1483 inch (3.8 mm) side rods with 0.1483 inch (3.8 mm) cross rods; width as required to provide not less than 5/8 inch (16 mm) of mortar coverage on each exposure.
- D. Adjustable Multiple Wythe Joint Reinforcement: ASTM A951/A951M.
 - 1. Type: Truss, with adjustable ties or tabs spaced at 16 in (406 mm) on center.
 - 2. Material: ASTM A1064/A1064M steel wire, hot dip galvanized after fabrication to ASTM A153/A153M, Class B.
 - 3. Size: 0.1875 inch (4.8 mm) side rods with 0.1483 inch (3.8 mm) cross rods and adjustable components of 0.1875 inch (4.8 mm)wire, width of components as required to provide not less than 5/8 inch (16 mm) of mortar coverage from each masonry face.
 - 4. Vertical adjustment: Not more than 1 1/4 inches (32 mm).
- E. Flexible Anchors: 2-piece anchors that permit differential movement between masonry and building frame, sized to provide not less than 5/8 inch (16 mm) of mortar coverage from masonry face.
- F. Masonry Veneer Anchors: 2-piece anchors that permit differential movement between masonry veneer and structural backup, hot dip galvanized to ASTM A 153/A 153M, Class B.
 - 1. Anchor plates: Not less than 0.075 inch (1.91 mm) thick, designed for fastening to structural backup through sheathing by two fasteners; provide design with legs that penetrate sheathing and insulation to provide positive anchorage.
 - 2. Wire ties: Manufacturer's standard shape, 0.1875 inch (4.75 mm) thick.
 - 3. Vertical adjustment: Not less than 3-1/2 inches (89 mm).

4. Seismic Feature: Provide lip, hook, or clip on end of wire ties to engage or enclose not less than one continuous horizontal joint reinforcement wire of 0.1483 inch (3.8 mm) diameter.

2.05 FLASHINGS

A. Stainless steel flashing

2.06 ACCESSORIES

- A. Preformed Control Joints: Rubber material. Provide with corner and tee accessories, fused joints.
 1. Manufacturers:
 - a. Blok-Lok Limited: www.blok-lok.com/#sle.
 - b. Hohmann & Barnard, Inc: www.h-b.com/#sle.
 - c. WIRE-BOND: www.wirebond.com/#sle.
 - d. Substitutions: See Section 01 60 00 Product Requirements.
- B. Joint Filler: Closed cell polyvinyl chloride; oversized 50 percent to joint width; self expanding; in maximum lengths available.
 - 1. Manufacturers:
 - a. Hohmann & Barnard, Inc: www.h-b.com/#sle.
 - b. WIRE-BOND: www.wirebond.com/#sle.
 - c. Substitutions: See Section 01 60 00 Product Requirements.
- C. Cavity Mortar Control: Semi-rigid polyethylene or polyester mesh panels, sized to thickness of wall cavity, and designed to prevent mortar droppings from clogging weeps and cavity vents and allow proper cavity drainage.
 - 1. Full-Height Airspace Maintenance and Drainage Material: Mesh panels, fitted between masonry ties.
 - a. Manufacturers:
 - 1) Advanced Building Products, Inc.; Mortairvent-CW: www.advancedbuildingproducts.com/#sle.
 - 2) CavClear/Archovations, Inc; CavClear Masonry Mat: www.cavclear.com/#sle.
 - 3) Substitutions: See Section 01 60 00 Product Requirements.
- D. Building Paper: ASTM D226/D226M, Type I ("No.15") asphalt felt.
- E. Weeps:
 - 1. Type: Polyester mesh.
 - 2. Color(s): As selected by Architect from manufacturer's full range.
 - 3. Manufacturers:
 - a. Advanced Building Products, Inc: www.advancedbuildingproducts.com/#sle.
 - b. Blok-Lok Limited: www.blok-lok.com/#sle.
 - c. CavClear/Archovations, Inc: www.cavclear.com/#sle.
 - d. Substitutions: See Section 01 60 00 Product Requirements.
- F. Cavity Vents:
 - 1. Type: Preformed aluminum vents with sloping louvers.
 - 2. Color(s): As selected by Architect from manufacturer's full range.
 - 3. Manufacturers:
 - a. Advanced Building Products, Inc: www.advancedbuildingproducts.com/#sle.
 - b. Blok-Lok Limited: www.blok-lok.com/#sle.
 - c. CavClear/Archovations, Inc: www.cavclear.com/#sle.
 - d. Hohmann & Barnard, Inc: www.h-b.com/#sle.
 - e. WIRE-BOND: www.wirebond.com/#sle.
 - f. Substitutions: See Section 01 60 00 Product Requirements.

G. Cleaning Solution: Non-acidic, not harmful to masonry work or adjacent materials.

2.07 MORTAR AND GROUT MIXING

- A. Mortar for Unit Masonry: ASTM C270, using the Proportion Specification.
- B. Grout: ASTM C476; consistency required to fill completely volumes indicated for grouting; fine grout for spaces with smallest horizontal dimension of 2 inches (50 mm) or less; coarse grout for spaces with smallest horizontal dimension greater than 2 inches (50 mm).

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that field conditions are acceptable and are ready to receive masonry.
- B. Verify that related items provided under other sections are properly sized and located.

3.02 PREPARATION

- A. Direct and coordinate placement of metal anchors supplied for installation under other sections.
- B. Provide temporary bracing during installation of masonry work. Maintain in place until building structure provides permanent bracing.

3.03 COLD AND HOT WEATHER REQUIREMENTS

A. Comply with requirements of TMS 402/602 or applicable building code, whichever is more stringent.

3.04 COURSING

- A. Establish lines, levels, and coursing indicated. Protect from displacement.
- B. Maintain masonry courses to uniform dimension. Form vertical and horizontal joints of uniform thickness.
- C. Concrete Masonry Units:
 - 1. Bond: Running.
 - 2. Coursing: One unit and one mortar joint to equal 8 inches (200 mm).
 - 3. Mortar Joints: Concave.
- D. Brick Units:
 - 1. Bond: Running.
 - 2. Coursing: Three units and three mortar joints to equal 8 inches (200 mm).
 - 3. Mortar Joints: Concave.

3.05 PLACING AND BONDING

- A. Lay solid masonry units in full bed of mortar, with full head joints, uniformly jointed with other work.
- B. Lay hollow masonry units with face shell bedding on head and bed joints.
- C. Buttering corners of joints or excessive furrowing of mortar joints is not permitted.
- D. Remove excess mortar and mortar smears as work progresses.
- E. Remove excess mortar with water repellent admixture promptly. Do not use acids, sandblasting or high pressure cleaning methods.
- F. Interlock intersections and external corners.
- G. Do not shift or tap masonry units after mortar has achieved initial set. Where adjustment must be made, remove mortar and replace.
- H. Perform job site cutting of masonry units with proper tools to provide straight, clean, unchipped edges. Prevent broken masonry unit corners or edges.
- I. Cut mortar joints flush where wall tile is scheduled or resilient base is scheduled.

3.06 WEEPS/CAVITY VENTS

- A. Install weeps in veneer and cavity walls at 24 inches (600 mm) on center horizontally on top of through-wall flashing above shelf angles and lintels and at bottom of walls.
- B. Install cavity vents in veneer and cavity walls at 32 inches (800 mm) on center horizontally below shelf angles and lintels and near top of walls.

3.07 CAVITY MORTAR CONTROL

- A. Do not permit mortar to drop or accumulate into cavity air space or to plug weep/cavity vents.
- B. For cavity walls, build inner wythe ahead of outer wythe to accommodate accessories.
- C. Install cavity mortar control panels continuously throughout full height of exterior masonry cavities during construction of exterior wythe, complying with manufacturer's installation instructions.
 - 1. Hold cavity mortar control panel tight to face wythe.
 - 2. Install horizontally between joint reinforcement.
 - 3. Stagger end joints in adjacent rows.
 - 4. Fit to perimeter construction and penetrations without voids.
- D. Install cavity mortar diverter at base of cavity and at other flashing locations as recommended by manufacturer to prevent mortar droppings from blocking weep/cavity vents.

3.08 REINFORCEMENT AND ANCHORAGE - GENERAL, SINGLE WYTHE MASONRY, AND CAVITY WALL MASONRY

- A. Unless otherwise indicated on drawings or specified under specific wall type, install horizontal joint reinforcement 16 inches (400 mm) on center.
- B. Place masonry joint reinforcement in first and second horizontal joints above and below openings. Extend minimum 16 inches (400 mm) each side of opening.
- C. Place continuous joint reinforcement in first and second joint below top of walls.
- D. Lap joint reinforcement ends minimum 6 inches (150 mm).
- E. Fasten anchors to structural framing and embed in masonry joints as masonry is laid. Unless otherwise indicated on drawings or closer spacing is indicated under specific wall type, space anchors at maximum of 36 inches (900 mm) horizontally and 24 inches (600 mm) vertically.

3.09 REINFORCEMENT AND ANCHORAGE - MASONRY VENEER

- A. Masonry Back-Up: Embed anchors to bond veneer at maximum 16 inches (400 mm) on center vertically and 36 inches (900 mm) on center horizontally. Place additional anchors at perimeter of openings and ends of panels, so maximum spacing of anchors is 8 inches (200 mm) on center.
- B. Seismic Reinforcement: Connect veneer anchors with continuous horizontal wire reinforcement before embedding anchors in mortar.

3.10 REINFORCEMENT AND ANCHORAGES - MULTIPLE WYTHE UNIT MASONRY

- A. Use individual metal ties installed in horizontal joints to bond wythes together. Provide ties spaced as indicated on drawings.
- B. Support and secure reinforcing bars from displacement. Maintain position within 1/2 inch (13 mm) of dimensioned position.

3.11 MASONRY FLASHINGS

- A. Whether or not specifically indicated, install masonry flashing to divert water to exterior at all locations where downward flow of water will be interrupted.
 - 1. Extend flashings full width at such interruptions and at least 6 inches (152 mm), minimum, into adjacent masonry or turn up flashing ends at least 1 inch (25.4 mm), minimum, to form watertight pan at non-masonry construction.

- 2. Remove or cover protrusions or sharp edges that could puncture flashings.
- 3. Seal lapped ends and penetrations of flashing before covering with mortar.
- B. Install flashing in accordance with manufacturer's instructions and BIA Technical Notes No. 7.
- C. Extend metal flashings through exterior face of masonry and terminate in an angled drip with hemmed edge. Install joint sealer below drip edge to prevent moisture migration under flashing.

3.12 LINTELS

- A. Install loose steel lintels over openings.
- B. Install reinforced unit masonry lintels over openings where steel or precast concrete lintels are not scheduled.
- C. Maintain minimum 8 inch (____ mm) bearing on each side of opening.

3.13 GROUTED COMPONENTS

- A. Reinforce bond beams with 2, No. (M) bars, 1 inch (25 mm) from bottom web.
- B. Support and secure reinforcing bars from displacement. Maintain position within 1/2 inch (13 mm) of dimensioned position.
- C. Place and consolidate grout fill without displacing reinforcing.
- D. At bearing locations, fill masonry cores with grout for a minimum 12 inches (300 mm) either side of opening.

3.14 CONTROL AND EXPANSION JOINTS

- A. Do not continue horizontal joint reinforcement through control or expansion joints.
- B. Install preformed control joint device in continuous lengths. Seal butt and corner joints in accordance with manufacturer's instructions.
- C. Size control joints as indicated on drawings; if not indicated, 3/4 inch (19 mm) wide and deep.

3.15 BUILT-IN WORK

- A. As work progresses, install built-in metal door frames and glazed frames and other items to be built into the work and furnished under other sections.
- B. Install built-in items plumb, level, and true to line.
- C. Bed anchors of metal door and glazed frames in adjacent mortar joints. Fill frame voids solid with grout.
 - 1. Fill adjacent masonry cores with grout minimum 12 inches (300 mm) from framed openings.
- D. Do not build into masonry construction organic materials that are subject to deterioration.

3.16 TOLERANCES

- A. Install masonry within the site tolerances found in TMS 402/602.
- B. Maximum Variation from Alignment of Columns: 1/4 inch (6 mm).
- C. Maximum Variation From Unit to Adjacent Unit: 1/16 inch (1.6 mm).
- D. Maximum Variation from Plane of Wall: 1/4 inch in 10 ft (6 mm/3 m) and 1/2 inch in 20 ft (13 mm/6 m) or more.
- E. Maximum Variation from Plumb: 1/4 inch (6 mm) per story non-cumulative; 1/2 inch (13 mm) in two stories or more.
- F. Maximum Variation from Level Coursing: 1/8 inch in 3 ft (3 mm/m) and 1/4 inch in 10 ft (6 mm/3 m); 1/2 inch in 30 ft (13 mm/9 m).
- G. Maximum Variation of Mortar Joint Thickness: Head joint, minus 1/4 inch, plus 3/8 inch (minus 6.4 mm, plus 9.5 mm).

H. Maximum Variation from Cross Sectional Thickness of Walls: 1/4 inch (6 mm).

3.17 CUTTING AND FITTING

- A. Cut and fit for chases. Coordinate with other sections of work to provide correct size, shape, and location.
- B. Obtain approval prior to cutting or fitting masonry work not indicated or where appearance or strength of masonry work may be impaired.

3.18 FIELD QUALITY CONTROL

- A. An independent testing agency will perform field quality control tests, as specified in Section 01 40 00 - Quality Requirements.
- B. Concrete Masonry Unit Tests: Test each variety of concrete unit masonry in accordance with ASTM C140/C140M for compliance with requirements of this specification.
- C. Mortar Tests: Test each type of mortar in accordance with ASTM C780, testing with same frequency as masonry samples.

3.19 CLEANING

- A. Remove excess mortar and mortar droppings.
- B. Replace defective mortar. Match adjacent work.
- C. Clean soiled surfaces with cleaning solution.

3.20 PROTECTION

A. Without damaging completed work, provide protective boards at exposed external corners that are subject to damage by construction activities.

END OF SECTION

SECTION 05 4100

LIGHT GAUGE STEEL TRUSSES

PART 1 - GENERAL

1.1 <u>SUMMARY</u>

- A. Section includes pre-engineered, pre-fabricated light gauge cold-formed steel framing elements. Work includes:
 - 1. Light gauge cold-formed steel roof trusses
 - 2. Anchorage, bracing, and bridging
- B. Related work:
 - 1. Drywall attachment
 - 2. Roofing, fascia, and soffit

1.2 <u>REFERENCES</u>

- A. Reference standards:
 - 1. ASTM
 - a. ASTM A653/A653M, "Sheet Steel, Zinc-Coated (galvanized) or Zinc-Iron Alloy-Coated (Galvanized) by the Hot-Dip Process."
 - b. ASTM A780, "Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings."
 - 2. American Welding Society (AWS)
 - a. AWS D1.1 "Structural Welding Code Steel"
 - b. AWS D1.3 "Structural Welding Code Sheet Steel"
 - 3. AISI
 - AISI, "Specification for the Design of Cold-Formed Steel Structural Members", 2001 Edition with 2004 Supplement
 - b. AISI, "Standard for Cold-Formed Steel Framing General Provisions", 2004 Edition
 - c. AISI, "Standard for Cold-formed Steel Framing Truss Design", 2004 Edition

1.3 <u>PERFORMANCE REQUIREMENTS</u>

- A. Calculate structural characteristics of cold-formed steel truss members according to AISI specifications.
- B. Structural Performance: Design, engineer, fabricate, and erect cold-formed steel trusses to withstand specified design loads within limits and under conditions required.
 - 1. Design Loads: As specified
 - 2. Deflections: Deflection meeting the following (unless otherwise specified):
 - a. Roof Trusses: Vertical Load Deflection less than or equal to 1/240 of the span Vertical live load deflection less than or equal to 1/360 of the span.
 - 3. Design framing systems to provide for movement of framing members without damage or overstressing, sheathing failure, connection failure, undue strain on fasteners and anchors, or other detrimental effects when subject to a maximum ambient temperature change (range) of 120 degrees F (67 degrees C).
- 4. Specifically, the prefabricated light gauge steel roof truss manufacturer (vendor) shall provide the following services:
 - a. Design and supply a complete light gauge steel roof system stamped by a Registered Engineer in the state where the project is located to include all of the following components:
 - 1. Light gauge steel trusses for gravity and lateral loads with truss sizes, gauges, and connections at truss joints.
 - 2. Design and stamp truss to truss connections and truss to bearing connections for gravity, lateral, and uplift loads.

3. Design and stamp the top cord, bottom cord, and web permanent bracing locations.

- 4. Design and stamp the roof deck structural support at eave edge, valley, hip, and ridge transition planes to support corrugated steel or plywood decking.
- 5. Design the roof deck shear transfer framing required to transfer the roof deck shear to the building structure. The Engineer of Record or Architect is responsible for determining the roof diaphragm, the location and magnitude of the roof shear transfer, and the location within the building structure through which this shear will pass.
- 6. Provide stamped calculations and shop drawings for project submittal requirements.

1.4 <u>SUBMITTALS</u>

- A. Submit manufacturer's product data and installation instructions for each type of cold-formed steel framing and accessory required.
- B. Submit shop drawings showing member, type, location, spacing, size, and gauge of member, method of attachment to supporting members, and all necessary details. Indicate supplemental bracing, strapping, splices, bridging, accessories, and details required for proper installation.
- C. Submit detailed floor truss and roof truss layouts.
- D. Submit truss drawings, sealed and signed by a qualified registered Professional Engineer, verifying the truss ability to meet local code and design requirements. Specifically include the engineering and design for <u>all</u> of the following:
 - 1. Description of design criteria.
 - 2. Engineering analysis depicting member stresses and truss deflection
 - 3. Truss member sizes, gauges, and connections at truss joints and truss-to-truss attachment details.
 - 4. Truss reaction at all bearing locations and truss to bearing attachment details.
 - 5. Top chord, bottom chord, and web permanent bracing requirements, and construction and temporary bracing per the latest edition of the Light Gauge Steel Engineers Association (LGSEA), "Field Installation Guidelines".
 - 6. Eave edge, valley, hip, and ridge structural support for roof corrugated or plywood decking.

7. Roof deck shear transfer framing required transferring the roof deck shear to the building structure.

1.5 **QUALITY ASSURANCE**

A. Fabricator Qualifications: Fabrication shall be performed by a cold-formed steel truss fabricator with experience in designing and fabricating cold-formed steel truss systems equal in material, design, and extent to the systems required for this Project.

1. Cold-formed steel truss system installation shall be performed by an experienced installer approved by the steel truss system fabricator.

- B. Welding Standards: Comply with applicable provisions of AWS D1.1, "Structural Welding Code-Steel" and AWS D1.3, "Structural Welding Code-Sheet Steel."
 - 1. Quality welding processes and welding operators in accordance with AWS, "Standard Qualification Procedure."
 - 2. Welding of any nature to these trusses is specifically prohibited unless permission is received from the manufacturer.

1.6 DELIVERY, STORAGE AND HANDLING

- A. Deliver materials in manufacturer's unopened containers or bundles, fully identified by name brand, type, and grade. Exercise care to avoid damage during unloading, storing, and erection.
- B. Store trusses on blocking pallets, platforms, or other supports off the ground and in an upright position sufficiently braced to avoid damage from excessive bending.
- C. Protect trusses and accessories from corrosion, deformation, damage, and deterioration when stored at jobsite. Keep trusses free of dirt and other foreign matter.

1.7 **PROJECT CONDITIONS**

A. During construction, adequately distribute all loads applied to trusses so as not to exceed the carrying capacity of any one (1) joist, truss, or other component.

PART 2 - PRODUCTS

2.1 <u>MANUFACTURERS</u>

- A. Acceptable truss manufacturers for light gauge metal trusses:
 - 1. Authorized distributor of Alpine TrusSteel by ITW Building Components Group, Inc.
 - 2. Authorized distributor of Ultra-Span by Aegis Metal Framing, a division of Mitek

2.2 <u>COMPONENTS</u>

- A. Light Gauge Steel Roof Trusses and Components:
 - 1. Alpine TrusSteel Cold Formed Steel Trusses
 - 2. Ultra-Span Cold Formed Steel Trusses
 - 3. Request for Substitutions will be considered in accordance with provisions of Specification Section 01630. The Architect or Engineer of Record must approve all permitted equals in writing. All applications for substitutions must include samples and technical data.

2.3 <u>MATERIALS</u>

- A. All component gauges: Fabricate components of structural quality steel sheet per ASTM A653/A653M with a minimum yield strength of 45,000 psi.
- B. Bracing, bridging and blocking members: Fabricate components of commercial quality steel sheet per ASTM A653/A653M with a minimum yield strength of 33,000 psi.
- C. Steel truss components: Provide sizes, shapes, and gauges indicated.
 - 1. Design Uncoated-Steel Thickness: 20 gauge, 0.0350 inch (0.91 mm)
 - 2. Design Uncoated-Steel Thickness: 18 gauge, 0.0460 inch (1.20 mm)
 - 3. Design Uncoated-Steel Thickness: 16 gauge, 0.0570 inch (1.52 mm)
 - 4. Design Uncoated-Steel Thickness: 14 gauge, 0.0730 inch (1.90 mm)
- D. Finish: Provide components with protective zinc coating complying with ASTM A653/A653M, minimum G60 coating.
- E. Fastenings:
 - 1. Manufacturer recommended self-drilling, self-tapping screws, with corrosion-resistant plated finish. Fasteners shall be of sufficient size and number to ensure the strength of the connection.
 - 2. Welding of any nature to these trusses is specifically prohibited unless permission is received from the truss manufacturer.
 - 3. Other fasteners as accepted by truss engineer.

2.4 FABRICATION

- A. Factory fabricate cold-formed steel trusses plumb, square, true-to-line, with connections securely fastened, according to manufacturer's recommendations, and the requirements of this section.
 - 1. Fabricate truss assemblies in jig templates
 - 2. Cut truss members by sawing or shearing or plasma cutting
 - 3. Fasten cold-formed steel truss members by screw fastening or other methods as standard with fabricator. Wire tying or welding of framing members is not permitted.
 - a. Locate mechanical fasteners and install according to cold-formed steel truss component manufacturer's instructions with screw penetrating joined members by not less than three (3) exposed screw threads.
- B. Care shall be taken during handling, delivery, and erection. Use of a crane or lull with a spreader bar is recommended for trusses longer than 30 foot. Brace, block, or reinforce truss, as necessary, to minimize member and connection stresses.
- C. Fabrication Tolerances: Fabricate trusses to a maximum allowable tolerance variation from plumb, level, and true-to-line of 1/8 inch in 10 feet (1:960) and as follows:
 - 1. Spacing: Space individual trusses no more than plus or minus 1/8 inch (3mm) from plan location. Cumulative error shall not exceed minimum fastening requirements of sheathing or other finishing materials.
 - 2. Sequencing: Fabricate each cold formed steel truss to a maximum out-of-square tolerance of 1/8 inch (3mm).

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine structure, substrates, and installation conditions. Do not proceed with cold-formed steel truss installations until unsatisfactory conditions have been corrected. Verify that the bearing elevations are correct before trusses are installed.
- B. Installation constitutes acceptance of existing conditions and responsibility for satisfactory performance.

3.2 INSTALLATION - GENERAL

- A. General:
 - 1. Erection of trusses, including proper handling, safety precautions, temporary bracing and other safeguards or procedures are the responsibility of the General Contractor and the installation Subcontractor. The use of a crane or lull with a spreader bar is recommended for trusses over 30 foot.
 - 2. Exercise care and provide erection bracing required to prevent toppling or dominoeing of trusses during erection as identified in the Light Gauge Steel Engineers Association (LGSEA) publication, "Field Installation Guide For Cold-Formed Steel Roof Trusses".
- B. Erect trusses with plane of truss webs vertical and parallel to each other, accurately located at design spacing indicated.
- C. Provide proper lifting equipment suited to sizes and types of trusses required, applied at lift points recommended by truss fabricator and use spreader bars for larger span trusses. Exercise care to avoid damage to truss members during erection and to keep horizontal bending of the trusses to a minimum.
- D. Provide framing anchors as indicated or accepted on the engineering design drawing or erection drawings. Anchor trusses securely at bearing points and the anchor must be attached to the correct side of the truss as shown in the truss drawings and attachment details.
- E. Install roof framing and accessories plumb, square, true to line, and with connections securely fastened, according to manufacturer's recommendations.
 - 1. DO NOT cut truss members without prior approval of truss manufacturer.
 - 2. Fasten cold-formed steel roof framing by mechanical fasteners only per truss manufacturer's recommendation. Wire tying or welding of roof framing is not permitted.
 - a. Welding of any nature to these trusses is strictly prohibited unless specific permission is received from the truss manufacturer.
 - b. Locate mechanical fasteners and install according to cold-formed roof framing manufacturer's instructions with screw penetrating joined members by not less than three (3) exposed screw threads.
 - c. Install roof framing in one-piece lengths, unless splice connections are indicated.

- d. Provide temporary bracing per Light Gauge Steel Engineers Association (LGSEA) publication, "Field Installation Guide For Cold-Formed Steel Roof Trusses", and leave in place until trusses are permanently stabilized.
- F. Erection Tolerances: Install trusses to a maximum allowable tolerance variation from plumb, level, and true-to-line of 1/4 inch in 10 feet (1:480) and as follows:
 - 1. Space individual trusses no more than plus or minus 1/4 inch from plan location. Cumulative error shall not exceed minimum fastening requirements of sheathing or other finishing materials.

3.3 <u>ROOF TRUSS INSTALLATION</u>

- A. Install bridge and brace trusses according to manufacturer's recommendations and requirements of this Section.
- B. Space trusses as shown on the plans.
- C. Do not alter, cut, or remove truss members of connections of trusses.
- D. Erect trusses with plane of truss webs plumb and parallel to each other, align, and accurately position at spacing indicated.
- E. Erect trusses without damaging truss members or connections.
- F. Align truss bottom chords with load-bearing studs or continuously reinforce track to transfer loads to structure. Anchor trusses securely at all bearing points.
- G. Install construction continuous bridging, bracing, cross bracing and diagonal bracing per Light Gauge Steel Engineers Association (LGSEA) publication, "Field Installation Guide for Cold-Formed Steel Roof Trusses".
- H. Attach trusses to trusses per truss manufacturer's recommendation.
- I. Attach trusses to bearing per truss manufacturer's recommendation.
- J. Attach permanent truss lateral and diagonal bracing per manufacturer's recommendation.
- K. Attach roof deck or sheathing structural support per truss manufacturer's recommendation.
- L. Attach roof deck shear transfer framing per truss manufacturer's recommendation.

3.4 <u>REPAIRS AND PROTECTION</u>

A. Galvanizing Repairs: Prepare and repair damaged galvanized coatings on fabricated and installed cold-formed steel framing with galvanizing repair paint according to ASTM A 780 and the manufacturer's instructions.

END OF SECTION

SECTION 05 5000

METAL FABRICATIONS

PART 1 - GENERAL

1.1 <u>RELATED DOCUMENTS</u>:

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and ivision 1 Specification Sections, apply to this Section.
- B. Related work specified elsewhere includes:
 - 1. Section 03310 "Concrete"
 - 2. Section 05210 "Steel Joists"
 - 3. Section 05310 "Steel Deck"
 - 4. Section 09900 "Painting"

1.2 <u>DESCRIPTION OF WORK</u>:

- A. Work described in this section includes metal fabrications, which include items made from iron and steel shapes, plates, bars, strips, tubes, pipes and castings which are not a part of structural steel or other metal systems specified elsewhere. Types of work in this section include metal fabrications for:
 - 1. Rough hardware.
 - 2. Loose bearing and leveling plates.
 - 3. Loose steel lintels.
 - 4. Miscellaneous framing and supports.
 - 5. Cast and extruded aluminum stair nosings; Typical at all exterior stairs at all treads and leading edge of landings down to stairs.
 - 6. Bollards (galvanized steel pipe with galvanized domed cap, concrete fill, paint, etc. Minimum 36-inches height unless other height is specifically indicated on the Drawings).

1.3 <u>QUALITY ASSURANCE</u>:

A. Shop Assembly: Preassemble items in shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation.

1.4 **<u>PERFORMANCE REQUIREMENTS</u>**:

- A. Structural Performance of Ladders: Provide ladders capable of withstanding the effects of loads and stresses within limits and under conditions specified in ANSI A14.3.
- B. Thermal Movements: Provide exterior metal fabrications that allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening of joints, overstressing of components, failure of connections, and

other detrimental effects. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

1. Temperature Change (Range): 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

1.5 <u>SUBMITTALS</u>:

- A. Product Data: Submit manufacturer's specifications, anchor details and installation instructions for products used in miscellaneous metal fabrications, including paint products and grout.
- B. Shop Drawings: Submit shop drawings for fabrication and erection of miscellaneous metal fabrications. Include plans, elevations and details of sections and connections. Show anchorage and accessory items. Provide templates for anchor and bolt installation by others. Where materials or fabrications are indicated to comply with certain requirements for design loadings include structural computations, material properties and other information needed for structural analysis.
 - 1. Show fabrication and installation details. In addition to applicable requirements above, include plans, elevations, sections, and details of connections. Show anchorage and accessory items. Provide templates for anchors and bolts specified for installation under other Sections.
- C. Samples: Submit representative samples of materials and finished products as may be requested by Architect.

1.6 **PROJECT CONDITIONS**:

- A. Field Measurements: Where fabrications are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
 - 1. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabrication without field measurements. Coordinate construction to ensure that actual dimensions correspond to established dimensions. Allow for trimming and fitting acceptable to fabricator's professional engineer, and in a manner that will not affect structural performance, deflection, safety, etc.

1.7 <u>COORDINATION</u>:

A. Coordinate installation of anchorages for metal fabrications and supports. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation, without delaying the work of this section or the Work of the project.

PART 2 - PRODUCTS

2.1 <u>MATERIALS</u>:

- A. Metal Surfaces, General: For fabrication of miscellaneous metal work which will be exposed to view, use only materials which are smooth and free of surface blemishes including pitting, seam marks, roller marks, rolled trade names and roughness.
- B. Ferrous Metals:
 - 1. Steel Plates, Shapes and Bars: ASTM A 36.
 - 2. Steel Bar Grating: ASTM A 569 or ASTM A 36. Galvanized Hot Dipped, GW 75A Smooth, Welded Construction, 1" x 1/8" Bearing Bars, 1-3/16" on Center, Regular Cross Bars 4" on Center.
 - 3. Steel Tubing: Cold formed, ASTM A 500; or hot rolled, ASTM A 501.
 - 4. Structural Steel Sheet: Hot-rolled, ASTM A 570; or cold-rolled ASTM A 611, Class 1; of grade required for design loading.
 - 5. Galvanized Structural Sheet Steel: ASTM A 446, of grade required for design loading. Coating designation as indicated, or if not indicated, G90.
 - 6. Steel Pipe: ASTM A 53; Type and grade (If applicable) as selected by fabricator and as required for design loading; black finish unless galvanizing is indicated; standard weight (schedule 40), unless otherwise indicated.
 - 7. Gray Iron Castings: ASTM A 48, Class 30.
 - 8. Malleable Iron Castings: ASTM A 47, grade as selected by fabricator.
 - 9. Brackets, Flanges and Anchors: Cast or formed metal of the same type material and finish as supported rails, unless otherwise indicated.
 - 10. Concrete Inserts: Threaded or wedge type; galvanized ferrous castings, either malleable iron, ASTM A 47, or cast steel, ASTM A 27. Provide bolts, washers and shims as required, hot-dip galvanized, ASTM A 153.
- C. Non-Ferrous Metals:
 - 1. Aluminum Drawn Seamless Tube: ASTM B 483, 6063-T832.
 - 2. Aluminum Castings: ASTM B 26, 356.0-T6.
 - 3. Aluminum Plate and Sheet: ASTM B 209, 6061-T6.
- D. Grout: Non-Shrink Non-Metallic Grout: Pre-mixed, factory-packaged, non-staining, noncorrosive, non-gaseous grout complying with CE-CRD-C621. Provide grout specifically recommended by manufacturer for interior and exterior applications of type specified in this section.
- E. Fasteners:
 - 1. General: Provide zinc-coated/galvanized fasteners for exterior use or where built into exterior walls. Select fasteners for the type, grade and class required. Provide appropriate grating fasteners for attachment to structural shapes indicated on Drawings.
 - 2. Anchors at exterior walls, and preservative pressure treated (P.T.) and fire-retardant treated wood shall be hot-dip galvanized steel or Type 304 stainless steel.
- F. Paint:
 - 1. Metal Primer Paint: Southern Coatings "Heavy Duty RIP Primer 1-0900", Tnemec A10-99 Primer", or approved equivalent.
 - 2. Primer selected must be compatible with finish coats of paint. Coordinate selection of metal primer with finish paint requirements specified in Section 09900 "Painting".

- 3. Galvanizing Repair Paint: High zinc dust content paint for re-galvanizing welds in galvanized steel, complying with Military Specifications MIL-P-21035 (Ships), or SSPC-Paint-20.
- 4. Bituminous Paint: Cold-applied asphalt mastic complying with SSPC-Paint 12, except containing no asbestos fibers, or cold-applied asphalt emulsion complying with ASTM D 1187.

2.2 <u>FABRICATION, GENERAL</u>:

A. Workmanship:

- 1. Use materials of size and thickness shown or, if not shown, of required size and thickness to produce strength and durability in finished product. Work to dimensions shown or accepted on shop drawings, using proven details of fabrication and support. Use type of materials shown or specified for various components of work.
- 2. Form exposed work true to line and level with accurate angles and surfaces and straight sharp edges. Ease exposed edges to a radius of approximately 1/32-inch unless otherwise shown. Form bent metal corners to smallest radius possible without causing grain separation or otherwise impairing work.
- 3. Weld corners and seams continuously, complying with AWS recommendations. At exposed connections, grind exposed welds smooth and flush to match and blend with adjoining surfaces.
- 4. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners wherever possible. Use exposed fasteners of type shown, or if not shown, Phillips flathead (countersunk) screws or bolts.
- 5. Provide for anchorage of type shown, coordinated with supporting structure. Fabricate and space anchoring devices to provide adequate support for intended use.
- 6. Cut, reinforce, drill and tap miscellaneous metal work as indicated to receive finish hardware and similar items.
- 7. Fabricate joints which will be exposed to weather in a manner to exclude water or provide weep holes where water may accumulate.
- B. Galvanizing: Provide a zinc coating for those items shown or specified to be galvanized, as follows:
 - 1. ASTM A 153 for galvanizing iron and steel hardware.
 - 2. ASTM A 123 for galvanizing rolled, pressed and forged steel shapes, plates, bars, and strip 1/8-inch thick and heavier.
 - 3. ASTM A 386 for galvanizing assembled steel products.
- C. Shop Painting:
 - 1. Apply shop primer to surfaces of metal fabrications except those which are galvanized or as indicated to be embedded in concrete or masonry, unless otherwise indicated, and in compliance with requirements of SSPC-PA1 "Paint Application Specification No. 1" for shop painting.
 - 2. Stripe paint all edges, corners, crevices, bolts, welds and sharp edges.
- D. Surface Preparation:
 - 1. Prepare ferrous metal surfaces to comply with minimum requirements indicated below for SSPC surface preparation specification and environmental exposure conditions of installed metal fabrications, except where otherwise recommended in current written instructions and recommendations of paint manufacturer for the substrates to be painted:
 - a. Exterior (SSPC Zone 1B): SSPC-SP6 "Commercial Blast Cleaning."

b. Interiors (SSPC Zone 1A): SSPC-SP3 "Power Tool Cleaning."

2.3 **ROUGH HARDWARE:**

- A. Furnish bent or otherwise custom fabricated bolts, plates, anchors, hangers, dowels and other miscellaneous steel and iron shapes as required for framing and supporting woodwork, and for anchoring or securing woodwork to concrete or other structures. Straight bolts and other stock rough hardware items are specified in Division 6 sections.
- B. Fabricate items of sizes, shapes and dimensions required. Furnish malleable iron washers for heads and nuts which bear on wood structural connections; elsewhere, furnish steel washers.

2.4 LOOSE BEARING AND LEVELING PLATES:

A. Provide loose bearing and leveling plates for steel items bearing on masonry or concrete construction, made flat, free from warps or twists, and of required thickness and bearing area. Drill plates to receive anchor bolts and for grouting as required. Galvanize after fabrication.

2.5 LOOSE STEEL LINTELS:

- Provide structural steel lintels for openings and recesses in masonry walls and partitions as shown. Α. Weld adjoining members together to form a single unit where indicated. Provide not less than 8inches bearing at each side of openings, unless otherwise shown.
 - Galvanize all steel lintels in exterior walls. 1.

2.6 **MISCELLANEOUS FRAMING AND SUPPORTS:**

- A. Provide miscellaneous steel framing and supports which are not a part of structural steel framework, as required to complete work.
- Β. Fabricate miscellaneous units to sizes, shapes and profiles shown or, if not shown, of required dimensions to receive adjacent other work to be retained by framing. Except as otherwise shown, fabricate from structural steel shapes and plates and steel bars, of welded construction using mitered joints for field connection. Cut, drill and tap units to receive hardware and similar items.
- C. Equip units with integrally welded anchors for casting into concrete or building into masonry. Furnish inserts if units must be installed after concrete is placed. Except as otherwise shown, space anchors 24-inches o.c. and provide minimum anchor units of 1-1/4-inches wide x 1/4-inch x 8-inch long steel straps.
- D. Galvanize exterior miscellaneous frames and supports.

2.7 CAST AND EXTRUDED ALUMINUM STAIR NOSINGS:

- A. For new exterior concrete stairs (at all treads and leading edge of landings down to stairs); Fabricate units of metal indicated below in sizes and configurations indicated and in lengths necessary to accurately fit openings or conditions. Provide units with an integral abrasive finish consisting of aluminum oxide, silicon carbide, or a combination of both.
 - 1. Metal: Cast aluminum, abrasive finish at tread; Extruded aluminum with abrasive inserts in colors selected.

- 2. Configurations: Provide units at every concrete stair nosing, including leading edge of each landing, whether or not indicated on the Drawings, and in the following configurations, unless otherwise indicated, equivalent to standard products indicated, as manufactured by American Safety Tread, Inc. (Phone: 1-800-245-4881):
 - a. Cast Aluminum Nosings for Cast-In-Place Concrete Stairs: Equivalent to Style No. 816, cross-hatched units, 4 inches (100 mm) wide x tread length less 6 inches at each end, for casting flush into cast-in-place concrete steps.
 - Metal Pan Type Cast Aluminum Stair Nosings <u>Only where not provided with</u> another type of nosing or covered with rubber stair treads: Equivalent to Style No. 820, cross-hatched units, 4 inches (100 mm) wide x tread length, for casting into steel pan concrete filled steps.
- 3. Provide anchors for embedding units in concrete, as an integral part of nosing units, as standard with manufacturer.
- 4. Apply bituminous paint to concealed bottoms, sides, and edges of units set into concrete.
- 5. Provide cast-in silicone carbide granules embedded into walking surface, at top of tread and where cross-hatched surfaces are indicated.
- 6. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. American Safety Tread Co., Inc. (Basis for Design)
 - b. Amstep Products.
 - c. Armstrong Products, Inc.
 - d. Balco/Metalines, Inc.
 - e. Granite State Casting Co.
 - f. Safe-T-Metal Co.
 - g. Wooster Products Inc.

2.8 <u>LADDERS - GENERAL</u>:

- A. General: Fabricate ladders for the locations shown, with dimensions, spacings, details, and anchorages as indicated.
 - 1. Comply with requirements of ANSI A14.3, unless otherwise indicated.
 - 2. Support each ladder at top and bottom and not more than 60 inches (1500 mm) o.c., with welded or bolted brackets, made from same metal as ladder.

2.9 <u>STEEL LADDERS</u>:

- A. General: Fabricate ladders for the locations shown, with dimensions, spacings, details, and anchorages as indicated. Comply with requirements of ANSI A14.3, unless otherwise indicated.
- B. Siderails: Continuous, steel, 1/2 by 2-1/2-inch (12-mm by 64-mm) flat bars, with eased edges, spaced 18 inches (460 mm) apart, unless otherwise indicated.
- C. Bar Rungs: 3/4-inch (19-mm) diameter steel bars, spaced 12 inches (300 mm) o.c., unless otherwise indicated.
- D. Fit rungs in centerline of side rails, plug weld and grind smooth on outer rail faces.
- E. Support each ladder at top and bottom and at intermediate points spaced not more than 5 feet (1.5 m) o.c. with welded or bolted steel brackets.

- 1. Size brackets to support design dead and live loads indicated and to hold centerline of ladder rungs clear of the wall surface by not less than 7 inches (180 mm).
- 2. Extend side rails 42 inches (1.1 m) above top rung, and return rails to wall or structure unless other secure handholds are provided. If the adjacent structure does not extend above the top rung, gooseneck the extended rails back to the structure to provide secure ladder access.
- F. Provide nonslip surfaces on top of each rung, either by coating the rung with aluminum-oxide granules set in epoxy-resin adhesive, or by using a type of manufactured rung that is filled with aluminum-oxide grout.
- G. Galvanize ladders, including brackets and fasteners at exterior locations.
- H. Finishes: Shop applied prime paint, 2 coats, for all components. Refer to Section 09900 "Painting", for finish painting, not the work of this Section 05500.
 - 1. All anchors, anchorage components, etc., shall be hot-dipped galvanized steel.

PART 3 - EXECUTION

3.1 **PREPARATION**:

- A. Field Measurements: Take field measurements prior to preparation of shop drawings and fabrication, where possible. Do not delay job progress; allow for trimming and fitting where taking field measurements before fabrication might delay work.
- B. Coordinate and furnish anchorages, setting drawings, diagrams, templates, instructions, and directions for installation of anchorages, such as concrete insets, sleeves, anchor bolts and miscellaneous items having integral anchors, which are to be embedded in concrete or masonry construction. Coordinate delivery of such items to project site.

3.2 <u>INSTALLATION</u>:

- A. General:
 - 1. Fastening to In-Place Construction: Provide anchorage devices and fasteners where necessary for securing miscellaneous metal fabrications to in-place construction, including threaded fasteners for concrete and masonry inserts, toggle bolts, through-bolts, lag bolts, wood screws and other connectors as required.
 - 2. Cutting, Fitting and Placement: Perform cutting, drilling and fitting required for installation of miscellaneous metal fabrications. Set work accurately in location, alignment and elevation, plumb, level, true and free of rack, measured from established lines and levels. Provide temporary bracing or anchors in formwork for items which are to be built into concrete, masonry or similar construction.
 - 3. Fit exposed connections accurately together to form tight hairline joints. Weld connections which are not to be left as exposed joints, but cannot be shop welded because of shipping size limitations. Grind exposed joints smooth and touch up shop paint coat. Do not weld, cut or abrade the surfaces of exterior units which have been hot-dip-galvanized after fabrication, and are intended for bolted or screwed field connections.

- B. Field Welding: Comply with AWS Code for procedures of manual shielded metal arc welding, appearance and quality of welds made, and methods used in correcting welding work.
- C. Setting Loose Plates:
 - 1. Clean concrete and masonry bearing surfaces of any bond-reducing materials, and roughen to improve bond to surfaces. Clean bottom surface of bearing plates.
 - 2. Set loose leveling and bearing plates on wedges, or other adjustable devices. After the bearing members have been positioned and plumbed, tighten the anchor bolts. Do not remove wedges or shims, but if protruding, cut off flush with the edge of the bearing plate before packing with grout. Use non-metallic, non-shrink grout.
 - 3. Pack grout solidly between bearing surfaces and plates to insure that no voids remain.

3.3 <u>ADJUST AND CLEAN</u>:

- A. Touch up Painting:
 - 1. Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with same materials as used for shop painting.
 - 2. Apply by brush or spray to provide a minimum dry film thickness of 2.0 mils.
- B. For Galvanized Surfaces: Clean field welds, bolted connections and abraded areas and apply galvanized repair paint to comply with ASTM A 780.

END OF METAL FABRICATIONS

SECTION 05 52 13 PIPE AND TUBE RAILINGS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Free-standing railings at steps.

1.02 RELATED REQUIREMENTS

- A. Section 03 30 00 Cast-in-Place Concrete: Placement of anchors in concrete.
- B. Section 09 91 13 Exterior Painting: Paint finish.
- C. Section 09 91 23 Interior Painting: Paint finish.

1.03 REFERENCE STANDARDS

- A. ADA Standards Americans with Disabilities Act (ADA) Standards for Accessible Design; 2010.
- B. ASTM A500/A500M Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes; 2013.
- C. ASTM E935 Standard Test Methods for Performance of Permanent Metal Railing Systems and Rails for Buildings; 2013.
- D. ASTM E985 Standard Specification for Permanent Metal Railing Systems and Rails for Buildings; 2000 (Reapproved 2006).

1.04 SUBMITTALS

- A. See Section 01 30 00 Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Indicate profiles, sizes, connection attachments, anchorage, size and type of fasteners, and accessories.

PART 2 PRODUCTS

2.01 RAILINGS - GENERAL REQUIREMENTS

- A. Design, fabricate, and test railing assemblies in accordance with the most stringent requirements of ASTM E985 and applicable local code.
- B. Distributed Loads: Design railing assembly, wall rails, and attachments to resist distributed force of 75 pounds per linear foot applied to the top of the assembly and in any direction, without damage or permanent set. Test in accordance with ASTM E935.
- C. Concentrated Loads: Design railing assembly, wall rails, and attachments to resist a concentrated force of 200 pounds applied at any point on the top of the assembly and in any direction, without damage or permanent set. Test in accordance with ASTM E935.
- D. Allow for expansion and contraction of members and building movement without damage to connections or members.
- E. Dimensions: See drawings for configurations and heights.
 - 1. Top Rails and Wall Rails: 1-1/2 inches diameter, round.
 - 2. Intermediate Rails: 1-1/2 inches diameter, round.
 - 3. Posts: 1-1/2 inches diameter, round.
- F. Provide anchors and other components as required to attach to structure, made of same materials as railing components unless otherwise indicated; where exposed fasteners are unavoidable provide flush countersunk fasteners.

G. Provide slip-on non-weld mechanical fittings to join lengths, seal open ends, and conceal exposed mounting bolts and nuts, including but not limited to elbows, T-shapes, splice connectors, flanges, escutcheons, and wall brackets.

2.02 STEEL RAILING SYSTEM

- A. Steel Tube: ASTM A500/A500M, Grade B cold-formed structural tubing.
- B. Non-Weld Mechanical Fittings: Slip-on, galvanized malleable iron castings, for Schedule 40 pipe, with flush setscrews for tightening by standard hex wrench, no bolts or screw fasteners.
- C. Exposed Fasteners: No exposed bolts or screws.

2.03 FABRICATION

- A. Accurately form components to suit specific project conditions and for proper connection to building structure.
- B. Fit and shop assemble components in largest practical sizes for delivery to site.
- C. Fabricate components with joints tightly fitted and secured. Provide spigots and sleeves to accommodate site assembly and installation.
- D. Welded Joints:
 - 1. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.
- E. Exterior Railing and handrails shall be hot dipped galvanized, shop primed, and powder coated. Al interior railings and handrails shall be shop primed and powder coated. See architectural plans for color.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that field conditions are acceptable and are ready to receive work.

3.02 PREPARATION

- A. Clean and strip primed steel items to bare metal where site welding is required.
- B. Supply items required to be cast into concrete or embedded in masonry with setting templates, for installation as work of other sections.

3.03 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Install components plumb and level, accurately fitted, free from distortion or defects, with tight joints.
- C. Install railings in compliance with ADA Standards for accessible design at applicable locations.
- D. Anchor railings securely to structure.
- E. Conceal anchor bolts and screws whenever possible. Where not concealed, use flush countersunk fastenings.

3.04 TOLERANCES

- A. Maximum Variation From Plumb: 1/4 inch per floor level, non-cumulative.
- B. Maximum Offset From True Alignment: 1/4 inch.
- C. Maximum Out-of-Position: 1/4 inch.

END OF SECTION

SECTION 06 10 00 ROUGH CARPENTRY

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Roofing nailers.
- B. Miscellaneous framing and sheathing.
- C. Communications and electrical room mounting boards.
- D. Concealed wood blocking, nailers, and supports.

1.02 RELATED REQUIREMENTS

A. Section 07 62 00 - Sheet Metal Flashing and Trim: Sill flashings.

1.03 REFERENCE STANDARDS

- A. ASTM A153/A153M Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2009.
- B. ASTM E84 Standard Test Method for Surface Burning Characteristics of Building Materials; 2014.
- C. AWPA U1 Use Category System: User Specification for Treated Wood; American Wood Protection Association; 2012.
- D. PS 2 Performance Standard for Wood-Based Structural-Use Panels; National Institute of Standards and Technology, U.S. Department of Commerce; 2010.
- E. PS 20 American Softwood Lumber Standard; National Institute of Standards and Technology, Department of Commerce; 2010.

1.04 SUBMITTALS

- A. See Section 01 30 00 Administrative Requirements, for submittal procedures.
- B. Product Data: Provide technical data on insulated sheathing, wood preservative materials, and application instructions.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. General: Cover wood products to protect against moisture. Support stacked products to prevent deformation and to allow air circulation.
- B. Fire Retardant Treated Wood: Prevent exposure to precipitation during shipping, storage, or installation.

PART 2 PRODUCTS

2.01 GENERAL REQUIREMENTS

- A. Dimension Lumber: Comply with PS 20 and requirements of specified grading agencies.
 - 1. If no species is specified, provide any species graded by the agency specified; if no grading agency is specified, provide lumber graded by any grading agency meeting the specified requirements.
 - 2. Grading Agency: Any grading agency whose rules are approved by the Board of Review, American Lumber Standard Committee (www.alsc.org) and who provides grading service for the species and grade specified; provide lumber stamped with grade mark unless otherwise indicated.
- B. Lumber fabricated from old growth timber is not permitted.

2.02 DIMENSION LUMBER FOR CONCEALED APPLICATIONS

- A. Sizes: Nominal sizes as indicated on drawings, S4S.
- B. Moisture Content: S-dry or MC19.
- C. Miscellaneous Framing, Blocking, Nailers, Grounds, and Furring:
 - 1. Lumber: S4S, No. 2 or Standard Grade.
 - 2. Boards: Standard or No. 3.
 - 3. Fire retardant where applicable to construction type.

2.03 CONSTRUCTION PANELS

- A. Subfloor/Underlayment Combination: Oriented strand board wood structural panel; PS 2, rated Single Floor.
 - 1. Edges: Tongue and groove.
 - 2. Surface Finish: Fully sanded face.
 - 3. Exposure Time: Sheathing will not delaminate or require sanding due to moisture absorption from exposure to weather for up to 500 days.
 - 4. Manufacturers:
 - a. Huber Engineered Woods, LLC; Product: AdvanTech Flooring: www.huberwood.com.
- B. Communications and Electrical Room Mounting Boards: PS 1 A-D plywood; 3/4 inch thick; flame spread index of 25 or less, smoke developed index of 450 or less, when tested in accordance with ASTM E84.

2.04 ACCESSORIES

- A. Fasteners and Anchors:
 - 1. Metal and Finish: Hot-dipped galvanized steel per ASTM A 153/A 153M for high humidity and preservative-treated wood locations, unfinished steel elsewhere.
- B. Sill Flashing: As specified in Section 07 62 00.
- C. Subfloor Glue: Waterproof, air cure type, cartridge dispensed.

2.05 FACTORY WOOD TREATMENT

- A. Treated Lumber and Plywood: Comply with requirements of AWPA U1 Use Category System for wood treatments determined by use categories, expected service conditions, and specific applications.
 - 1. Fire-Retardant Treated Wood: Mark each piece of wood with producer's stamp indicating compliance with specified requirements.
 - 2. Preservative-Treated Wood: Provide lumber and plywood marked or stamped by an ALSC-accredited testing agency, certifying level and type of treatment in accordance with AWPA standards.

PART 3 EXECUTION

3.01 PREPARATION

- A. Where wood framing bears on cementitious foundations, install full width sill flashing continuous over top of foundation, lap ends of flashing minimum of 4 inches and seal.
- B. Coordinate installation of rough carpentry members specified in other sections.

3.02 INSTALLATION - GENERAL

- A. Select material sizes to minimize waste.
- B. Reuse scrap to the greatest extent possible; clearly separate scrap for use on site as accessory components, including: shims, bracing, and blocking.

C. Where treated wood is used on interior, provide temporary ventilation during and immediately after installation sufficient to remove indoor air contaminants.

3.03 BLOCKING, NAILERS, AND SUPPORTS

- A. Provide framing and blocking members as indicated or as required to support finishes, fixtures, specialty items, and trim.
- B. In metal stud walls, provide continuous blocking around door and window openings for anchorage of frames, securely attached to stud framing.
- C. In walls, provide blocking attached to studs as backing and support for wall-mounted items, unless item can be securely fastened to two or more studs or other method of support is explicitly indicated.
- D. Provide the following specific non-structural framing and blocking:
 - 1. Cabinets and shelf supports.
 - 2. Wall brackets.
 - 3. Handrails.
 - 4. Grab bars.
 - 5. Towel and bath accessories.
 - 6. Wall-mounted door stops.
 - 7. Chalkboards and marker boards.
 - 8. Wall paneling and trim.
 - 9. Joints of rigid wall coverings that occur between studs.

3.04 INSTALLATION OF CONSTRUCTION PANELS

- A. Subflooring/Underlayment Combination: Screw to framing; staples are not permitted.
- B. Communications and Electrical Room Mounting Boards: Secure with screws to studs with edges over firm bearing; space fasteners at maximum 24 inches on center on all edges and into studs in field of board.
 - 1. At fire-rated walls, install board over wall board indicated as part of the fire-rated assembly.
 - 2. Where boards are indicated as full floor-to-ceiling height, install with long edge of board parallel to studs.
 - 3. Install adjacent boards without gaps.

3.05 TOLERANCES

- A. Framing Members: 1/4 inch from true position, maximum.
- B. Surface Flatness of Floor: 1/8 inch in 10 feet maximum, and 1/4 inch in 30 feet maximum.
- C. Variation from Plane (Other than Floors): 1/4 inch in 10 feet maximum, and 1/4 inch in 30 feet maximum.

3.06 CLEANING

- A. Waste Disposal: Comply with the requirements of Section 01 74 19.1. Do not burn scrap on project site.
- B. Do not leave any wood, shavings, sawdust, etc. on the ground or buried in fill.
- C. Prevent sawdust and wood shavings from entering the storm drainage system.

END OF SECTION

SECTION 06 20 0 FINISH CARPENTRY

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Finish carpentry items.
- B. Hardware and attachment accessories.

1.02 REFERENCE STANDARDS

- A. ANSI A208.1 American National Standard for Particleboard; 2009.
- B. AWI/AWMAC/WI (AWS) Architectural Woodwork Standards; 2014.
- C. BHMA A156.9 American National Standard for Cabinet Hardware; Builders Hardware Manufacturers Association; 2010 (ANSI/BHMA A156.9).
- D. NEMA LD 3 High-Pressure Decorative Laminates; National Electrical Manufacturers Association; 2005.
- E. PS 1 Structural Plywood; 2009.

1.03 ADMINISTRATIVE REQUIREMENTS

- A. Coordinate the work with plumbing rough-in, electrical rough-in, and installation of associated and adjacent components.
- B. Sequence installation to ensure utility connections are achieved in an orderly and expeditious manner.

1.04 SUBMITTALS

- A. See Section 01 30 00 Administrative Requirements for submittal procedures.
- B. Shop Drawings: Indicate materials, component profiles, fastening methods, jointing details, and accessories.
 - 1. Minimum Scale of Detail Drawings: 1-1/2 inch to 1 foot.

1.05 QUALITY ASSURANCE

A. Fabricator Qualifications: Company specializing in fabricating the products specified in this section with minimum five years of documented experience.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Protect work from moisture damage.

PART 2 PRODUCTS

2.01 FINISH CARPENTRY ITEMS

- A. Quality Grade: Unless otherwise indicated provide products of quality specified by AWI/AWMAC/WI (AWS) for Custom Grade.
- B. Interior Woodwork Items:
 - 1. Moldings, Bases, Casings, and Miscellaneous Trim: Clear Poplar; prepare for paint finish.

2.02 LUMBER MATERIALS

A. Hardwood Lumber: Poplar species, Plain sawn, maximum moisture content of 6 percent; with vertical grain, of quality suitable for transparent finish.

2.03 SHEET MATERIALS

A. Softwood Plywood Not Exposed to View: Any face species, veneer core; PS 1 Grade A-B; glue type as recommended for application.

B. Particleboard: ANSI A208.1; composed of wood chips, sawdust, or flakes of medium density, made with waterproof resin binders; of grade to suit application; sanded faces.

2.04 PLASTIC LAMINATE MATERIALS

- A. Plastic Laminate: NEMA LD 3, HGS; color as selected; finish as selected.
- B. Low Pressure Laminate: Melamine; Color as indicated, and gloss surface texture.

2.05 FASTENINGS

- A. Adhesive for Purposes Other Than Laminate Installation: Suitable for the purpose; not containing formaldehyde or other volatile organic compounds.
- B. Fasteners: Of size and type to suit application; satin finish in concealed locations and satin finish in exposed locations.

2.06 ACCESSORIES

- A. Lumber for Shimming, Blocking, and _____: Softwood lumber of any species.
- B. Plastic Edge Trim: Extruded convex shaped; smooth finish; self locking serrated tongue; of width to match component thickness; selected color.
- C. Primer: Alkyd primer sealer.
- D. Wood Filler: Solvent base, tinted to match surface finish color.

2.07 HARDWARE

A. Hardware: Comply with BHMA A156.9.

2.08 FABRICATION

- A. Shop assemble work for delivery to site, permitting passage through building openings.
- B. Cap exposed plastic laminate finish edges with plastic trim.
- C. When necessary to cut and fit on site, provide materials with ample allowance for cutting. Provide trim for scribing and site cutting.
- D. Apply plastic laminate finish in full uninterrupted sheets consistent with manufactured sizes. Fit corners and joints hairline; secure with concealed fasteners. Slightly bevel arises. Locate counter butt joints minimum 2 feet from sink cut-outs.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify adequacy of backing and support framing.
- B. Verify mechanical, electrical, and building items affecting work of this section are placed and ready to receive this work.

3.02 INSTALLATION

- A. Install work in accordance with AWI/AWMAC/WI (AWS) requirements for grade indicated.
- B. Set and secure materials and components in place, plumb and level.
- C. Carefully scribe work abutting other components, with maximum gaps of 1/32 inch. Do not use additional overlay trim to conceal larger gaps.

3.03 TOLERANCES

- A. Maximum Variation from True Position: 1/16 inch.
- B. Maximum Offset from True Alignment with Abutting Materials: 1/32 inch.

END OF SECTION

SECTION 07 1113

BITUMINOUS DAMPPROOFING

PART 1 - GENERAL

1.1 <u>RELATED DOCUMENTS</u>:

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 <u>SUMMARY</u>:

- A. This Section includes the following:
 - 1. Cold-applied, asbestos-free asphalt emulsion dampproofing, "pin-hole free", that is resistant to water penetration, and which is VOC compliant.
 - 2. Applications to exterior face of all concealed back-up masonry and concrete in exterior walls.

1.3 <u>SUBMITTALS</u>:

- A. General: Submit each item in this Article according to the Conditions of the Contract and Division 1 Specification Sections.
- B. Product data for each type of product specified, including data substantiating that materials comply with requirements for each dampproofing material specified. Include recommended method of application, recommended primer, number of coats, coverage or thickness, and recommended protection course.
 - 1. Certification by dampproofing manufacturer that products supplied comply with local regulations controlling use of volatile organic compounds (VOC's).

1.4 **QUALITY ASSURANCE**:

- A. Installer Qualifications: Engage an experienced Installer who has completed bituminous dampproofing similar in material, design, and extent to that indicated for this Project and with a verifiable record of successful in-service performance.
 - 1. Refer to Section 01015 "Special Conditions", for additional information and minimum experience requirements.
- B. Single-Source Responsibility: Obtain primary dampproofing materials and primers from one source and by a single manufacturer. Provide secondary materials only as recommended by manufacturer of primary materials.

1.5 **PROJECT CONDITIONS**:

- A. Substrate: Proceed with dampproofing only after substrate construction and penetrating work have been completed.
- B. Weather Limitations: Proceed with dampproofing only when existing and forecasted weather conditions will permit work to be performed according to manufacturer's recommendations and warranty requirements.

PART 2 - PRODUCTS

2.1 <u>MANUFACTURERS</u>:

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Cold-Applied, Asphalt Emulsion Dampproofing:
 - a. BASF Building Systems.
 - b. Euclid Chemical Co.
 - c. Henry Company
 - d. Karnak Chemical Corporation.
 - e. Koppers Industries, Inc.
 - f. Meadows: W.R. Meadows, Inc.

2.2 <u>BITUMINOUS DAMPPROOFING</u>:

- A. General: Provide products recommended by manufacturer for designated application.
- B. Cold-Applied, Asphalt Emulsion Dampproofing: Asphalt-based emulsions recommended by the manufacturer for dampproofing use when applied according to the manufacturer's instructions.
 - 1. Spray Grade: Emulsified asphalt, prepared with mineral-colloid emulsifying agents without fibrous reinforcement, complying with ASTM D 1227, Type I (spray) or Type II (brush).
- C. Product/Manufacturer: Equivalent to "Sealmastic" emulsion dampproofing, as manufactured by W.R. Meadows of Georgia; Austell, Georgia; Phone: (404) 948-1934.

2.3 <u>MISCELLANEOUS MATERIALS</u>:

- A. Primer: Asphalt primer complying with ASTM D 41, for asphalt-based dampproofing.
- B. Glass Fabric Reinforcing: Woven glass fabric, treated with asphalt, complying with ASTM D 1668, Type I.

- C. Protection Course, Board Type: Premolded, 1/8-inch- (3-mm-) thick, multi-ply, semi-rigid board, consisting of a mineral-stabilized asphalt core sandwiched between layers of asphalt-saturated felt, and faced on one side with polyethylene film.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. MasterSeal 977: BASF Building Systems.
 - b. Bituthene Asphaltic Hardboard; Grace: W.R. Grace & Co.
 - c. PC-2 Protection Course; Meadows: W.R. Meadows, Inc.
 - 2. When rigid insulation in cavity wall is acceptable as protection board to Manufacturer of dampproofing product, and such rigid insulation is indicated to be provided, omit additional/separate protection board.

PART 3 - EXECUTION

3.1 <u>PREPARATION</u>:

- A. Clean substrate of projections and substances detrimental to work; comply with recommendations of prime materials manufacturer.
- B. Install cant strips and similar accessories as shown and as recommended by prime materials manufacturer even though not shown.
- C. Fill voids, seal joints, and apply bond breakers, if any, as recommended by prime materials manufacturer, with particular attention at construction joints.
- D. Install separate flashings and corner protection stripping, as recommended by prime materials manufacturer, where indicated to precede application of dampproofing. Comply with details shown and with manufacturer's recommendations. Pay particular attention to requirements at building expansion joints, if any.
- E. Prime substrate, if recommended by prime materials manufacturer.
- F. Protection of Other Work: Do not allow liquid and mastic compounds to enter and clog drains and conductors. Prevent spillage and migration onto other surfaces of work by masking or otherwise protecting adjoining work.

3.2 INSTALLATION, GENERAL:

- A. Comply with manufacturer's current written instructions and recommendations except where more stringent requirements are indicated and where Project conditions require extra precautions to ensure satisfactory performance of work.
 - 1. All dampproofing applications shall be "pin-hole free".
- B. Application: Apply dampproofing to the following surfaces.

- 1. Exterior, below-grade surfaces of exterior concrete and masonry walls in contact with earth or other backfill and where space is enclosed on opposite side.
- 2. Back side of concrete and masonry retaining walls to prevent percolating of water through the wall or facing.
- 3. Exterior surface of inside wythe of double-wythe, exterior masonry walls and at concrete back-up walls above grade, to prevent water-vapor penetration through the wall.
- 4. Any additional locations indicated on the Drawings.
- C. Reinforcement: At changes in plane and/or where otherwise shown as "reinforced," install lapped course of glass fabric in first coat of dampproofing compound before it thickens.
- D. Bituminous Cant Strips: If recommended by manufacturer of primary dampproofing system, install 2-by-2-inch (50-by-50-mm) or other recommended size cant strip of bituminous grout at base of vertical dampproofing where it meets horizontal surface.
- E. Apply vertical dampproofing full height, from top of walls, down walls to top of footing. Extend 12 inches (300 mm) onto intersecting walls and footings, but do not extend onto surfaces exposed to view when the Project is completed.

3.3 COLD-APPLIED, ASPHALT EMULSION DAMPPROOFING:

- A. Spray or Brush Grade: Detailing of corners, off-sets, and similar substrates anticipated to be accomplished by brush-on application.
 - 1. Apply primer if necessary, according to current written requirements of primary coating manufacturer for substrate and location of various project applications, in accordance with current written directions and recommendations.
 - 2. Brush or spray apply a coat of asphalt emulsion dampproofing at a rate of 1.5 to 2.5 gal./100 sq. ft. (0.6 to 1 L/sq. m), depending on substrate texture, to produce a uniform, dry-film thickness of not less than 15 mils (0.4 mm). Apply in 2 coats at locations where reinforcing mesh is indicated, and if otherwise necessary to obtain required thickness, allowing time for complete drying between coats.

3.4 **PROTECTION AND CLEANING**:

A. Protect exterior, below-grade dampproofing membrane from damage until backfill is completed. Remove overspray and spilled materials from surfaces not intended to receive dampproofing.

3.5 INSTALLATION OF PROTECTION COURSE:

A. General: Where indicated, install protection course of type indicated over completed-and-cured dampproofing treatment. Comply with dampproofing materials manufacturer's recommendations for method of support or attaching of protection materials. Support with spot application of trowel-grade mastic where not otherwise indicated. END OF BITUMINOUS DAMPPROOFING

SECTION 07 2120

BATT INSULATION

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Batt insulation where indicated in drawings and specified.
- B. Batt insulation for filling perimeter window and door shim spaces and crevices in exterior wall and roof.
- C. Board insulation for behind manufactured metal wall panels.

1.02 RELATED REQUIREMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
- B. Section Gypsum Board Assemblies: Supporting structure for batt insulation.
- C. Section Manufactured Wall Panels.

1.03 REFERENCE STANDARDS

- A. ASTM E 84 Standard Test Method for Surface Burning Characteristics of Building Materials; 2010.
- B. ASTM E 136 Standard Test Method for Behavior of Materials in a Vertical Tube Furnace At 750 Degrees C; 2009b.

1.04 SUBMITTALS

- A. See Section Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on product characteristics, performance criteria, and product limitations.

1.05 FIELD CONDITIONS

A. Do not install insulation adhesives when temperature or weather conditions are detrimental to successful installation.

PART 2 - PRODUCTS

2.01 BATT INSULATION MATERIALS

- A. Where batt insulation is indicated, either glass fiber or mineral fiber batt insulation may be used, at Contractor's option.
- B. Glass Fiber Batt Insulation: Flexible preformed batt or blanket, with formaldehyde-free thermosetting resins to comply with ASTM C 665; friction fit.
 - 1. Combustibility: Non-combustible, when tested in accordance with ASTM E 136.
 - 2. Thickness: As indicated.
 - 3. Facing: Unfaced.
 - 4. Manufacturers:
 - a. CertainTeed Corporation: www.certainteed.com.
 - b. Johns Manville Corporation: www.jm.com.

- c. Owens Corning Corp: www.owenscorning.com.
- 5. Substitutions: See Section 01600 Product Requirements.
- C. Mineral Fiber Batt Insulation: Flexible preformed batt or blanket, with formaldehyde-free thermosetting resins to comply with ASTM C 665; friction fit; unfaced flame spread index of 0 (zero) when tested in accordance with ASTM E 84.
 - 1. Smoke Developed Index: 0 (zero), when tested in accordance with ASTM E 84.
 - 2. Thickness: As shown on drawings or as required to friction fit within void.
 - 3. Manufacturers:
 - a. Thermafiber, Inc: www.thermafiber.com.
 - b. Owens Corning: www.owenscorning.com.
 - c. Substitutions: See Section 01600 Product Requirements.
- D. Sound Batt Insulation: Flexible sound attenuation batts, with formaldehyde-free thermosetting resins to comply with ASTM C 665; friction fit.
 - 1. Combustibility: Non-combustible, when tested in accordance with ASTM E84.
 - 2. Thickness: 3 ½" within 3 5/8" stud walls. 5 ½" within 6" stud walls.
 - 3. Facing: Unfaced.
 - 4. Manufacturers:
 - a. CertainTeed Corporation: www.certainteed.com.
 - b. Johns Manville Corporation: www.jm.com.
 - c. Owens Corning Corp: www.owenscorning.com.
 - 5. Substitutions: See Section 01600 Product Requirements.

2.02 BOARD INSULATION MATERIALS

- A. Foil Faced Polyisocyanurate Foam Board Insulation: High performance rigid cellular foam board complying with ASTM C1289 Type I, Class 1 consisting of an ASTM E84 Class A closed cell polyisocyanurate foam core laminated between a coated foil facer on front side of board and a reflective foil facer on the back side of the board.
 - 1. Basis of Design Product: Subject to compliance with the documents, provide Atlas roofing Corporation "Energy Shield Pro or comparable product[s] by one of the following:
 - a. Carlisle Coatings and Waterproofing.
 - b. Dow.
 - c. Hunter Panels.
 - Provide aluminum faced polyisocyanurate insulation with the following thickness and R-value:
 2 inch (51 mm) thick; minimum R-12
 - 3. Facer Materials: Class A durable reflective aluminum facer on each face of insulation.
 - 4. Size:4'-0" x 8'-0" (1219 mm x 2438 mm) or as otherwise appropriate to fit between zee girts.
 - 5. Flame Spread and Smoke Developed: Less than 25 and less than 450, respectively, when tested in accordance with ASTM E 84.
 - 6. Moisture Vapor Transmission: Less than 0.3 when tested in accordance with ASTM E 96, Desiccant Method.
 - 7. Compressive Strength:Grade 3 when tested in accordance with ASTM C 1289.

- 8. Water Absorption: Less than 1% by volume when tested in accordance with ASTM C 209.
- 9. Dimensional Stability: Less than 1% linear change when tested in accordance with ASTM D 2126.
- 10. Service Temperatures: -100°F to + 250°F (-73°C to +122°C)
- 11. Potential Heat:12,000 Btu/lb.
- 12. Auto-Ignition Temperature: 800°F

2.03 BATT INSULATION ACCESSORIES

- A. Nails or Staples: Steel wire; electroplated, or galvanized; type and size to suit application.
- B. Adhesive: Type recommended by insulation manufacturer for application.

2.04 BOARD INSULATION ACCESSORIES

- B. Insulation Adhesive: High strength, heavy-bodied, thermoplastic rubber adhesive formulated to bond insulation to metal, concrete or masonry surfaces.
 - 1. Product: Subject to compliance with the requirements, provide one of the following:
 - a. AGM Industries GPA-72 Adhesive.
 - b. Loctite PL 300 VOC.
 - c. BASF Sonneborn Premium Adhesive
 - d. Other products approved in writing by the board insulation manufacturer.
- C. Joint Sealant (for joints 1/2" or less): Single component, non-shrink joint sealants and backings which are compatible with each other and with other materials in the assembly.
 - 1. Product: Subject to compliance with the requirements, provide one of the following:
 - a. Sikaflex-1A and 2C NS
 - b. PecoraDynotrol I & II
 - c. Sonneborn NP1 & NP
 - d. Dow 790, 791, 795
 - e. GE Silpruf, Silpruf LM
 - f. Pecora 890, 895
 - g. Loctite PL 300 Foamboard adhesive.
 - h. BASF Sonneborn Premium Adhesive.
 - i. Other joint sealant approved in writing by the insulation board manufacturer.
- D. Expanding Foam Sealant (for joints larger than 1/2"): Single component, non-shrink, Class A polyurethane insulating closed cell foam that is compatible with insulation board; Complies with ASTM E814 Standard Test Method for Fire Tests of Through-Penetration Fire Stops; air and vapor permeance not greater than insulating board.
 - 1. Product: Subject to compliance with the requirements, provide one of the following:
 - a. Dow Great Stuff Pro Gaps & Cracks Insulating Foam Sealant.
 - b. FOMO Products, Inc.; Handi-Foam Fireblock Sealant.

- c. Other products approved in writing by the insulation board manufacturer.
- E. Joint Tape: Minimum 2 mil thick x 3 inch (76 mm) wide, high strength aluminum foil coated tape with high temperature acrylic adhesive intended for adhesion to foil substrate.
 - 1. Product: Subject to compliance with the requirements, provide one of the following:
 - a. IPG Cold Weather Aluminum Foil Tape.
 - b. Atlas Roofing Corporation WRB Tape.
 - c. Other products approved in writing by the insulation board manufacturer.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify that substrate, adjacent materials, and insulation materials are dry and that substrates are ready to receive insulation.

3.02 BATT INSTALLATION

- A. Install insulation in accordance with manufacturer's instructions.
- B. Trim insulation neatly to fit spaces. Insulate miscellaneous gaps and voids.
- C. Fit insulation tightly in cavities and tightly to exterior side of mechanical and electrical services within the plane of the insulation.

3.03 BOARD INSTALLATION

- A. General:
 - 1. Comply with manufacturer's instructions for installation of polyisocyanurate rigid foam board insulation.
 - 2. Do not install polyisocyanurate rigid foam board insulation that has become soiled, wet, or has not been properly protected from sunlight.
 - 3. Dry fit polyisocyanurate rigid foam board insulation prior to final installation. Neatly trim board around conduits, pipes, and other items that will penetrate board insulation.
- B. Adhesive Attachment:
 - 1. Apply 3 inch diameter dabs of adhesive spaced no greater than 24 inches (610 mm) on center in both directions. At perimeter edges and at openings, apply additional continuous ribbon of adhesive no greater than 3 inches (76 mm) from edge of board or opening in board.
 - 2. Before adhesive skims over, align board and press insulation board on to substrate, applying an even, medium pressure to spread adhesive and remove air pockets.

3.04 BOARD ACCESSORIES

- A. Joint Sealant: For joints, gaps, and openings less that ½ inch (13 mm) wide, install continuous bead of joint sealant. Provide backer rod as required to prohibit joint sealant from bonding to a third surface.
- B. Expanding Foam Sealant: For joints, gaps, and openings greater than ½ inch (13 mm) wide, install sealant in a continuous ribbon between adjacent board edges, working sealant in to joint for a full depth bead of sealant.
- C. Tape: Install tape evenly between adjacent boards in continuous pieces using longest practicable lengths. Where splices are required, provide laps no less than 6 inches (150mm).
 - 1. Install tape centered over horizontal and vertical joints.
 - 2. Start taping at lowest condition. Tape horizontal joints first and then vertical joints up the building. Ensure tape is installed in shingle-like fashion and that horizontal seams are taped first where horizontal and vertical tapes intersect.
 - 3. Firmly roll tape with "J" roller to remove air pockets and to ensure complete attachment of tape to insulation board.

3.05 PROTECTION

- A. Do not permit installed insulation to be damaged prior to its concealment.
- B. Protect polyisocyanurate rigid foam board insulation from excess moisture, mechanical damage, and exposure to open flame.
- C. Promptly repair damage caused to insulation in a manner that retains integrity and continuity of insulation and facer materials.
- D. Cover insulation with cladding promptly, but no later than 180 days after installation of insulation.

END OF SECTION

SECTION 07 2222

COMPOSITE ROOF DECK - VENTILATING, INSULATED, NAILABLE

PART 1 - GENERAL

1.01 WORK INCLUDES

- A. The work shall consist of covering all areas shown on the drawings with ventilated roof insulation
- B. RELATED WORK
 - 1. Specified elsewhere:
 - 2. Section 07 Metal roofing or other roofing system over the ventilated insulation. Section 07 - Ridge vents and eave vents.
- C. SYSTEM DESCRIPTION
 - 1. Description of system:
 - a. The ventilated roof insulation shall be a preassembled panel consisting of one layer of 7/16" oriented strand board (FSC or standard), built-in ventilation space maintained by 1" wood spacers blocks, and isocyanurate insulation on the bottom. Architect's option for top surface: 5/8" or 3/4" OSB or Plywood. FSC or Standard
 - b. Architect's option for spacer blocks 1-1/2"
 - c. The Long Term Thermal Resistance (LTTR) R-Value of the ventilated Roof insulation shall be no less than _____years for foam only.
 - d. Wood panel edges shall be rabbetted to allow the foam edges to fit there while providing clearance between the wood sheathing on adjoining panels.
 - e. Foam sides and ends shall have a machined tongue and groove profile to reduce heat loss at the joints.
 - 2. Performance Requirements:
 - a. The wood spacer blocks shall not exceed 8% of the panel area and shall leave 50% open for lateral (across the slope) ventilation. Spacer blocks shall not be over 12" apart in either direction.
 - b. The vent space shall provide a minimum of 10 sq. in. of Net Free Area per lineal foot of insulation along the 8' edge after deducting for the spacer blocks.
 - c. The foam insulation shall have a Flame Spread Rating of 40-60.
- D. QUALITITY ASSURANCE
 - 1. The ventilated insulation shall be classified by Underwriters Laboratories Inc. as a shingle decking accessory for use with any Class A, B or C asphalt glass mat or asphalt organic shingle. Each bundle of ventilated panels shall bear an Underwriter Laboratory's label. If applicable FSC Chain-of-Custody procedure will apply.

E. SUBMITTALS

- 1. The following will be submitted to the architect for approval:
 - a. Copies of the manufacturer's product information and installation instructions.
 - b. A sample with the edge profile specified and large enough to show the actual lateral spacing of the vent space supports.
 - c. A manufacturer's dimensioned drawing showing how the 50% lateral ventilation is achieved.
 - d. Calculations of spacer block percentage of panel area and the Net Free Area per Lin. Ft. of insulation after deducting for spacers.
- F. DELIVERY AND STORAGE
 - 1. The ventilated insulation shall be protected in the transit by plastic covers and by truck tarps. When material is stored at the jobsite, a reasonably level, drained storage area shall be provided. The insulation shall rest on firm blocking and shall be covered with tarps.
- G. SEQUENCING/SCHEDULING
 - 1. Erection of the ventilated insulation shall be coordinated with the roofing subcontractor so the roofing is applied as soon as possible after insulation is in place.

COMPOSITE ROOF DECK - VENTILATING, INSULATED, NAILABLE 07 2222 - 1 of 2

PART 2 - PRODUCTS

2.01 PRODUCTS SHOWN BELOW ARE ACCEPTABLE PROVIDED THEY MEET THE REQUIREMENTS OF THIS SPECIFICATION:

- A. ThermaCal® 1 Ventilated Roof Insulation Panels by GAF Cornell, Tele: (800)766-3411 or (800)522-9224 Fax: 877-271-6588
 - 1. www.gaf.com and www.cornellcorporation.com
 - a. ThermaCal® Fasteners as required per the appropriate fastener pattern.
- B. Equal or Better Products will be Approved.

PART 3 - EXECUTION

3.01 PREPARATION

- A. The structural roof deck shown in the plans shall be smooth and flat (in a single sloped plane) and free of water or debris before the ventilated insulation is installed. Apply vapor retarder if required.
- B. NOTE: GAF Cornell recommends that the designer carefully considers the need for a vapor/air retarder.
- C. SUBSTRATE INSTALLATION
 - 1. Installation shall follow the manufacturer's written installation instructions.
 - 2. Fasten with ThermaCal® Fasteners to the supporting roof deck shown in the plans.
 - 3. Protect ventilated insulation work from exposure to moisture damage and deterioration, primarily by prompt installation of the roofing, sheet metal and waterproofing work.

END OF SECTION 07 2222

SECTION 07 25 00 WEATHER BARRIERS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Vapor Retarders: Materials to make exterior walls water vapor resistant and air tight.
- B. Air Barriers: Materials that form a system to stop passage of air through exterior walls.

1.02 REFERENCE STANDARDS

- A. 40 CFR 59, Subpart D National Volatile Organic Compound Emission Standards for Architectural Coatings; U.S. Environmental Protection Agency current edition.
- B. ASTM C1177/C1177M Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing 2017.
- C. ASTM E84 Standard Test Method for Surface Burning Characteristics of Building Materials 2021a.
- D. ASTM E96/E96M Standard Test Methods for Water Vapor Transmission of Materials 2016.

1.03 SUBMITTALS

- A. See Section 01 30 00 Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on material characteristics.
- C. Shop Drawings: Provide drawings of special joint conditions.
- D. ABAA Field Quality Control Submittals: Submit third-party reports of testing and inspection required by ABAA QAP.
- E. Manufacturer's Installation Instructions: Indicate preparation.
- F. ABAA Manufacturer Qualification: Submit documentation of current evaluation of proposed manufacturer and materials.
- G. ABAA Installer Qualification: Submit documentation of current contractor accreditation and current installer certification; keep copies of each contractor accreditation and installer certification on site during and after installation, and present on-site documentation upon request.

1.04 QUALITY ASSURANCE

- A. Air Barrier Association of America (ABAA) Quality Assurance Program (QAP); www.airbarrier.org/#sle:
 - 1. Installer Qualification: Use accredited contractor, certified installers, evaluated materials, and third-party field quality control audit.
 - 2. Manufacturer Qualification: Use evaluated materials from a single manufacturer regularly engaged in air barrier material manufacture, and use secondary materials approved in writing by primary material manufacturer.

1.05 FIELD CONDITIONS

A. Maintain temperature and humidity recommended by the materials manufacturers before, during and after installation.

PART 2 PRODUCTS

2.01 VAPOR RETARDER MATERIALS (AIR BARRIER AND WATER-RESISTIVE)

- A. Vapor Retarder Coating: Liquid applied, resilient, UV-resistant coating and associated joint treatment.
 - 1. Dry Film Thickness (DFT): 40 mils, 0.040 inch (1.016 mm), minimum.
 - 2. Water Vapor Permeance: 1.0 perm (57 ng/(Pa s sq m)), maximum, when tested in accordance with ASTM E96/E96M.
 - 3. VOC Content: Less than 50 g per L when tested in accordance with 40 CFR 59, Subpart D (EPA Method 24).
 - 4. Suitable for use on concrete, masonry, plywood and gypsum sheathing.
 - 5. Joint Preparation Treatment: Coating manufacturer's recommended method, either tape or reinforcing mesh saturated with coating material.
 - 6. Manufacturers:
 - a. BASF Corporation; MasterSeal AWB 660 I: www.master-builderssolutions.basf.us/#sle.
 - b. Carlisle Coatings and Waterproofing, Inc; Barriseal-R: www.carlisleccw.com/#sle.
 - c. W.R. Meadows, Inc; Air-Shield LM or Air-Shield LM (All Season): www.wrmeadows.com/#sle.
 - d. Substitutions: See Section 01 60 00 Product Requirements.
 - 7. Joint Filler: As recommended by coating manufacturer and suitable to the substrate.

2.02 ACCESSORIES

A. Sealants, Tapes, and Accessories for Sealing Weather Barrier and Sealing Weather Barrier to Adjacent Substrates: As specified or as recommended by weather barrier manufacturer.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that surfaces and conditions are ready to accept the work of this section.

3.02 PREPARATION

A. Remove projections, protruding fasteners, and loose or foreign matter that might interfere with proper installation.

3.03 INSTALLATION

- A. Install materials in accordance with manufacturer's instructions.
- B. Vapor Retarders: Install continuous air tight barrier over surfaces indicated, with sealed seams and with sealed joints to adjacent surfaces.
- C. Coatings:
 - 1. Prepare substrate in manner recommended by coating manufacturer; treat joints in substrate and between dissimilar materials as recommended by manufacturer.
 - 2. Where exterior masonry veneer is to be installed, install masonry anchors before installing weather barrier over masonry; seal around anchors air tight.
 - 3. Use flashing to seal to adjacent construction and to bridge joints.

3.04 FIELD QUALITY CONTROL

- A. See Section 01 40 00 Quality Requirements, for additional requirements.
- B. Coordination of ABAA Tests and Inspections:
 - 1. Provide testing and inspection required by ABAA QAP.

- 2. Notify ABAA in writing of schedule for air barrier work, and allow adequate time for testing and inspection.
- 3. Cooperate with ABAA testing agency.
- 4. Allow access to air barrier work areas and staging.
- 5. Do not cover air barrier work until tested, inspected, and accepted.
- C. Do not cover installed weather barriers until required inspections have been completed.

3.05 PROTECTION

A. Do not leave materials exposed to weather longer than recommended by manufacturer.

END OF SECTION

SECTION 07 53 00 ELASTOMERIC MEMBRANE ROOFING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Elastomeric roofing membrane, mechanically fastened conventional and adhered conventional application.
- B. Insulation, flat and tapered.
- C. Vapor retarder.
- D. Deck sheathing.
- E. Flashings.
- F. Roofing cant strips, stack boots, roofing expansion joints, and walkway pads.

1.02 RELATED REQUIREMENTS

- A. Section 05 31 00 Steel Decking: Product requirements for acoustical insulation for deck flutes, for placement by this section.
- B. Section 06 10 00 Rough Carpentry: Wood nailers and curbs.
- C. Section 07 62 00 Sheet Metal Flashing and Trim: Counterflashings, reglets.
- D. Section 07 71 00 Roof Specialties: Prefabricated roofing expansion joint flashing.
- E. Section 07 71 00 Manufactured Gutters and Downspouts
- F. Section 07 72 00 Roof Accessories: Roof-mounted units; prefabricated curbs.
- G. Section 08 62 00 Unit Skylights: Skylight frame, integral curb, and counterflashing.
- H. Section 22 10 06 Plumbing Piping Specialties: Roof drains.

1.03 REFERENCE STANDARDS

- A. ASTM C208 Standard Specification for Cellulosic Fiber Insulating Board 2012, with Editorial Revision (2019).
- B. ASTM C1177/C1177M Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing 2017.
- C. ASTM C1289 Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board 2021.
- D. ASTM D4637/D4637M Standard Specification for EPDM Sheet Used in Single-Ply Roof Membrane 2015.
- E. ASTM E84 Standard Test Method for Surface Burning Characteristics of Building Materials 2021a.
- F. ASTM E96/E96M Standard Test Methods for Water Vapor Transmission of Materials 2016.
- G. FM (AG) FM Approval Guide current edition.
- H. FM DS 1-28 Wind Design 2016.
- I. NRCA (WM) The NRCA Waterproofing Manual 2005.
- J. UL (DIR) Online Certifications Directory Current Edition.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Coordinate with installation of associated counterflashings installed under other sections.
B. Preinstallation Meeting: Convene a preinstallation meeting one week before starting work of this section; require attendance by all affected installers; review preparation and installation procedures and coordination and scheduling necessary for related work.

1.05 SUBMITTALS

- A. See Section 01 30 00 Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data indicating membrane materials, flashing materials, insulation, vapor retarder, surfacing, and fasteners.
- C. Shop Drawings: Indicate joint or termination detail conditions, conditions of interface with other materials, and paver layout.
- D. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
- E. Manufacturer's Installation Instructions: Indicate membrane seaming precautions and perimeter conditions requiring special attention.
- F. Manufacturer's Field Reports: Indicate procedures followed, ambient temperatures, humidity, wind velocity during application, and supplementary instructions given.
- G. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

1.06 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years of documented experience.
- B. Installer Qualifications: Company specializing in performing the work of this section with minimum three years documented experience.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials in manufacturer's original containers, dry and undamaged, with seals and labels intact.
- B. Store materials in weather protected environment, clear of ground and moisture.
- C. Ensure storage and staging of materials does not exceed static and dynamic load-bearing capacities of roof decking.
- D. Protect foam insulation from direct exposure to sunlight.

1.08 FIELD CONDITIONS

- A. Do not apply roofing membrane during unsuitable weather.
- B. Do not apply roofing membrane when ambient temperature is below 40 degrees F (5 degrees C) or above 100 degrees F (38 degrees C).
- C. Do not apply roofing membrane to damp or frozen deck surface or when precipitation is expected or occurring.
- D. Do not expose materials vulnerable to water or sun damage in quantities greater than can be weatherproofed the same day.
- E. Schedule applications so that no partially completed sections of roof are left exposed at end of workday.

1.09 WARRANTY

- A. See Section 01 78 00 Closeout Submittals, for additional warranty requirements.
- B. Provide 30 year manufacturer's total roofing system warranty.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. EPDM Membrane Materials:
 - 1. Carlisle Roofing Systems, Inc; Sure-Seal EPDM: Universal Design "A" Adhered roofing System; www.carlisle-syntec.com/#sle.
 - 2. Firestone Building Products, LLC: www.firestonebpco.com.
 - 3. Versico Roofing Systems; VersiGard EPDM: www.versico.com/#sle.

2.02 ROOFING - UNBALLASTED APPLICATIONS

- A. Elastomeric Membrane Roofing: One ply membrane, fully adhered, over vapor retarder and insulation.
- B. Roofing Assembly Requirements:
- 1. Roof Covering External Fire Resistance Classification: UL (DIR) certified Class A.

2.03 ROOFING MEMBRANE AND ASSOCIATED MATERIALS

- A. Membrane: Ethylene-propylene-diene-monomer (EPDM); externally reinforced with fabric; complying with minimum properties of ASTM D4637/D4637M.
 - 1. Thickness: 0.060 inch (60 mil) (1.5 mm).
 - 2. Sheet Width: 76 inch (1930 mm), minimum; factory-fabricate into largest sheets possible.
 - 3. Solar Reflectance: 0.75, minimum, initial, and 0.64, minimum, 3-year, certified by Cool Roof Rating Council.
 - 4. Thermal Emittance: 0.84, minimum, initial, and 0.87, minimum, 3-year, certified by Cool Roof Rating Council.
 - 5. Color: Black.
- B. Seaming Materials: As recommended by membrane manufacturer.
- C. Membrane Fasteners: As recommended by and approved by membrane manufacturer.
- D. Vapor Retarder: Reinforced Kraft paper laminate, complying with requirements of fire rating classification; compatible with roofing and insulation materials.

1. Fire-retardant adhesive.

- E. Flexible Flashing Material: Same material as membrane.
 - 1. Thickness: 60 mil (1.5 mm).
 - 2. Elasticity: 50 percent with full recovery without set.
 - 3. Color: Black.

2.04 DECK SHEATHING AND COVER BOARDS

- A. Deck Sheathing: Glass mat faced gypsum panels, ASTM C1177/C1177M, fire resistant type, 5/8 inch (16 mm) thick.
 - 1. Manufacturers:
 - a. USG Corporation; Securock Ultralight Glass-Mat Roof Board or Securock Ultralight Coated Glass-Mat Roof Board: www.usg.com/#sle.
 - b. Substitutions: See Section 01 60 00 Product Requirements.

2.05 INSULATION

- A. Polyisocyanurate Board Insulation: Rigid cellular foam, complying with ASTM C1289, Type II, Class 2, polymer bonded glass fiber mat both faces and with the following characteristics:
 - 1. Board Thickness: 2.0 inch (50 mm).

- 2. Tapered Board: Slope as indicated; minimum thickness 4" inch (101.6 mm); fabricate of fewest layers possible.
- 3. Manufacturers:
 - a. Carlisle.

2.06 ACCESSORIES

- A. Prefabricated Roofing Expansion Joint Flashing: As specified in Section 07 71 00.
- B. Stack Boots: Prefabricated flexible boot and collar for pipe stacks through membrane; same material as membrane.
- C. Cant and Edge Strips: Wood fiberboard, compatible with roofing materials ; cants formed to 45 degree angle.
- D. Sheathing Adhesive: Non-combustible type, for adhering gypsum sheathing to metal deck.
- E. Sheathing Joint Tape: Paper type, 4 inch (101.6 mm) wide, self adhering.
- F. Insulation Joint Tape: Glass fiber reinforced type as recommended by insulation manufacturer, compatible with roofing materials; 6 inches (150 mm) wide; self adhering.
- G. Insulation Fasteners: Appropriate for purpose intended.
- H. Membrane Adhesive: As recommended by membrane manufacturer.
- I. Surface Conditioner for Adhesives: Compatible with membrane and adhesives.
- J. Insulation Adhesive: As recommended by insulation manufacturer.
- K. Roofing Nails: Galvanized, hot dipped type, size and configuration as required to suit application.
- L. Strip Reglet Devices: Galvanized steel, maximum possible lengths per location, with attachment flanges.
- M. Sealants: As recommended by membrane manufacturer.
- N. Walkway Pads: Suitable for maintenance traffic, contrasting color or otherwise visually distinctive from roof membrane.
 - 1. Composition: Rubber with mineral granule surface.
 - 2. Size: 24 by 24 inch (609 by 609 mm).
 - 3. Surface Color: Black.
 - 4. Manufacturers:
 - a. W.R. Meadows, Inc; Duo-Pad: www.wrmeadows.com/#sle.
 - b. Carlisle.
 - c. Substitutions: See Section 01 60 00 Product Requirements.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that surfaces and site conditions are ready to receive work.
- B. Verify deck is supported and secure.
- C. Verify deck is clean and smooth, flat, free of depressions, waves, or projections, properly sloped and suitable for installation of roof system.
- D. Verify deck surfaces are dry and free of snow or ice.
- E. Verify that roof openings, curbs, and penetrations through roof are solidly set, and cant strips are in place.

3.02 METAL DECK PREPARATION

- A. Install preformed acoustical glass fiber insulation strips specified in Section 05 31 00 within roof deck flutes. Install in accordance with manufacturer's instructions.
- B. Install deck sheathing on metal deck.
 - 1. Lay with long side at right angle to flutes; stagger end joints; provide support at ends.
 - 2. Cut sheathing cleanly and accurately at roof breaks and protrusions to provide smooth surface.
 - 3. Tape joints.
- C. Mechanically fasten sheathing to roof deck, in accordance with Factory Mutual recommendations and roofing manufacturer's instructions.
 - 1. Over entire roof area, fasten sheathing using 6 fasteners with washers per sheathing board.

3.03 VAPOR RETARDER AND INSULATION - UNDER MEMBRANE

- A. Apply vapor retarder to deck surface with adhesive in accordance with manufacturer's instructions.
 - 1. Extend vapor retarder under cant strips and blocking to deck edge.
 - 2. Install flexible flashing from vapor retarder to air seal material of wall construction, lap and seal to provide continuity of the air barrier plane.
- B. Ensure vapor retarder is clean and dry, continuous, and ready for application of insulation.
- C. Attachment of Insulation:
 - 1. Mechanically fasten first layer of insulation to deck in accordance with roofing manufacturer's instructions and FM (AG) Factory Mutual requirements.
 - 2. Embed second layer of insulation into full bed of adhesive in accordance with roofing and insulation manufacturers' instructions.
- D. Lay subsequent layers of insulation with joints staggered minimum 6 inch (150 mm) from joints of preceding layer.
- E. Place tapered insulation to the required slope pattern in accordance with manufacturer's instructions.
- F. On metal deck, place boards parallel to flutes with insulation board edges bearing on deck flutes.
- G. Lay boards with edges in moderate contact without forcing. Cut insulation to fit neatly to perimeter blocking and around penetrations through roof.
- H. Tape joints of insulation in accordance with roofing and insulation manufacturers' instructions.
- I. At roof drains, use factory-tapered boards to slope down to roof drains over a distance of 18 inches (450 mm).
- J. Do not apply more insulation than can be covered with membrane in same day.

3.04 MEMBRANE APPLICATION

- A. Apply elastomeric membrane roofing system in accordance with manufacturer's recommendations and NRCA (WM) applicable requirements.
- B. Roll out membrane, free from wrinkles or tears. Place sheet into place without stretching.
- C. Fully Adhered Application: Apply adhesive to subtrate at rate specified by manufacturer. Fully embed membrane in adhesive except in areas directly over or within 3 inches of expansion joints. Fully adhere one roll before proceeding to adjacent rolls.

- D. Overlap edges and ends and seal seams by contact adhesive, minimum 3 inches (75 mm). Seal permanently waterproof. Apply uniform bead of sealant to joint edge.
- E. At intersections with vertical surfaces:
 - 1. Extend membrane over cant strips and up a minimum of 4 inches (100 mm) onto vertical surfaces.
 - 2. Fully adhere flexible flashing over membrane and up to nailing strips.
- F. Around roof penetrations, seal flanges and flashings with flexible flashing.
- G. Install roofing expansion joints where indicated. Make joints watertight.
 - 1. Install prefabricated joint components in accordance with manufacturer's instructions.
- H. Coordinate installation of roof drains and sumps and related flashings.

3.05 FIELD QUALITY CONTROL

A. Require site attendance of roofing and insulation material manufacturers daily during installation of the Work.

3.06 CLEANING

- A. See Section 01 74 19 Construction Waste Management and Disposal, for additional requirements.
- B. Remove bituminous markings from finished surfaces.
- C. In areas where finished surfaces are soiled by work of this section, consult manufacturer of surfaces for cleaning advice and comply with their documented instructions.
- D. Repair or replace defaced or damaged finishes caused by work of this section.

3.07 PROTECTION

- A. Protect installed roofing and flashings from construction operations.
- B. Where traffic must continue over finished roof membrane, protect surfaces using durable materials.

SECTION 07 61 00 SHEET METAL ROOFING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Sheet metal roofing, associated flashings, and underlayment.
- B. Counterflashings.
- C. Sealants for joints within sheet metal fabrications.

1.02 RELATED REQUIREMENTS

A. Section 07 72 00 - Roof Accessories: Manufactured accessories.

1.03 REFERENCE STANDARDS

- A. AAMA 2604 Voluntary Specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix) 2017a.
- B. AAMA 2605 Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix) 2017a.
- C. ASTM A653/A653M Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process 2020.
- D. ASTM A792/A792M Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process 2021a.
- E. ASTM B209 Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate 2014.
- F. ASTM B209M Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate (Metric) 2014.
- G. ASTM B370 Standard Specification for Copper Sheet and Strip for Building Construction 2012 (Reapproved 2019).
- H. ASTM C920 Standard Specification for Elastomeric Joint Sealants 2018.
- ASTM D1970/D1970M Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection 2020.
- J. ASTM E96/E96M Standard Test Methods for Water Vapor Transmission of Materials 2016.
- K. ASTM E108 Standard Test Methods for Fire Tests of Roof Coverings 2020a.
- L. ICC-ES AC188 Acceptance Criteria for Roof Underlayments 2012, with Editorial Revision (2015).
- M. SMACNA (ASMM) Architectural Sheet Metal Manual 2012.

1.04 SUBMITTALS

- A. See Section 01 30 00 Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on metal types, finishes, characteristics.

- C. Shop Drawings: Indicate material profile, jointing pattern, jointing details, fastening methods, flashings, terminations, and installation details.
- D. Installation Samples: Submit two samples [12" by 12"] inch ([____] mm) in size illustrating metal roofing mounted on plywood backing illustrating typical seam.
- E. Color Samples: Submit two samples 4" by 4" inch (<u>by</u> mm) in size illustrating metal finish color.

1.05 QUALITY ASSURANCE

- A. Perform work in accordance with SMACNA (ASMM) requirements and standard details, except as otherwise noted.
 - 1. Maintain one copy on project site.
- B. Installer Qualifications: Company specializing in performing sheet metal roof installations with minimum three years of documented experience.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Stack material to prevent twisting, bending, or abrasion, and to provide ventilation. Slope metal sheets to ensure drainage.
- B. Prevent contact with materials that could cause discoloration or staining.

1.07 WARRANTY

- A. See Section 01 78 00 Closeout Submittals, for additional warranty requirements.
- B. Correct defective Work within a five year period after Date of Substantial Completion. Defective work includes degradation of metal finish.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Sheet Metal Roofing Manufacturers:
 - 1. Petersen Aluminum Corporation; Snap-Clad; Seam in 12" widths w/ 1 3/4" high seam: www.pac-clad.com/sle.
 - 2. Sheffield Metals International; Galvalume: www.sheffieldmetals.com/#sle.
 - 3. Substitutions: See Section 01 60 00 Product Requirements.

2.02 SHEET MATERIALS

- A. Pre-Finished Aluminum Sheet: ASTM B209 (ASTM B209M), [___] alloy, [___] temper; 20 gage, 0.032 inch (0.81 mm) minimum base metal thickness; plain texture; shop pre-coated with polyvinylidene fluoride (PVDF) coating, color as selected by Architect.
- B. Stainless Steel Sheet: ASTM A666, Type [____], soft temper, 28 gage, 0.0156 inch (0.40 mm) thick; smooth No. 4 finish.

2.03 FABRICATION

- A. Form sections true to shape, accurate in size, square, and free from distortion or defects.
- B. Fabricate cleats of same material as sheet, thickness to match roofing sheet, and at least [___] inch ([___] mm) wide, interlockable with sheet.
- C. Fabricate starter strips, interlockable with sheet.
- D. Form pieces in longest practical lengths.
- E. Hem exposed edges on underside 1/2 inch (13 mm); miter and seam corners.

2.04 FINISHES

- A. Fluoropolymer Coating: High Performance Organic Finish, AAMA 2604; multiple coat, thermally cured fluoropolymer finish system.
- B. PVDF (Polyvinylidene Fluoride) Coating: Superior Performance Organic Finish, AAMA 2605; multiple coat, thermally cured fluoropolymer finish system.
- C. Color: As selected by Architect from manufacturer's standard colors.
- D. Primer Coat: On coated sheets, finish concealed side of sheet with primer compatible with finish system as recommended by finish system manufacturer.

2.05 ACCESSORIES

- A. Underlayment: Synthetic non-asphaltic sheet, intended by manufacturer for mechanically fastened roofing underlayment without sealed seams.
 - 1. Type: Woven polypropylene with anti-slip polyolefin coating on both sides.
 - 2. Minimum Requirements: Comply with requirements of ICC-ES AC188 for non-selfadhesive sheet.
 - 3. Self Sealability: Passing nail sealability test specified in ASTM D1970/D1970M.
 - 4. Flammability: Minimum of Class A, when tested in accordance with ASTM E108.
 - 5. Ultraviolet Resistance and Weatherability: Approved in writing by manufacturer for exposure to weather for minimum of 12 months.
 - 6. Low Temperature Flexibility: Passing test specified in ASTM D1970/D1970M.
 - 7. Water Vapor Permeance: Vapor retarder; maximum of 0.1 perm (5.7 ng/(Pa s sq m)), when tested in accordance with ASTM E96/E96M Procedure A (desiccant method).
 - 8. Fasteners: As specified by manufacturer and building code qualification report or approval, if any.
- B. Concealed Sealants: Non-curing butyl sealant.
- C. Exposed Sealants: ASTM C920 elastomeric sealant, with minimum movement capability as recommended by manufacturer for sealed substrates; color to match adjacent material.
 - 1. Products:
 - a. Franklin International, Inc; Titebond WeatherMaster Metal Roof Sealant: www.titebond.com/#sle.
 - b. Substitutions: See Section 01 60 00 Product Requirements.
- D. Reglets: Surface mounted type, same material as roofing sheets; face and ends covered with plastic tape.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Inspect roof deck to verify deck is clean and smooth, free of depressions, waves, or projections, properly sloped to drains.
- B. Verify roof openings, curbs, pipes, sleeves, ducts, or vents through roof are solidly set, reglets are in place, and nailing strips located.
- C. Verify roofing termination and base flashings are in place, sealed, and secure.

3.02 PREPARATION

A. Install starter and edge strips, and cleats before starting installation.

B. Back paint concealed metal surfaces and surfaces in contact with dissimilar metals with protective backing paint to a minimum dry film thickness of 15 mil (0.4 mm).

3.03 INSTALLATION - ROOFING

- A. Apply underlayment over entire roof area.
- B. Apply slip sheet in one layer, laid loose.
- C. Cleat and seam all joints.
- D. Use plastic cement for joints between metal and bitumen and for joints between metal and felts.

3.04 INSTALLATION - STANDING SEAM ROOFING

- A. Comply with SMACNA (ASMM) details [____].
- B. Lay sheets with long dimension perpendicular to eaves. Apply pans beginning at eaves.
- C. Lock cleats into seams and flatten.
- D. Stagger transverse joints of roofing sheets.
- E. At eaves and gable ends, terminate roofing by hooking over edge strip.
- F. Bend up one side edge 1-1/2 inches (38 mm) and other edge 1-3/4 inches (44 mm).
- G. Make first fold 1/4 inch (6 mm) wide single fold and second fold 1/2 inch (13 mm) wide, providing locked portion of standing seam, 5 plies in thickness.
- H. Fold lower ends of seams at eaves over at 45 degree angle.

3.05 INSTALLATION - FLASHINGS

- A. Comply with SMACNA (ASMM) details [____].
- B. Insert flashings into reglets to form tight fit.
 - 1. Secure in place with lead wedges at maximum [___] inches ([___] mm) on center. Pack remaining spaces with lead wool.
 - 2. Seal flashings into reglets with sealant.
- C. Secure flashings in place using concealed fasteners, and use exposed fasteners only where permitted.
- D. Cleat and seam all joints.
- E. Apply plastic cement compound between metal flashings and felt flashings.
- F. Fit flashings tight in place, and make corners square, surfaces true and straight in planes, and lines accurate to profiles.

3.06 PROTECTION

A. Do not permit traffic over unprotected roof surface.

SECTION 07 62 00 SHEET METAL FLASHING AND TRIM

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Fabricated sheet metal items, including flashings, counterflashings, gutters, and downspouts.
- B. Sealants for joints within sheet metal fabrications.

1.02 RELATED REQUIREMENTS

- A. Section 04 20 00 Unit Masonry: Metal flashings embedded in masonry.
- B. Section 06 10 00 Rough Carpentry: Wood nailers for sheet metal work.
- C. Section 06 10 00 Rough Carpentry: Wood blocking for batten seams.
- D. Section 06 10 00 Rough Carpentry: Field fabricated roof curbs.
- E. Section 07 31 13 Asphalt Shingles: Non-metallic flashings associated with shingle roofing.
- F. Section 07 71 23 Manufactured Gutters and Downspouts.
- G. Section 07 72 00 Roof Accessories: Manufactured metal roof curbs.
- H. Section 08 62 00 Unit Skylights: Integral metal curbs.
- I. Section 08 63 00 Metal-Framed Skylights: Integral metal curbs.
- J. Section 23 72 23 Packaged Air-to-Air Energy Recovery Units: Roof curbs for packaged, roof mounted air handling units.

1.03 REFERENCE STANDARDS

- A. AAMA 611 Voluntary Specification for Anodized Architectural Aluminum 2014 (2015 Errata).
- B. AAMA 2603 Voluntary Specification, Performance Requirements and Test Procedures for Pigmented Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix) 2017a.
- C. ASTM A653/A653M Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process 2020.
- D. ASTM A666 Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar 2015.
- E. ASTM B209 Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate 2014.
- F. ASTM B209M Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate (Metric) 2014.
- G. ASTM B749 Standard Specification for Lead and Lead Alloy Strip, Sheet, and Plate Products 2020.
- H. ASTM C920 Standard Specification for Elastomeric Joint Sealants 2018.
- I. ASTM D226/D226M Standard Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing 2017.
- J. ASTM D4586/D4586M Standard Specification for Asphalt Roof Cement, Asbestos-Free 2007 (Reapproved 2018).
- K. CDA A4050 Copper in Architecture Handbook current edition.

L. SMACNA (ASMM) - Architectural Sheet Metal Manual 2012.

1.04 SUBMITTALS

- A. See Section 01 30 00 Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Indicate material profile, jointing pattern, jointing details, fastening methods, flashings, terminations, and installation details.

1.05 QUALITY ASSURANCE

A. Perform work in accordance with SMACNA (ASMM) and CDA A4050 requirements and standard details, except as otherwise indicated.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Stack material to prevent twisting, bending, and abrasion, and to provide ventilation. Slope metal sheets to ensure drainage.
- B. Prevent contact with materials that could cause discoloration or staining.

PART 2 PRODUCTS

2.01 SHEET MATERIALS

- A. Galvanized Steel: ASTM A653/A653M, with G90/Z275 zinc coating; minimum 24 gage, (0.0239 inch) (0.61 mm) thick base metal.
- B. Aluminum: ASTM B209 (ASTM B209M); 20 gage, (0.032 inch) (0.81 mm) thick; anodized finish of color as selected.
 - 1. Color Anodized Finish: AAMA 611 AA-M12C22A42/44 Class I integrally or electrolytically colored anodic coating not less than 0.7 mils (0.018 mm) thick.
- C. Pre-Finished Aluminum: ASTM B209 (ASTM B209M); 20 gage, (0.032 inch) (0.81 mm) thick; plain finish shop pre-coated with modified silicone coating.
 - 1. Modified Silicone Polyester Coating: Pigmented Organic Coating System, AAMA 2603; baked enamel finish system.
- D. Lead Sheet: ASTM B749, 0.047 inch (1.19 mm) minimum thickness; UNS Number L51121.
- E. Stainless Steel: ASTM A666, Type 304 alloy, soft temper, 28 gage, (0.0156 inch) (0.40 mm) thick; smooth No. 4 Brushed finish.

2.02 FABRICATION

- A. Form sections true to shape, accurate in size, square, and free from distortion or defects.
- B. Form pieces in longest possible lengths.
- C. Hem exposed edges on underside 1/2 inch (13 mm); miter and seam corners.
- D. Form material with flat lock seams, except where otherwise indicated; at moving joints, use sealed lapped, bayonet-type or interlocking hooked seams.
- E. Fabricate corners from one piece with minimum 18 inch (450 mm) long legs; seam for rigidity, seal with sealant.

2.03 ACCESSORIES

- A. Fasteners: Galvanized steel, with soft neoprene washers.
- B. Primer: Zinc chromate type.
- C. Concealed Sealants: Non-curing butyl sealant.

- D. Exposed Sealants: ASTM C920; elastomeric sealant, with minimum movement capability as recommended by manufacturer for substrates to be sealed; color to match adjacent material.
- E. Plastic Cement: ASTM D4586/D4586M, Type I.
- F. Reglets: Surface mounted type, galvanized steel; face and ends covered with plastic tape.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify roof openings, curbs, pipes, sleeves, ducts, and vents through roof are solidly set, reglets in place, and nailing strips located.
- B. Verify roofing termination and base flashings are in place, sealed, and secure.

3.02 PREPARATION

- A. Install starter and edge strips, and cleats before starting installation.
- B. Install surface mounted reglets true to lines and levels, and seal top of reglets with sealant.
- C. Back paint concealed metal surfaces with protective backing paint to a minimum dry film thickness of 15 mil (0.4 mm).

3.03 INSTALLATION

- A. Secure flashings in place using concealed fasteners, and use exposed fasteners only where permitted..
- B. Apply plastic cement compound between metal flashings and felt flashings.
- C. Fit flashings tight in place; make corners square, surfaces true and straight in planes, and lines accurate to profiles.

3.04 SCHEDULE

- A. Through-Wall Flashing in Masonry:
- B. Fascia and Cornices:
- C. Gutters and Downspouts:
- D. Scuppers:
- E. Coping, Cap, Parapet, Sill and Ledge Flashings:
- F. Counterflashings at Roofing Terminations (over roofing base flashings):
- G. Counterflashings at Curb-Mounted Roof Items, including skylights and roof hatches:
- H. Roofing Penetration Flashings, for Pipes, Structural Steel, and Equipment Supports:

SECTION 07 71 00 ROOF SPECIALTIES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Manufactured roof specialties, including copings, fascias, gravel stops, and vents.
- B. Roof control and expansion joint covers.
- C. Roof membrane vents.

1.02 RELATED REQUIREMENTS

A. Section 07 72 00 - Roof Accessories: Manufactured curbs, roof hatches, and snow guards.

1.03 REFERENCE STANDARDS

- A. AAMA 611 Voluntary Specification for Anodized Architectural Aluminum 2014 (2015 Errata).
- B. AAMA 2603 Voluntary Specification, Performance Requirements and Test Procedures for Pigmented Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix) 2017a.
- C. AAMA 2604 Voluntary Specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix) 2017a.
- D. ANSI/SPRI/FM 4435/ES-1 Test Standard for Edge Systems Used with Low Slope Roofing Systems 2017.
- E. ASTM B209 Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate 2014.
- F. NRCA (RM) The NRCA Roofing Manual 2019.
- G. SMACNA (ASMM) Architectural Sheet Metal Manual 2012.

1.04 SUBMITTALS

- A. See Section 01 30 00 Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on shape of components, materials and finishes, anchor types and locations.
- C. Shop Drawings: Indicate configuration and dimension of components, adjacent construction, required clearances and tolerances, and other affected work.
- D. Manufacturer's Installation Instructions: Indicate special procedures, fasteners, supporting members, and perimeter conditions requiring special attention.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Roof Edge Flashings and Copings:
 - 1. Architectural Products Co: www.archprod.com.
 - 2. ATAS International, Inc; Rapid-Lok Fascia: www.atas.com/#sle.
 - 3. Metal Roofing Systems, Inc; Rapid Lock Coping: www.metalroofingsystems.biz/#sle.
- B. Control and Expansion Joint Covers:
 - 1. EMSEAL Joint Systems, Ltd; Emseal RoofJoint: www.emseal.com/#sle.
 - 2. GAF: www.gaf.com/sle.

- 3. Johns Manville: www.jm.com.
- 4. Substitutions: See Section 01 60 00 Product Requirements.
- C. Louvered Vents:
 - 1. Vulcan Supply Corp: www.vulcansupply.com/#sle.
 - 2. Substitutions: See Section 01 60 00 Product Requirements.
- D. Pipe and Penetration Flashings:
 - 1. Elmdor Stonemen; [____]: www.elmdorstoneman.com/#sle.
 - 2. Portals Plus: www.portalsplus.com.
 - 3. Substitutions: See Section 01 60 00 Product Requirements.
- E. Counterflashings:
 - 1. ATAS International, Inc: www.atas.com/sle.
 - 2. Substitutions: See Section 01 60 00 Product Requirements.
- F. Pipe Penetration Wall Seal:
 - 1. Airex Manufacturing, Inc; Airex Titan Outlet: www.airexmfg.com/#sle.
 - 2. Substitutions: See Section 01 60 00 Product Requirements.
- G. Pipe Penetration Wall Seal and Insulation Protection System:
 - 1. Airex Manufacturing, Inc; Airex Pro-System Kit: www.airexmfg.com/#sle.
 - 2. Substitutions: See Section 01 60 00 Product Requirements.
- H. Roof Vents:
 - 1. Construction Specialties, Inc; Roof Vents: www.c-sgroup.com/#sle.
 - 2. Substitutions: See Section 01 60 00 Product Requirements.

2.02 COMPONENTS

- A. Roof Edge Flashings: Factory fabricated to sizes required; mitered, welded corners; concealed fasteners.
 - 1. Configuration: Fascia, cant, and edge securement for roof membrane.
 - 2. Pull-Off Resistance: Tested in accordance with ANSI/SPRI/FM 4435/ES-1 using test methods RE-1 and RE-2 to positive and negative design wind pressure as defined by applicable local building code.
 - 3. Color: To be selected by Architect from manufacturer's standard range.
- B. Copings: Factory fabricated to sizes required; mitered, welded corners; concealed fasteners.
 - 1. Configuration: Concealed continuous hold down cleat at both legs; internal splice piece at joints of same material, thickness and finish as cap; concealed stainless steel fasteners.
 - 2. Pull-Off Resistance: Tested in accordance with ANSI/SPRI/FM 4435/ES-1 using test method RE-3 to positive and negative design wind pressure as defined by applicable local building code.
 - 3. Material: Formed aluminum sheet, 0.050 inch (1.3 mm) thick, minimum.
 - 4. Finish: Anodized bronze.
 - 5. Color: To be selected by Architect from manufacturer's standard range.
- C. Control and Expansion Joint Covers: Composite construction of manufacturer's recommended width flexible EPDM flashing of white color with closed cell urethane foam backing, each edge seamed to aluminum sheet metal flanges, designed for nominal joint width of 1 inch (25.4 mm). Include special formed corners, tees, intersections, and wall flashings, each sealed watertight.

- D. Pipe and Penetration Flashing: Base of rounded aluminum, compatible with sheet metal roof systems, and capable of accomodating pipes sized between 3/8 inch (9.5 mm) and 12 inch (305 mm).
 - 1. Caps: EPDM.
 - 2. Color: Black.

2.03 ACCESSORIES

- A. Sealant for Joints in Linear Components: As recommended by component manufacturer.
- B. Adhesive for Anchoring to Roof Membrane: Compatible with roof membrane and approved by roof membrane manufacturer.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that deck, curbs, roof membrane, base flashing, and other items affecting work of this Section are in place and positioned correctly.

3.02 INSTALLATION

- A. Install components in accordance with manufacturer's instructions and NRCA (RM) applicable requirements.
- B. Anchor components securely.
- C. Coordinate installation of components of this section with installation of roofing membrane and base flashings.
- D. Coordinate installation of sealants and roofing cement with work of this section to ensure water tightness.
- E. Coordinate installation of flashing flanges into reglets.

SECTION 07 71 23 MANUFACTURED GUTTERS AND DOWNSPOUTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Pre-finished aluminum gutters and downspouts.

1.02 REFERENCE STANDARDS

- A. AAMA 611 Voluntary Specification for Anodized Architectural Aluminum 2014 (2015 Errata).
- B. ASTM A653/A653M Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process 2020.
- C. ASTM B209 Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate 2014.
- D. ASTM B209M Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate (Metric) 2014.
- E. SMACNA (ASMM) Architectural Sheet Metal Manual 2012.

1.03 ADMINISTRATIVE REQUIREMENTS

- A. Comply with SMACNA (ASMM) for sizing components for rainfall intensity determined by a storm occurrence of 1 in 5 years.
- B. Comply with applicable code for size and method of rain water discharge.

1.04 SUBMITTALS

- A. See Section 01 30 00 Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on prefabricated components.
- C. Shop Drawings: Indicate locations, configurations, jointing methods, fastening methods, locations, and installation details.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Stack material to prevent twisting, bending, or abrasion, and to provide ventilation. Slope to drain.
- B. Prevent contact with materials that could cause discoloration, staining, or damage.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Gutters and Downspouts:
 - 1. ATAS International, Inc; Water Control System: www.atas.com/#sle.
 - 2. SAF Perimeter Systems, a division of Southern Aluminum Finishing Company, Inc: www.saf.com/persys.
 - 3. Substitutions: See Section 01 60 00 Product Requirements.
- B. Scupper and Collectors:
 - 1. ATAS International, Inc; Scuppers and Collector Boxes: www.atas.com/#sle.
 - 2. Substitutions: See Section 01 60 00 Product Requirements.

2.02 MATERIALS

- A. Pre-Finished Galvanized Steel Sheet: ASTM A653/A653M, with G90/Z275 zinc coating; minimum 0.02 inch (0.6 mm) thick base metal.
 - 1. Finish: Shop pre-coated with modified silicone coating.
 - 2. Color: as selected from manufacturers full range of colors..
- B. Pre-Finished Aluminum Sheet: ASTM B209 (ASTM B209M), [___] alloy, [___] temper; 0.032 inch (0.8 mm) thick.
 - 1. Finish: Plain, shop pre-coated with modified silicone coating.
 - 2. Color: As selected from manufactures full range of colors.

2.03 COMPONENTS

- A. Gutters: SMACNA rectangular style profile.
- B. Downspouts: SMACNA Rectangular profile.
- C. Anchors and Supports: Profiled to suit gutters and downspouts.
 - 1. Anchoring Devices: In accordance with SMACNA requirements.
 - 2. Gutter Supports: Brackets.
 - 3. Downspout Supports: Brackets.
- D. Fasteners: Galvanized steel, with soft neoprene washers.

2.04 ACCESSORIES

A. Downspout Boots: Cast Iron; ASTM48, Paint to match brick veneer. Color selected by Architect.

2.05 FABRICATION

- A. Form gutters and downspouts of profiles and size indicated.
- B. Fabricate with required connection pieces.
- C. Form sections square, true, and accurate in size, in maximum possible lengths, free of distortion or defects detrimental to appearance or performance. Allow for expansion at joints.
- D. Hem exposed edges of metal.
- E. Fabricate gutter and downspout accessories; seal watertight.

2.06 FINISHES

A. Class I Color Anodized Finish: AAMA 611 AA-M12C22A42; integrally colored anodic coating not less than 0.7 mils (0.018 mm) thick.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions before starting work.

3.02 INSTALLATION

- A. Install gutters, downspouts, and accessories in accordance with manufacturer's instructions.
- B. Sheet Metal: Join lengths with formed seams sealed watertight. Flash and seal gutters to downspouts and accessories.
- C. Connect downspouts to downspout boots at 18" inches (457 mm) above grade. Grout connection watertight.

D. Connect downspouts to storm sewer system. Grout connection watertight. END OF SECTION

SECTION 07 72 00 ROOF ACCESSORIES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Curbs.
- B. Equipment rails.
- C. Roof penetrations mounting curbs.
- D. Roof hatches, manual and automatic operation, including smoke vents.

1.02 RELATED REQUIREMENTS

- A. Section 05 31 00 Steel Decking.
- B. Section 07 41 13 Metal Roof Panels.
- C. Section 07 62 00 Sheet Metal Flashing and Trim: Roof accessory items fabricated from sheet metal.
- D. Section 07 71 00 Roof Specialties: Other manufactured roof items.
- E. Section 07 71 23 Manufactured Gutters and Downspouts.

1.03 REFERENCE STANDARDS

- A. 29 CFR 1910.23 Ladders current edition.
- B. ASTM A123/A123M Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products 2017.
- C. ASTM A153/A153M Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware 2016a.
- D. ASTM A653/A653M Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process 2020.
- E. MSS SP-58 Pipe Hangers and Supports Materials, Design, Manufacture, Selection, Application, and Installation 2018.

1.04 SUBMITTALS

- A. See Section 01 30 00 Administrative Requirements, for submittal procedures.
- B. Product Data: Manufacturer's data sheets on each product to be used.
 - 1. Preparation instructions and recommendations.
 - 2. Storage and handling requirements and recommendations.
 - 3. Installation methods.
 - 4. Maintenance requirements.
- C. Shop Drawings: Submit detailed layout developed for this project and provide dimensioned location and number for each type of roof accessory.
 - 1. Non-penetrating Rooftop Supports: Submit design calculations for loadings and spacings.
 - 2. Submit shop drawings sealed and signed by a Professional Engineer experienced in design of this type of work and licensed in the State in which the Project is located.
- D. Warranty Documentation:
 - 1. Submit manufacturer warranty.
 - 2. Ensure that forms have been completed in Owner's name and registered with manufacturer.

3. Submit documentation that roof accessories are acceptable to roofing manufacturer, and do not limit the roofing warranty.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Store products in manufacturer's unopened packaging until ready for installation.
- B. Store products under cover and elevated above grade.

1.06 WARRANTY

- A. See Section 01 78 00 Closeout Submittals, for additional warranty requirements.
- B. Correct defective Work within a one year period after Date of Substantial Completion.

PART 2 PRODUCTS

2.01 ROOF CURBS

- A. Manufacturers:
 - 1. AES Industries Inc; [____]: www.aescurb.com/#sle.
 - 2. Substitutions: See Section 01 60 00 Product Requirements.
- B. Roof Curbs Mounting Assemblies: Factory fabricated hollow sheet metal construction, internally reinforced, and capable of supporting superimposed live and dead loads and designated equipment load with fully mitered and sealed corner joints welded or mechanically fastened, and integral counterflashing with top and edges formed to shed water.
 - 1. Roof Curb Mounting Substrate: Curb substrate consists of standing seam metal roof panel system.
 - 2. Sheet Metal Material:
 - 3. Galvanized Steel: Hot-dip zinc coated steel sheet complying with ASTM A653/A653M, SS Grade 33 (230); G60 (Z180) coating designation; 18 gage, 0.048 inch (1.21 mm) thick.
 - 4. Roofing Cants: Provide integral sheet metal roofing cants dimensioned to begin slope at top of roofing system at 1:1 slope; minimum cant height 4 inches (102 mm).
 - 5. Fabricate curb bottom and mounting flanges for installation directly on metal roof panel system to match slope and configuration of system.
 - a. Extend side flange to next adjacent roof panel seam and comply with seam configurations and seal connection, providing at least 6 inch (152 mm) clearance between curb and metal roof panel flange allowing water to properly flow past curb.
 - b. Where side of curb aligns with metal roof panel flange, attach fasteners on upper slope of flange to curb connection allowing water to flow past below fasteners, and seal connection.
 - c. Maintain at least 12 inch (305 mm) clearance from curb, and lap upper curb flange on underside of down sloping metal roof panel, and seal connection.
 - d. Lap lower curb flange overtop of down sloping metal roof panel and seal connection.
 - 6. Provide layouts and configurations indicated on drawings.
- C. Curbs Adjacent to Roof Openings: Provide curb on each side of opening, with top of curb horizontal for equipment mounting.
 - 1. Provide preservative treated wood nailers along top of curb.
 - 2. Insulate inside curbs with 1-1/2 inch (38 mm) thick fiberglass insulation.
 - 3. Height Above Finished Roof Surface: 8 inches (203 mm), minimum.
 - 4. Height Above Roof Deck: 14 inches (356 mm), minimum.
- D. Equipment Rail Curbs: Straight curbs on each side of equipment, with top of curbs horizontal and level with each other for equipment mounting.

- 1. Provide preservative treated wood nailers along top of rails.
- 2. Height Above Finished Roof Surface: 8 inches (203 mm), minimum.
- 3. Height Above Roof Deck: 14 inches (356 mm), minimum.
- E. Pipe, Duct, or Conduit Mounting Curbs: Vertical posts, minimum 8 inches (400 mm) square unless otherwise indicated.
 - 1. Provide sliding channel welded along top edge with adjustable height steel bracket, fabricated to fit item supported.
 - 2. Height Above Finished Roof Surface: 8 inches (203 mm), minimum.
 - 3. Height Above Roof Deck: 14 inches (356 mm), minimum.

2.02 ROOF HATCHES AND VENTS, MANUAL AND AUTOMATIC OPERATION

- A. Roof Hatch Manufacturers:
 - 1. Acudor Products Inc; Galvanized Steel Roof Hatch: www.acudor.com/#sle.
 - 2. Babcock-Davis; ThermalMAX: www.babcockdavis.com/#sle.
 - 3. Bilco Company; Type TB (various types and special size): www.bilco.com/#sle.
 - 4. Dur-Red Products: www.dur-red.com.
 - 5. Milcor, Inc: www.milcorinc.com.
 - 6. Substitutions: See Section 01 60 00 Product Requirements.
- B. Roof Hatches and Smoke Vents: Factory-assembled aluminum frame and cover, complete with operating and release hardware.
 - 1. Style: Provide flat metal covers unless otherwise indicated.
 - 2. Mounting Substrate: Provide frames and curbs suitable for mounting on standing seam metal roof panel system.
 - 3. Size: As indicated on drawings; single-leaf style unless indicated as double-leaf.
 - 4. For Ladder Access: Single leaf; 30 by 36 inches (762 by 914 mm).
 - 5. For Ships Ladder Access: Single leaf; 30 by 54 inches (762 by 1372 mm).
- C. Frames and Curbs: One-piece curb and frame with integral cap flashing to receive roof flashings; extended bottom flange to suit mounting.
 - 1. Material: Stainless steel, Type 304, 14 gage, 0.0747 inch (1.90 mm) thick.
 - 2. Finish: Factory prime paint.
 - 3. Insulation: Manufacturer's standard; 1 inch (25 mm) rigid glass fiber, located on outside face of curb.
 - 4. Curb Height: As indicated on drawings.
- D. Metal Covers: Flush, insulated, hollow metal construction.
 - 1. Capable of supporting 40 psf (1.92 kPa) live load.
 - 2. Material: Galvanized steel; outer cover 14 gage, 0.0747 inch (1.90 mm) thick, liner 22 gage, 0.03 inch (0.76 mm) thick.
 - 3. Finish: Factory prime paint.
 - 4. Insulation: Manufacturer's standard 1 inch (25 mm) rigid glass fiber.
 - 5. Gasket: Neoprene, continuous around cover perimeter.
- E. Hardware: Steel, zinc coated and chromate sealed, unless otherwise indicated or required by manufacturer.
 - 1. Lifting Mechanisms: Compression or torsion spring operator with shock absorbers that automatically opens upon release of latch; capable of lifting covers despite 10 psf (475 kPa) load.
 - 2. Hinges: Heavy duty pintle type.

- 3. Hold open arm with vinyl-coated handle for manual release.
- 4. Latch: Upon closing, engage latch automatically and reset manual release.
- 5. Manual Release: Pull handle on interior.
- 6. Locking: Padlock hasp on interior.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Do not begin installation until substrates have been properly prepared.
- B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.02 PREPARATION

- A. Clean surfaces thoroughly prior to installation.
- B. Prepare surfaces using methods recommended by manufacturer for achieving acceptable results for applicable substrate under project conditions.

3.03 INSTALLATION

A. Install in accordance with manufacturer's instructions, in manner that maintains roofing system weather-tight integrity.

3.04 CLEANING

A. Clean installed work to like-new condition.

3.05 PROTECTION

- A. Protect installed products until completion of project.
- B. Touch-up, repair or replace damaged products before Date of Substantial Completion.

SECTION 07 81 00 APPLIED FIRE PROTECTION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Fireproofing of interior structural steel not exposed to damage or moisture.

1.02 RELATED REQUIREMENTS

- A. Section 05 12 00 Structural Steel Framing.
- B. Section 05 21 00 Steel Joist Framing.
- C. Section 05 31 00 Steel Decking.

1.03 REFERENCE STANDARDS

- A. ASTM E84 Standard Test Method for Surface Burning Characteristics of Building Materials 2021a.
- B. ASTM E736/E736M Standard Test Method for Cohesion/Adhesion of Sprayed Fire-Resistive Materials Applied to Structural Members 2019.
- C. ASTM E760/E760M Standard Test Method for Effect of Impact on Bonding of Sprayed Fire-Resistive Material Applied to Structural Members 1992 (Reapproved 2020).
- D. ASTM E937/E937M Standard Test Method for Corrosion of Steel by Sprayed Fire-Resistive Material (SFRM) Applied to Structural Members 1993 (Reapproved 2020).
- E. UL (FRD) Fire Resistance Directory Current Edition.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Coordinate with placement of ceiling hanger tabs, mechanical component hangers, and electrical components.
- B. Preinstallation Meeting: Convene one week before starting work of this section.

1.05 SUBMITTALS

- A. See Section 01 30 00 Administrative Requirements, for submittals procedures.
- B. Product Data: Provide data indicating product characteristics.
- C. Manufacturer's Certificate: Certify that applied fireproofing products meet or exceed requirements of Contract Documents.
- D. Manufacturer's Installation Instructions: Indicate special procedures.
- E. Manufacturer's Qualification Statement.

1.06 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than three years of documented experience.

1.07 FIELD CONDITIONS

- A. Do not apply fireproofing when temperature of substrate material and surrounding air is below 40 degrees F (4 degrees C) or when temperature is predicted to be below said temperature for 24 hours after application.
- B. Provide ventilation in areas to receive fireproofing during application and 24 hours afterward, to dry applied material.

C. Provide temporary enclosure to prevent spray from contaminating air.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Applied Fireproofing:
 - 1. GCP Applied Technologies: www.gcpat.com/#sle.
 - 2. Isolatek International Corp: www.isolatek.com/#sle.
 - 3. Southwest Fireproofing Products Company: www.sfrm.com/#sle.
 - 4. Substitutions: See Section 01 60 00 Product Requirements.

2.02 FIREPROOFING ASSEMBLIES

A. Provide assemblies as indicated on drawings.

2.03 MATERIALS

- A. Applied Fireproofing Material for Interior Applications, Concealed: Manufacturer's standard factory mixed material, which when combined with water is capable of providing indicated fire resistance, and complying with following requirements:
 - 1. Bond Strength: 150 pounds per square foot (7.2 kPa), minimum, when tested in accordance with ASTM E736/E736M when set and dry.
 - 2. Compressive Strength: 8.33 pounds per square inch (57.4 kPa), minimum.
 - 3. Effect of Impact on Bonding: No cracking, spalling or delamination, when tested in accordance with ASTM E760/E760M.
 - 4. Corrosivity: No evidence of corrosion, when tested in accordance with ASTM E937/E937M.
 - 5. Surface Burning Characteristics: Maximum flame spread index of 0 (zero) and maximum smoke developed index of 0 (zero), when tested in accordance with ASTM E84.

2.04 ACCESSORIES

- A. Primer Adhesive: Of type recommended by applied fireproofing manufacturer.
- B. Metal Lath: Expanded metal lath; minimum weight of 1.7 psf (8 kg/sq m), galvanized finish.
- C. Water: Clean, potable.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that surfaces are ready to receive fireproofing.
- B. Verify that clips, hangers, supports, sleeves, and other items required to penetrate fireproofing are in place.
- C. Verify that ducts, piping, equipment, or other items that would interfere with application of fireproofing have not been installed.
- D. Verify that voids and cracks in substrate have been filled.
- E. Verify that projections have been removed where fireproofing will be exposed to view as a finish material.

3.02 PREPARATION

- A. Perform tests as recommended by fireproofing manufacturer in applications where adhesion of fireproofing to substrate is in question.
- B. Remove incompatible materials that could effect bond by scraping, brushing, scrubbing, or sandblasting.

- C. Prepare substrates to receive fireproofing in strict accordance with instructions of fireproofing manufacturer.
- D. Protect surfaces not scheduled for fireproofing and equipment from damage by overspray, fallout, and dusting.
- E. Close off and seal duct work in areas where fireproofing is being applied.

3.03 APPLICATION

- A. Install metal lath over structural members as indicated or as required by UL Assembly Design Numbers.
- B. Apply primer adhesive in accordance with manufacturer's instructions.
- C. Apply fireproofing in uniform thickness and density as necessary to achieve required ratings.

3.04 FIELD QUALITY CONTROL

- A. Perform field inspection and testing in accordance with Section 01 40 00 Quality Requirements.
- B. Inspect installed fireproofing after application and curing for integrity, prior to its concealment.
- C. Ensure that actual thicknesses, densities, and bond strengths meet requirements for specified ratings and requirements of authorities having jurisdiction (AHJ).
- D. Re-inspect installed fireproofing for integrity of fire protection, after installation of subsequent Work.

3.05 CLEANING

- A. Remove excess material, overspray, droppings, and debris.
- B. Remove fireproofing from materials and surfaces not required to be fireproofed.

SECTION 07 92 00 JOINT SEALANTS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Nonsag gunnable joint sealants.
- B. Joint backings and accessories.

1.02 RELATED REQUIREMENTS

- A. Section 08 71 00 Door Hardware: Setting exterior door thresholds in sealant.
- B. Section 08 80 00 Glazing: Glazing sealants and accessories.
- C. Section 09 21 16 Gypsum Board Assemblies: Sealing acoustical and sound-rated walls and ceilings.
- D. Section 09 30 00 Tiling: Sealant between tile and plumbing fixtures and at junctions with other materials and changes in plane.

1.03 REFERENCE STANDARDS

- A. ASTM C661 Standard Test Method for Indentation Hardness of Elastomeric-Type Sealants by Means of a Durometer 2015.
- B. ASTM C794 Standard Test Method for Adhesion-In-Peel of Elastomeric Joint Sealants 2018.
- C. ASTM C834 Standard Specification for Latex Sealants 2017.
- D. ASTM C920 Standard Specification for Elastomeric Joint Sealants 2018.
- E. ASTM C1087 Standard Test Method for Determining Compatibility of Liquid-Applied Sealants with Accessories Used in Structural Glazing Systems 2016.
- F. ASTM C1193 Standard Guide for Use of Joint Sealants 2016.
- G. ASTM C1248 Standard Test Method for Staining of Porous Substrate by Joint Sealants 2018.
- H. ASTM C1521 Standard Practice for Evaluating Adhesion of Installed Weatherproofing Sealant Joints 2019 (Reapproved 2020).

1.04 SUBMITTALS

- A. See Section 01 30 00 Administrative Requirements, for submittal procedures.
- B. Product Data for Sealants: Submit manufacturer's technical data sheets for each product to be used, that includes the following.
 - 1. Physical characteristics, including movement capability, VOC content, hardness, cure time, and color availability.
 - 2. List of backing materials approved for use with the specific product.
 - 3. Substrates that product is known to satisfactorily adhere to and with which it is compatible.
 - 4. Substrates the product should not be used on.
- C. Product Data for Accessory Products: Submit manufacturer's technical data sheet for each product to be used, including physical characteristics, installation instructions, and recommended tools.
- D. Color Cards for Selection: Where sealant color is not specified, submit manufacturer's color cards showing standard colors available for selection.

- E. Preconstruction Laboratory Test Reports: Submit at least four weeks prior to start of installation.
- F. Preinstallation Field Adhesion Test Plan: Submit at least two weeks prior to start of installation.
- G. Preinstallation Field Adhesion Test Reports: Submit filled out Preinstallation Field Adhesion Test Reports log within 10 days after completion of tests; include bagged test samples and photographic records.

1.05 QUALITY ASSURANCE

- A. Preconstruction Laboratory Testing: Arrange for sealant manufacturer(s) to test each combination of sealant, substrate, backing, and accessories.
 - 1. Adhesion Testing: In accordance with ASTM C794.
 - 2. Compatibility Testing: In accordance with ASTM C1087.
 - 3. Allow sufficient time for testing to avoid delaying the work.
 - 4. Deliver to manufacturer sufficient samples for testing.
 - 5. Report manufacturer's recommended corrective measures, if any, including primers or techniques not indicated in product data submittals.
 - 6. Testing is not required if sealant manufacturer provides data showing previous testing, not older than 24 months, that shows satisfactory adhesion, lack of staining, and compatibility.
- B. Preinstallation Field Adhesion Test Plan: Include destructive field adhesion testing of one sample of each combination of sealant type and substrate, except interior acrylic latex sealants, and include the following for each tested sample.
 - 1. Identification of testing agency.
 - 2. Preinstallation Field Adhesion Test Log Form: Include the following data fields, with known information filled out.
 - a. Test date.
 - b. Copy of test method documents.
 - c. Age of sealant upon date of testing.
 - d. Test results, modeled after the sample form in the test method document.
 - e. Indicate use of photographic record of test.
- C. Field Adhesion Test Procedures:
 - 1. Allow sealants to fully cure as recommended by manufacturer before testing.
 - 2. Have a copy of the test method document available during tests.
 - 3. Record the type of failure that occurred, other information required by test method, and the information required on the Field Quality Control Log.
 - 4. When performing destructive tests, also inspect the opened joint for proper installation characteristics recommended by manufacturer, and report any deficiencies.
 - 5. Deliver the samples removed during destructive tests in separate sealed plastic bags, identified with project, location, test date, and test results, to Owner.
 - 6. If any combination of sealant type and substrate does not show evidence of minimum adhesion or shows cohesion failure before minimum adhesion, report results to Architect.
- D. Destructive Field Adhesion Test: Test for adhesion in accordance with ASTM C1521, using Destructive Tail Procedure.
 - 1. Sample: At least 18 inch (457 mm) long.
 - 2. Minimum Elongation Without Adhesive Failure: Consider the tail at rest, not under any elongation stress; multiply the stated movement capability of the sealant in percent by

two; then multiply 1 inch (25 mm) by that percentage; if adhesion failure occurs before the "1 inch mark" is that distance from the substrate, the test has failed.

3. If either adhesive or cohesive failure occurs prior to minimum elongation, take necessary measures to correct conditions and re-test; record each modification to products or installation procedures.

1.06 WARRANTY

- A. See Section 01 78 00 Closeout Submittals, for additional warranty requirements.
- B. Correct defective work within a five year period after Date of Substantial Completion.
- C. Warranty: Include coverage for installed sealants and accessories that fail to achieve watertight seal, exhibit loss of adhesion or cohesion, or do not cure.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Non-Sag Sealants: Permits application in joints on vertical surfaces without sagging or slumping.
 - 1. BASF Construction Chemicals-Building Systems: www.buildingsystems.basf.com.
 - 2. Dow Corning Corporation: www.dowcorning.com/construction/#sle.
 - 3. Sika Corporation: www.usa-sika.com/#sle.
 - 4. Tremco Commercial Sealants & Waterproofing: www.tremcosealants.com/#sle.
 - 5. Substitutions: See Section 01 60 00 Product Requirements.

2.02 JOINT SEALANT APPLICATIONS

- A. Scope:
 - 1. Exterior Joints: Seal open joints, whether or not the joint is indicated on drawings, unless specifically indicated not to be sealed. Exterior joints to be sealed include, but are not limited to, the following items.
 - a. Wall expansion and control joints.
 - b. Joints between door, window, and other frames and adjacent construction.
 - c. Joints between different exposed materials.
 - d. Openings below ledge angles in masonry.
 - e. Other joints indicated below.
 - 2. Interior Joints: Do not seal interior joints unless specifically indicated to be sealed. Interior joints to be sealed include, but are not limited to, the following items.
 - a. Joints between door, window, and other frames and adjacent construction.
 - b. Other joints indicated below.
 - 3. Do not seal the following types of joints.
 - a. Intentional weepholes in masonry.
 - b. Joints indicated to be treated with manufactured expansion joint cover or some other type of sealing device.
 - c. Joints where sealant is specified to be provided by manufacturer of product to be sealed.
 - d. Joints where installation of sealant is specified in another section.
 - e. Joints between suspended panel ceilings/grid and walls.
- B. Exterior Joints: Use non-sag non-staining silicone sealant, unless otherwise indicated.
- C. Interior Joints: Use non-sag polyurethane sealant, unless otherwise indicated.
 - 1. Wall and Ceiling Joints in Non-Wet Areas: Acrylic emulsion latex sealant.

- 2. Type [___] Joints between Fixtures in Wet Areas and Floors, Walls, and Ceilings: Mildew-resistant silicone sealant; white.
- D. Interior Wet Areas: Bathrooms, restrooms, kitchens, food service areas, food processing areas, and [_____]; fixtures in wet areas include plumbing fixtures, food service equipment, countertops, cabinets, other similar items, and [____].

2.03 JOINT SEALANTS - GENERAL

2.04 NONSAG JOINT SEALANTS

- A. Non-Staining Silicone Sealant: ASTM C920, Grade NS, Uses M and A; not expected to withstand continuous water immersion or traffic.
 - 1. Movement Capability: Plus and minus 50 percent, minimum.
 - 2. Non-Staining To Porous Stone: Non-staining to light-colored natural stone when tested in accordance with ASTM C1248.
 - 3. Dirt Pick-Up: Reduced dirt pick-up compared to other silicone sealants.
- B. Type [___] Mildew-Resistant Silicone Sealant: ASTM C920, Grade NS, Uses M and A; single component, mildew resistant; not expected to withstand continuous water immersion or traffic.
 - 1. Color: White.
- C. Polyurethane Sealant: ASTM C920, Grade NS, Uses M and A; single or multi-component; not expected to withstand continuous water immersion or traffic.
 - 1. Movement Capability: Plus and minus [____] percent, minimum.
 - 2. Hardness Range: 20 to 35, Shore A, when tested in accordance with ASTM C661.
 - 3. Color: To be selected by Architect from manufacturer's standard range.
 - 4. Service Temperature Range: Minus 40 to 180 degrees F (Minus 40 to 82 degrees C).
- D. Acrylic Emulsion Latex: Water-based; ASTM C834, single component, non-staining, nonbleeding, non-sagging; not intended for exterior use.
 - 1. Color: To be selected by Architect from manufacturer's standard range.
 - 2. Grade: ASTM C834; Grade Minus 18 Degrees C (0 Degrees F).

2.05 ACCESSORIES

- A. Backer Rod: Cylindrical cellular foam rod with surface that sealant will not adhere to, compatible with specific sealant used, and recommended by backing and sealant manufacturers for specific application.
- B. Backing Tape: Self-adhesive polyethylene tape with surface that sealant will not adhere to and recommended by tape and sealant manufacturers for specific application.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that joints are ready to receive work.
- B. Verify that backing materials are compatible with sealants.
- C. Verify that backer rods are of the correct size.
- D. Preinstallation Adhesion Testing: Install a sample for each test location indicated in the test plan.
 - 1. Test each sample as specified in PART 1 under QUALITY ASSURANCE article.
 - 2. Notify Architect of date and time that tests will be performed, at least 7 days in advance.
 - 3. Record each test on Preinstallation Adhesion Test Log as indicated.

- 4. If any sample fails, review products and installation procedures, consult manufacturer, or take whatever other measures are necessary to ensure adhesion; re-test in a different location; if unable to obtain satisfactory adhesion, report to Architect.
- 5. After completion of tests, remove remaining sample material and prepare joint for new sealant installation.

3.02 PREPARATION

- A. Remove loose materials and foreign matter that could impair adhesion of sealant.
- B. Clean joints, and prime as necessary, in accordance with manufacturer's instructions.
- C. Perform preparation in accordance with manufacturer's instructions and ASTM C1193.
- D. Mask elements and surfaces adjacent to joints from damage and disfigurement due to sealant work; be aware that sealant drips and smears may not be completely removable.

3.03 INSTALLATION

- A. Perform work in accordance with sealant manufacturer's requirements for preparation of surfaces and material installation instructions.
- B. Perform installation in accordance with ASTM C1193.
- C. Install bond breaker backing tape where backer rod cannot be used.
- D. Install sealant free of air pockets, foreign embedded matter, ridges, and sags, and without getting sealant on adjacent surfaces.
- E. Do not install sealant when ambient temperature is outside manufacturer's recommended temperature range, or will be outside that range during the entire curing period, unless manufacturer's approval is obtained and instructions are followed.
- F. Nonsag Sealants: Tool surface concave, unless otherwise indicated; remove masking tape immediately after tooling sealant surface.

SECTION 08 11 13 HOLLOW METAL DOORS AND FRAMES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Non-fire-rated hollow metal doors and frames.
- B. Hollow metal frames for wood doors.
- C. Fire-rated hollow metal doors and frames.
- D. Thermally insulated hollow metal doors with frames.
- E. Commercial security hollow metal doors and frames.
- F. Detention security hollow metal doors and frames.
- G. Accessories, including glazing, louvers, and matching panels.

1.02 RELATED REQUIREMENTS

- A. Section 08 71 00 Door Hardware.
- B. Section 08 80 00 Glazing: Glass for doors and borrowed lites.
- C. Section 09 91 23 Interior Painting: Field painting.

1.03 REFERENCE STANDARDS

- A. ADA Standards Americans with Disabilities Act (ADA) Standards for Accessible Design 2010.
- B. ANSI/SDI A250.3 Test Procedure and Acceptance Criteria for Factory Applied Finish Coatings for Steel Doors and Frames 2007 (Reaffirmed 2011).
- C. ANSI/SDI A250.4 Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors, Frames and Frame Anchors 2011.
- D. ANSI/SDI A250.6 Recommended Practice for Hardware Reinforcing on Standard Steel Doors and Frames 2003 (R2009).
- E. ANSI/SDI A250.8 Specifications for Standard Steel Doors and Frames (SDI-100) 2017.
- F. ANSI/SDI A250.10 Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames 2011.
- G. ASTM A653/A653M Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process 2020.
- H. ASTM A1008/A1008M Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Required Hardness, Solution Hardened, and Bake Hardenable 2021.
- I. ASTM A1011/A1011M Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength 2018a.
- J. ASTM E90 Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements 2009 (Reapproved 2016).
- K. ASTM E330/E330M Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference 2014.

- L. BHMA A156.115 American National Standard for Hardware Preparation in Steel Doors and Steel Frames 2016.
- M. ICC A117.1 Accessible and Usable Buildings and Facilities 2017.
- N. ITS (DIR) Directory of Listed Products current edition.
- O. NAAMM HMMA 805 Recommended Selection and Usage Guide for Hollow Metal Doors and Frames 2012.
- P. NAAMM HMMA 830 Hardware Selection for Hollow Metal Doors and Frames 2002.
- Q. NAAMM HMMA 831 Hardware Locations for Hollow Metal Doors and Frames 2011.
- R. NAAMM HMMA 840 Guide Specifications For Receipt, Storage and Installation of Hollow Metal Doors and Frames 2007.
- S. NAAMM HMMA 850 Fire-Protection and Smoke Control Rated Hollow Metal Door and Frame Products 2014.
- T. NAAMM HMMA 860 Guide Specifications for Hollow Metal Doors and Frames 2018.
- U. NAAMM HMMA 861 Guide Specifications for Commercial Hollow Metal Doors and Frames 2014.
- V. NFPA 80 Standard for Fire Doors and Other Opening Protectives 2019.
- W. NFPA 105 Standard for Smoke Door Assemblies and Other Opening Protectives 2019.
- X. NFPA 252 Standard Methods of Fire Tests of Door Assemblies 2017.
- Y. SDI 117 Manufacturing Tolerances for Standard Steel Doors and Frames 2013.
- Z. UL (DIR) Online Certifications Directory Current Edition.
- AA. UL 10C Standard for Positive Pressure Fire Tests of Door Assemblies Current Edition, Including All Revisions.
- BB. UL 1784 Standard for Air Leakage Tests of Door Assemblies Current Edition, Including All Revisions.

1.04 SUBMITTALS

- A. See Section 01 30 00 Administrative Requirements, for submittal procedures.
- B. Product Data: Materials and details of design and construction, hardware locations, reinforcement type and locations, anchorage and fastening methods, and finishes; and one copy of referenced standards/guidelines.
- C. Shop Drawings: Details of each opening, showing elevations, glazing, frame profiles, and any indicated finish requirements.
- D. Samples: Submit two samples of metal, 2 inch by 2 inch in size (50 mm by 50 mm in size) showing factory finishes, colors, and surface texture.
- E. Installation Instructions: Manufacturer's published instructions, including any special installation instructions relating to this project.
- F. Manufacturer's Certificate: Certification that products meet or exceed specified requirements.
- G. Manufacturer's Qualification Statement.
- H. Installer's Qualification Statement.

1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than three years documented experience.
- B. Maintain at project site copies of reference standards relating to installation of products specified.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Comply with NAAMM HMMA 840 or ANSI/SDI A250.8 (SDI-100) in accordance with specified requirements.
- B. Protect with resilient packaging; avoid humidity build-up under coverings; prevent corrosion and adverse effects on factory applied painted finish.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Hollow Metal Doors and Frames:
 - 1. Ceco Door, an Assa Abloy Group company: www.assaabloydss.com.
 - 2. Republic Doors: www.republicdoor.com.
 - 3. Steelcraft, an Allegion brand: www.allegion.com/#sle.
 - 4. Substitutions: See Section 01 60 00 Product Requirements.
- B. Commercial Security Hollow Metal Doors and Frames:
 - 1. Fleming Door Products, an Assa Abloy Group company; [____]: www.assaabloydss.com/#sle.
 - 2. Republic Doors, an Allegion brand; [____]: www.republicdoor.com/#sle.
 - 3. Security Metal Products Corporation, an Assa Abloy Group company; [____]: www.assaabloydss.com/#sle.
 - 4. Substitutions: See Section 01 60 00 Product Requirements.

2.02 PERFORMANCE REQUIREMENTS

- A. Requirements for Hollow Metal Doors and Frames:
 - Steel Sheet: Comply with one or more of the following requirements; galvannealed steel complying with ASTM A653/A653M, cold-rolled steel complying with ASTM A1008/A1008M, or hot-rolled pickled and oiled (HRPO) steel complying with ASTM A1011/A1011M, commercial steel (CS) Type B, for each.
 - 2. Accessibility: Comply with ICC A117.1 and ADA Standards.
 - 3. Exterior Door Top Closures: Flush end closure channel, with top and door faces aligned.
 - 4. Door Edge Profile: Manufacturers standard for application indicated.
 - 5. Typical Door Face Sheets: Flush.
 - 6. Hardware Preparations, Selections and Locations: Comply with NAAMM HMMA 830 and NAAMM HMMA 831 or BHMA A156.115 and ANSI/SDI A250.8 (SDI-100) in accordance with specified requirements.
 - 7. Zinc Coating for Typical Interior and/or Exterior Locations: Provide metal components zinc-coated (galvanized) and/or zinc-iron alloy-coated (galvannealed) by the hot-dip process in accordance with ASTM A653/A653M, with manufacturer's standard coating thickness, unless noted otherwise for specific hollow metal doors and frames.
- B. Hollow Metal Panels: Same construction, performance, and finish as doors.
- C. Combined Requirements: If a particular door and frame unit is indicated to comply with more than one type of requirement, comply with the specified requirements for each type; for

instance, an exterior door that is also indicated as being sound-rated must comply with the requirements specified for exterior doors and for sound-rated doors; where two requirements conflict, comply with the most stringent.

2.03 HOLLOW METAL DOORS

- A. Door Finish: Factory primed and field finished.
- B. Exterior Doors: Thermally insulated.
 - 1. Based on NAAMM HMMA Custom Guidelines:
 - a. Comply with guidelines of NAAMM HMMA 860 for Hollow Metal Doors and Frames.
 - b. Performance Level 3 Heavy Duty, in accordance with NAAMM HMMA 805.
 - c. Physical Performance Level C, 250,000 cycles; in accordance with ANSI/SDI A250.4.
 - d. Door Face Metal Thickness: 20 gage, 0.032 inch (0.8 mm), minimum.
 - 2. Door Core Material: Manufacturers standard core material/construction and in compliance with requirements.
 - 3. Door Thickness: 1-3/4 inch (44.5 mm), nominal.
 - 4. Weatherstripping: Integral, recessed into door edge or frame.
- C. Fire-Rated Doors:
 - 1. Based on NAAMM HMMA Custom Guidelines: Comply with NAAMM HMMA 850 requirements for fire-rated doors.
 - a. Comply with guidelines of NAAMM HMMA 860 for Hollow Metal Doors and Frames.
 - b. Performance Level 2 Moderate Duty, in accordance with NAAMM HMMA 805.
 - c. Physical Performance Level C, 250,000 cycles; in accordance with ANSI/SDI A250.4.
 - d. Door Face Metal Thickness: 20 gage, 0.032 inch (0.8 mm), minimum.
 - 2. Fire Rating: As indicated on Door Schedule, tested in accordance with UL 10C and NFPA 252 ("positive pressure fire tests").
 - 3. Temperature-Rise Rating (TRR) Across Door Thickness: In accordance with local building code and authorities having jurisdiction.
 - 4. Provide units listed and labeled by UL (DIR) or ITS (DIR).
 - a. Attach fire rating label to each fire rated unit.
 - 5. Smoke and Draft Control Doors (Indicated with letter "S" on Drawings and/or Door Schedule): Self-closing or automatic closing doors in accordance with NFPA 80 and NFPA 105, with fire-resistance-rated wall construction rated the same or greater than the fire-rated doors, and the following;
 - a. Maximum Air Leakage: 3.0 cfm/sq ft (0.02 cu m/sec/sq m) of door opening at 0.10 inch w.g. (24.9 Pa) pressure, when tested in accordance with UL 1784 at both ambient and elevated temperatures.
 - b. Gasketing: Provide gasketing or edge sealing as necessary to achieve leakage limit.
 - c. Label: Include the "S" label on fire-rating label of door.
 - 6. Door Core Material: Manufacturers standard core material/construction in compliance with requirements.
 - 7. Door Thickness: 1-3/4 inch (44.5 mm), nominal.

2.04 HOLLOW METAL FRAMES

- A. Comply with standards and/or custom guidelines as indicated for corresponding door in accordance with applicable door frame requirements.
- B. Frame Finish: Factory primed and field finished.
- C. Exterior Door Frames: Full profile/continuously welded type.
 - 1. Galvanizing: Components hot-dipped zinc-iron alloy-coated (galvannealed) in accordance with ASTM A653/A653M, with A40/ZF120 coating.
 - 2. Frame Metal Thickness: 16 gage, 0.053 inch (1.3 mm), minimum.
 - 3. Weatherstripping: Integral, recessed into door edge or frame.
- D. Interior Door Frames, Non-Fire Rated: Full profile/continuously welded type.
 - 1. Terminated Stops: Provide at interior doors; closed end stop terminated 6 inch (150 mm), maximum, above floor at 45 degree angle.
 - 2. Frame Metal Thickness: 16 gage, 0.053 inch (1.3 mm), minimum.
- E. Door Frames, Fire-Rated: Full profile/continuously welded type.
 - 1. Fire Rating: Same as door, labeled.
 - 2. Frame Metal Thickness: 16 gage, 0.053 inch (1.3 mm), minimum.
- F. Commercial and/or Detention Security-Resistant Door Frames: With same security resistance as door; face welded or full profile/continuously welded construction, ground smooth, fully prepared and reinforced for hardware installation.
 - 1. Frame Metal Thickness: 16 gage, 0.053 inch (1.3 mm), minimum.
 - 2. Frame Finish: Factory primed and field finished.
- G. Mullions for Pairs of Doors: Removable type, with profile similar to jambs.
- H. Provide mortar guard boxes for hardware cut-outs in frames to be installed in masonry or to be grouted.
- I. Frames in Masonry Walls: Size to suit masonry coursing with head member 4 inch (102 mm) high to fill opening without cutting masonry units.
- J. Frames Wider than 48 inches (1219 mm): Reinforce with steel channel fitted tightly into frame head, flush with top.

2.05 FINISHES

A. Primer: Rust-inhibiting, complying with ANSI/SDI A250.10, door manufacturer's standard.

2.06 ACCESSORIES

- A. Louvers: Roll formed steel with overlapping frame; finish same as door components ; factoryinstalled.
 - 1. In Fire-Rated Doors: UL (DIR) or ITS (DIR) listed fusible link louver, same rating as door.
- B. Glazing: As specified in Section 08 80 00, factory installed.
- C. Astragals for Double Doors:
 - 1. Fire-Rated Doors: Steel, shape as required for fire rating.
- D. Mechanical Fasteners for Concealed Metal-to-Metal Connections: Self-drilling, self-tapping, steel with electroplated zinc finish.
- E. Grout for Frames: Portland cement grout with maximum 4 inch (102 mm) slump for hand troweling; thinner pumpable grout is prohibited.

- F. Silencers: Resilient rubber, fitted into drilled hole; provide three on strike side of single door, three on center mullion of pairs, and two on head of pairs without center mullions.
- G. Temporary Frame Spreaders: Provide for factory- or shop-assembled frames.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Verify that opening sizes and tolerances are acceptable.
- C. Verify that finished walls are in plane to ensure proper door alignment.

3.02 PREPARATION

A. Coat inside of frames to be installed in masonry or to be grouted, with bituminous coating, prior to installation.

3.03 INSTALLATION

- A. Install doors and frames in accordance with manufacturer's instructions and related requirements of specified door and frame standards or custom guidelines indicated.
- B. Install prefinished frames after painting and wall finishes are complete.
- C. Install fire rated units in accordance with NFPA 80.
- D. Coordinate frame anchor placement with wall construction.
- E. Grout frames in masonry construction, using hand trowel methods; brace frames so that pressure of grout before setting will not deform frames.
- F. Install door hardware as specified in Section 08 71 00.
- G. Coordinate installation of electrical connections to electrical hardware items.
- H. Touch up damaged factory finishes.

3.04 TOLERANCES

- A. Clearances Between Door and Frame: Comply with related requirements of specified frame standards or custom guidelines indicated in accordance with SDI 117 or NAAMM HMMA 861.
- B. Maximum Diagonal Distortion: 1/16 inch (1.6 mm) measured with straight edge, corner to corner.

3.05 ADJUSTING

- A. Adjust for smooth and balanced door movement.
- B. Adjust sound control doors so that seals are fully engaged when door is closed.
- C. Test sound control doors for force to close, latch, and unlatch; adjust as necessary in compliance with requirements.
SECTION 08 11 16 ALUMINUM DOORS AND FRAMES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Flush aluminum doors with fiberglass reinforced plastic (FRP) face sheets.
- B. Fire doors with fiberglass reinforced plastic (FRP) face sheets.
- C. Aluminum frames.
- D. Flush door panels.
- E. Flush infill panels.
- F. Glazing.
- G. Aluminum door louvers.

1.02 RELATED REQUIREMENTS

- A. Section 07 25 00 Weather Barriers: Sealing door frame to weather barrier installed on adjacent construction.
- B. Section 07 92 00 Joint Sealants: Sealing joints between door frames and adjacent construction.
- C. Section 08 14 16 Flush Wood Doors: Wood doors to be installed in aluminum frames specified in this section.
- D. Section 08 71 00 Door Hardware: Hardware for aluminum doors.
- E. Section 08 80 00 Glazing: Glazing materials for aluminum doors and frames.

1.03 REFERENCE STANDARDS

- A. AAMA 609 & 610 Cleaning and Maintenance Guide for Architecturally Finished Aluminum (Combined Document) 2015.
- B. AAMA 611 Voluntary Specification for Anodized Architectural Aluminum 2014 (2015 Errata).
- C. AAMA 701/702 Combined Voluntary Specifications for Pile Weatherstrip and Replaceable Fenestration Weatherseals 2011.
- D. AAMA 1503 Voluntary Test Method for Thermal Transmittance and Condensation Resistance of Windows, Doors and Glazed Wall Sections 2009.
- E. ASTM A123/A123M Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products 2017.
- F. ASTM B209 Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate 2014.
- G. ASTM B221 Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes 2020.
- H. ASTM C365/C365M Standard Test Method for Flatwise Compressive Properties of Sandwich Cores 2016.
- I. ASTM C1363 Standard Test Method for Thermal Performance of Building Materials and Envelope Assemblies by Means of a Hot Box Apparatus 2019.

- J. ASTM D256 Standard Test Methods for Determining the Izod Pendulum Impact Resistance of Plastics 2010 (Reapproved 2018).
- K. ASTM D570 Standard Test Method for Water Absorption of Plastics 1998 (Reapproved 2018).
- L. ASTM D638 Standard Test Method for Tensile Properties of Plastics 2014.
- M. ASTM D790 Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials 2017.
- N. ASTM D2583 Standard Test Method for Indentation Hardness of Rigid Plastics by Means of Barcol Impressor 2013a.
- O. ASTM E84 Standard Test Method for Surface Burning Characteristics of Building Materials 2021a.
- P. ASTM E90 Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements 2009 (Reapproved 2016).
- Q. ASTM E283 Standard Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen 2004 (Reapproved 2012).
- R. ASTM E331 Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference 2000 (Reapproved 2016).
- S. ASTM E1996 Standard Specification for Performance of Exterior Windows, Curtain Walls, Doors, and Impact Protective Systems Impacted by Windborne Debris in Hurricanes 2017.
- T. ASTM E2112 Standard Practice for Installation of Exterior Windows, Doors and Skylights 2019c.
- U. ITS (DIR) Directory of Listed Products current edition.
- V. NFPA 252 Standard Methods of Fire Tests of Door Assemblies 2017.
- W. UL (DIR) Online Certifications Directory Current Edition.
- X. UL 10C Standard for Positive Pressure Fire Tests of Door Assemblies Current Edition, Including All Revisions.

1.04 SUBMITTALS

- A. See Section 01 30 00 Administrative Requirements, for submittal procedures.
- B. Product Data: Manufacturer's descriptive literature for each type of door; include information on fabrication methods.
- C. Shop Drawings: Include elevations of each opening type.
 - 1. Verify dimensions by field measurements before fabrication and indicate on shop drawings.
- D. Selection Samples: Complete set of color and finish options, using actual materials, for Architect's selection.
- E. Test Report: Submit certified test reports from qualified independent testing agency indicating doors comply with specified performance requirements.
- F. Manufacturer's Qualification Statement.
- G. Installer's Qualification Statement.

H. Warranty: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with not less than five years of documented experience.
- B. Installer Qualifications: Company specializing in performing work of type specified and with at least three years of documented experience.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Deliver aluminum components in manufacturer's standard protective packaging, palleted, crated, or banded together.
- B. Inspect delivered components for damage and replace. Repaired components will not be accepted.
- C. Store components in clean, dry, indoor area, under cover in manufacturer's packaging until installation.
- D. Protect materials and finish from damage during handling and installation.

1.07 FIELD CONDITIONS

A. Do not begin installation of interior aluminum components until space has been enclosed and ambient thermal conditions are being maintained at levels consistent with final project requirements.

1.08 WARRANTY

- A. See Section 01 78 00 Closeout Submittals, for additional warranty requirements.
- B. Correct defective Work within a one year period after Date of Substantial Completion.
- C. Provide ten year manufacturer warranty for defects in workmanship and materials.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Flush Aluminum Doors with Fiberglass Reinforced Plastic (FRP) Face Sheets:
 - 1. Cline Aluminum Doors, Inc; Series 200BE (FRP Facer): www.clinedoors.com/#sle.
 - 2. FRP Architectural Doors, Inc. www.frparch.com Heavy Wall Door Series FD55.
 - 3. Substitutions: See Section 01 60 00 Product Requirements.
- B. Aluminum Frames:
 - 1. Cline Aluminum Doors, Inc: www.clinedoors.com/sle.
 - 2. Kawneer.
 - 3. Tubelight
 - 4. Efco Corp.
 - 5. Wasua
 - 6. Substitutions: See Section 01 60 00 Product Requirements.

2.02 DOORS AND FRAMES

- A. Flush Aluminum Doors with Fiberglass Reinforced Plastic (FRP) Face Sheets: Aluminum internal framing; no steel components.
 - 1. Thickness: 1-3/4 inches (44 mm).
 - 2. Aluminum Finish: Class I Natural anodized.
 - 3. Facing: Seamless, ultraviolet stabilized laminated FRP sheet.

- a. Sheet Thickness: 0.12 inch (3 mm), minimum.
- b. FRP Texture: Pebble on Exterior Surface; Sandstone on Interior Surface.
- c. Surface Burning Characteristics: Flame spread index (FSI) of 0 to 25, Class A, and smoke developed index (SDI) of 450 or less; when tested in accordance with ASTM E84.
- d. Provide products that meet USDA requirements for incidental food contact.
- e. Color: As selected from manufacturers full line of colors..
- f. FRP Color: as selected from manufacturers full range of colors..
- 4. Weatherstripping: Replaceable pile type; at jambs and head of exterior doors.
- B. Aluminum Frames for Doors, Sidelights, or Transoms: Extruded aluminum, non-thermally broken hollow or C-shaped sections; no steel components.
 - 1. Frame Depth: 4-1/4 inches (108 mm).
 - 2. Frames for Fire-Rated Doors Specified Elsewhere: Tested in accordance with NFPA 252, listed and labeled by UL (DIR), ITS (DIR), or testing agency acceptable to authorities having jurisdiction.
 - 3. Finish: Same as doors.
 - 4. Weatherstripping: Replaceable pile type; at jambs and head.
 - 5. Sidelight/Transom Glazing: Sealed insulating glass units, 1 inch (25 mm) overall thickness, with two panes of clear 1/4 inch (6 mm) thick fully tempered glass.
- C. Dimensions and Shapes: As indicated on drawings; dimensions indicated are nominal.
 - 1. Provide louvers as indicated on drawings.
 - 2. Provide the following clearances:
 - a. Hinge and Lock Stiles: 1/8 inch (3.2 mm).
 - b. Between Meeting Stiles: 1/4 inch (6.4 mm).
 - c. At Top Rail and Bottom Rail: 1/8 inch (3.2 mm).

2.03 COMPONENTS

- A. Flush Door Panels: Without visible seams on face sheet.
 - 1. Framing and Hardware Backup: Extruded aluminum tubing, 1/8 inch (3.2 mm) minimum thickness.
 - 2. Perimeter Edges: Extruded aluminum cap.
 - 3. Insulating Panel Thickness: 1 inch (25.4 mm) overall thickness.
 - 4. Exterior Doors Thermal Transmittance: U-value of 0.50, nominal, when tested in accordance with ASTM C1363.
 - 5. Laminating Adhesive: Manufacturer's standard low-VOC materials.
- B. Frames: Extruded aluminum shapes, not less than 0.062 inch (1.6 mm) thick, reinforced at hinge and strike locations.
 - 1. Corner Brackets: Extruded aluminum, fastened with stainless steel screws.
 - 2. Trim: Extruded aluminum, not less than 0.062 inch (1.6 mm) thick, removable snap-in type without exposed fasteners.
- C. Flush Infill Panels for Sidelights/Transoms: Panel face sheet finish and thickness same as doors without any visible seams.
- D. Louvers: Blades and frame of extruded aluminum, minimum 0.06 inch (1.6 mm) thick; size as indicated.
- E. Door Hardware: Refer to Section 08 71 00 for additional requirements.

2.04 PERFORMANCE REQUIREMENTS

- A. Provide door assemblies that have been designed and fabricated in compliance with specified performance requirements.
- B. Wind-Borne-Debris Resistance: Identical full-size glazed assembly without auxiliary protection, tested by independent agency in accordance with ASTM E1996 and Wind Zone 4 -Additional Protection for Large and Small Missile impact and pressure cycling at design wind pressure.
- C. Water Leakage: No uncontrolled leakage on interior face when tested in accordance with ASTM E331 at differential pressure of 7.5 psf (359 Pa).
- D. Air Leakage: Maximum of 0.1 cu ft/min/sq ft at 6.27 psf (0.5 L/sec/sq m at 300 Pa) differential pressure, when tested in accordance with ASTM E283.
- E. Condensation Resistance Factor: 50, measured in accordance with AAMA 1503.
- F. Acoustical Performance: Sound Transmission Class (STC) of 25, minimum, when tested in accordance with ASTM E90.
- G. Fiberglass Reinforced Plastic (FRP) Face Sheet Properties:
 - 1. Izod Impact Resistance: ASTM D256, 7 ft lbf/inch of width, minimum, with notched izod.
 - 2. Tensile Strength at Break: ASTM D638, 13,250 psi, minimum.
 - 3. Water Absorption: ASTM D570, 0.16 percent, maximum, after 24 hours at 74 degrees F (23 degrees C).
 - 4. Flexural Strength: ASTM D790, 27,000 psi, minimum.
 - 5. Barcol Hardness: ASTM D2583, minimum of 40 units.

2.05 FINISHES

- A. Class I Color Anodized Finish: Electrolytically deposited colored anodic coating; AAMA 611 AA-M12C22A44, minimum dry film thickness (DFT) of 0.7 mils, 0.0007 inch (0.018 mm).
- B. Color: As indicated on drawings.
- C. Touch-Up Materials: As recommended by coating manufacturer for field application.

2.06 ACCESSORIES

- A. Replaceable Weatherstripping: AAMA 701/702 wool pile.
- B. Fasteners: Aluminum, non-magnetic stainless steel, or other material warranted by manufacturer as non-corrosive and compatible with aluminum components.
- C. Brackets and Reinforcements: Manufacturer's high-strength aluminum units where feasible, otherwise, non-magnetic stainless steel or steel hot-dip galvanized in compliance with ASTM A123/A123M.
- D. Bituminous Coating: Cold-applied asphaltic mastic, compounded for 30-mil (0.76 mm) thickness per coat.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that wall surfaces and openings are ready to receive frames and are within tolerances specified in manufacturer's instructions.

- B. Verify that frames installed by other trades for installation of doors of this section are in strict accordance with recommendations and approved shop drawings and within tolerances specified in manufacturer's instructions.
- C. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.02 PREPARATION

- A. Perform cutting, fitting, forming, drilling, and grinding of frames as required for project conditions.
- B. Replace components with damage to exposed finishes.
- C. Separate dissimilar metals to prevent electrolytic action between metals.

3.03 INSTALLATION

- A. Install doors and frames in accordance with manufacturer's instructions and approved shop drawings.
- B. Install exterior doors and frames in accordance with ASTM E2112.
- C. Set frames plumb, square, level, and aligned to receive doors. Anchor frames to adjacent construction in strict accordance with manufacturer's recommendations and within specified tolerances.
- D. Where aluminum surfaces contact metals other than stainless steel, zinc, or small areas of white bronze, protect from direct contact by painting dissimilar metal with heavy coating of bituminous paint.
- E. Hang doors and adjust hardware to achieve specified clearances and proper door operation.
- F. Install door hardware as specified in Section 08 71 00.
- G. Install glazing; set glazing stops and glazing gaskets flush with face of door or frame.

3.04 CLEANING

- A. Upon completion of installation, thoroughly clean door and frame surfaces in accordance with AAMA 609 & 610.
- B. Do not use abrasive, caustic, or acid cleaning agents.

3.05 PROTECTION

- A. Protect products of this section from damage caused by subsequent construction until Date of Substantial Completion.
- B. Replace damaged or defective components that cannot be repaired to a condition indistinguishable from undamaged components.

END OF SECTION

SECTION 08 14 16 FLUSH WOOD DOORS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Flush wood doors; flush configuration; fire-rated and non-rated.

1.02 RELATED REQUIREMENTS

- A. Section 08 11 13 Hollow Metal Doors and Frames.
- B. Section 08 71 00 Door Hardware.
- C. Section 08 80 00 Glazing.
- D. Section 09 91 23 Interior Painting: Field finishing of doors.

1.03 REFERENCE STANDARDS

- A. 16 CFR 1201 Safety Standard for Architectural Glazing Materials Current Edition.
- B. ANSI A135.4 Basic Hardboard 2012 (R2020).
- C. ASTM C1048 Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass 2018.
- D. ASTM C1172 Standard Specification for Laminated Architectural Flat Glass 2019.
- E. ASTM E90 Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements 2009 (Reapproved 2016).
- F. ASTM E413 Classification for Rating Sound Insulation 2016.
- G. ASTM E2112 Standard Practice for Installation of Exterior Windows, Doors and Skylights 2019c.
- H. AWI/AWMAC/WI (AWS) Architectural Woodwork Standards, 2nd Edition 2014, with Errata (2016).
- I. AWMAC/WI (NAAWS) North American Architectural Woodwork Standards, U.S. Version 3.1 2017, with Errata (2019).
- J. NEMA LD 3 High-Pressure Decorative Laminates 2005.
- K. NFPA 80 Standard for Fire Doors and Other Opening Protectives 2019.
- L. NFPA 105 Standard for Smoke Door Assemblies and Other Opening Protectives 2019.
- M. NFPA 252 Standard Methods of Fire Tests of Door Assemblies 2017.
- N. UL 10C Standard for Positive Pressure Fire Tests of Door Assemblies Current Edition, Including All Revisions.
- O. UL 1784 Standard for Air Leakage Tests of Door Assemblies Current Edition, Including All Revisions.
- P. WDMA I.S. 1A Interior Architectural Wood Flush Doors 2013.

1.04 SUBMITTALS

- A. See Section 01 30 00 Administrative Requirements, for submittal procedures.
- B. Product Data: Indicate door core materials and construction; veneer species, type and characteristics.

- C. Shop Drawings: Show doors and frames, elevations, sizes, types, swings, undercuts, beveling, blocking for hardware, factory machining, factory finishing, cutouts for glazing and other details.
- D. Certificate: Submit labels and certificates required by quality assurance and quality control programs.
- E. Test Reports: Show compliance with specified requirements for the following:
- F. Manufacturer's Installation Instructions: Indicate special installation instructions.
- G. Warranty, executed in Owner's name.

1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section, with not less than one year of documented experience.
 - 1. Company with at least one project within the past 5 years with value of woodwork within 20 percent of cost of woodwork for this project.
 - 2. Accredited participant in the specified certification program prior to the commencement of fabrication and throughout the duration of the project.
- B. Installer Qualifications: Company specializing in performing work of the type specified in this section, with not less than three years of documented experience.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Package, deliver and store doors in accordance with specified quality standard.
- B. Accept doors on site in manufacturer's packaging. Inspect for damage.
- C. Protect doors with resilient packaging sealed with heat shrunk plastic. Do not store in damp or wet areas; or in areas where sunlight might bleach veneer. Seal top and bottom edges with tinted sealer if stored more than one week. Break seal on site to permit ventilation.

1.07 WARRANTY

- A. See Section 01 78 00 Closeout Submittals, for additional warranty requirements.
- B. Interior Doors: Provide manufacturer's warranty for the life of the installation.
- C. Include coverage for delamination of veneer, warping beyond specified installation tolerances, defective materials, and telegraphing core construction.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Wood Veneer Faced Doors:
- B. High Pressure Decorative Laminate (HPDL) Faced Doors:
 - 1. Ampco Products, Inc: www.ampco.com.
 - 2. VT Industries, Inc: www.vtindustries.com.
 - 3. Algoma Hardwoods, Inc..
 - 4. Graham Wood Doors
 - 5. Marshfield Door Systems, Inc.
 - 6. Substitutions: See Section 01 60 00 Product Requirements.

2.02 DOORS AND PANELS

- A. Doors: Refer to drawings for locations and additional requirements.
 - 1. Quality Standard: Custom Grade, Heavy Duty performance, in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS), unless noted otherwise.

- 2. Wood Veneer Faced Doors: 5-ply unless otherwise indicated.
- 3. High Pressure Decorative Laminate (HPDL) Faced Doors: 5-ply unless otherwise indicated.
- B. Exterior Doors: Flush solid core construction and water repellent treated.
 - 1. Thickness: 1-3/4 inches (44 mm), unless otherwise indicated.
 - 2. Facing: FRP veneer with factory opaque finish as indicated on drawings.
- C. Interior Doors: 1-3/4 inches (44 mm) thick unless otherwise indicated; flush construction.
 - 1. Provide solid core doors at each location.
 - 2. Fire Rated Doors: Tested to ratings indicated on drawings in accordance with UL 10C -Positive Pressure; Underwriters Laboratories Inc (UL) or Intertek/Warnock Hersey (WHI) labeled without any visible seals when door is open.
 - 3. Smoke and Draft Control Doors (Indicated as "S" on Drawings): In addition to required fire rating, provide door assemblies tested in accordance with UL 1784 with maximum air leakage of 3.0 cfm per sq ft (0.01524 cu m/s/sq m) of door opening at 0.10 inch wg (24.9 Pa) pressure at both ambient and elevated temperatures for "S" label; if necessary, provide additional gasketing or edge sealing.
 - 4. High pressure decorative laminate (HPDL) finish as indicated on drawings.

2.03 DOOR AND PANEL CORES

- A. Non-Rated Solid Core and 20 Minute Rated Doors: Type particleboard core (PC), plies and faces as indicated.
- B. Fire-Rated Doors: Mineral core type, with fire resistant composite core (FD), plies and faces as indicated above; with core blocking as required to provide adequate anchorage of hardware without through-bolting.

2.04 DOOR FACINGS

- A. High Pressure Decorative Laminate (HPDL) Facing for Fire Doors: NEMA LD 3, SGF; color as selected from manufacturer full range of colors; textured, low gloss finish.
- B. Facing Adhesive: Type I waterproof.

2.05 DOOR CONSTRUCTION

- A. Fabricate doors in accordance with door quality standard specified.
- B. Cores Constructed with stiles and rails:
- C. Factory machine doors for hardware other than surface-mounted hardware, in accordance with hardware requirements and dimensions.
- D. Factory fit doors for frame opening dimensions identified on shop drawings, with edge clearances in accordance with specified quality standard.
- E. Provide edge clearances in accordance with the quality standard specified.

2.06 ACCESSORIES

- A. Hollow Metal Door Frames: As specified in Section 08 11 13.
- B. Metal Louvers:
 - 1. Material and Finish: Roll formed steel; pre-painted finish to Match frame color.
 - 2. Louver Blade: Inverted V blade, sight proof, light proof.
- C. Glazed Openings:
 - 1. Heat-Strengthened and Fully Tempered Glass: ASTM C1048.

- 2. Laminated Safety Glass: Comply with 16 CFR 1201 test requirements for Category II.
- 3. Glazing: Single vision units, 1/4 inch (6.4 mm) thick glass.
- 4. Tint: Clear.
- D. Glazing Stops: Wood, of same species as door facing, butted corners; prepared for countersink style tamper proof screws.
- E. Astragals for Non-Rated Double Doors: Steel, T shaped, overlapping and recessed at face edge.
- F. Astragals for Fire-Rated Double Doors: Steel, T shaped, overlapping and recessed at face edge, specifically for double doors.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Verify that opening sizes and tolerances are acceptable.
- C. Do not install doors in frame openings that are not plumb or are out-of-tolerance for size or alignment.

3.02 INSTALLATION

- A. Install doors in accordance with manufacturer's instructions and specified quality standard.
 - 1. Install fire-rated doors in accordance with NFPA 80 requirements.
 - 2. Install smoke and draft control doors in accordance with NFPA 105 requirements.
- B. Factory-Finished Doors: Do not field cut or trim; if fit or clearance is not correct, replace door.
- C. Use machine tools to cut or drill for hardware.
- D. Coordinate installation of doors with installation of frames and hardware.
- E. Coordinate installation of glazing.
- F. Install door louvers plumb and level.

3.03 TOLERANCES

- A. Comply with specified quality standard for fit and clearance tolerances.
- B. Comply with specified quality standard for telegraphing, warp, and squareness.

3.04 ADJUSTING

- A. Adjust doors for smooth and balanced door movement.
- B. Adjust closers for full closure.

END OF SECTION

SECTION 08 4313 ALUMINUM FRAMED STOREFRONTS

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Aluminum-framed storefront, with vision glass.
- B. Aluminum doors and frames.
- C. Weatherstripping.
- D. Perimeter sealant.

1.2 RELATED REQUIREMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
- B. Section 05 5000 METAL FABRICATIONS: Steel attachment devices.
- C. Section 07 9010 Joint Sealers: Perimeter sealant and back-up materials.
- D. Section 08 8000 Glazing: Glass and glazing accessories.

1.3 REFERENCE STANDARDS

- A. AAMA CW-10 Care and Handling of Architectural Aluminum From Shop to Site 2015.
- B. AAMA 501.2 Quality Assurance and Diagnostic Water Leakage Field Check of Installed Storefronts, Curtain Walls, and Sloped Glazing Systems 2015.
- C. AAMA 611 Voluntary Specification for Anodized Architectural Aluminum 2014 (2015 Errata).
- D. AAMA 2605 Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix) 2017a.
- E. ASTM B221 Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes 2020.
- F. ASTM B221M Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric) 2013.
- G. ASTM E330/E330M Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference 2014.

H. ASTM E331 - Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference; 2000 (Reapproved 2009).

1.4 ADMINISTRATIVE REQUIREMENTS

- A. Coordinate with installation of other components that comprise the exterior enclosure.
- B. Preinstallation Meeting: Conduct a preinstallation meeting one week before starting work of this section; require attendance by all affected installers.

1.5 SUBMITTALS

- A. See Section 01 3000 ADMINISTRATIVE REQUIREMENTS, for submittal procedures.
- B. Product Data: Provide component dimensions, describe components within assembly, anchorage and fasteners, glass and infill, internal drainage details.
- C. Shop Drawings: Indicate system dimensions, framed opening requirements and tolerances, affected related work, expansion and contraction joint location and details, and field welding required.
- D. Design Data: Provide framing member structural and physical characteristics, engineering calculations, and dimensional limitations.
- E. Samples: Submit two samples 12 by 12 inches in size illustrating finished aluminum surface, glass, infill panels, glazing materials.
- F. Submit all storefront materials and accessory products to glazing manufacturer to verify materials compatibility with glazing.
- G. Field Quality Control Submittals: Report of field testing for water penetration and air leakage.
- H. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

1.6 QUALITY ASSURANCE

- A. Designer Qualifications: Design structural support framing components under direct supervision of a Professional Structural Engineer experienced in design of this Work and licensed in the State in which the Project is located.
- B. Manufacturer Qualifications: Company specializing in performing work of type specified and with at least three years of documented experience.
- C. Installer Qualifications: Company specializing in performing work of type specified and with at least three years of documented experience.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Handle products of this section in accordance with AAMA CW-10.
- B. Protect finished aluminum surfaces with wrapping. Do not use adhesive papers or sprayed coatings that bond to aluminum when exposed to sunlight or weather.

1.8 FIELD CONDITIONS

A. Do not install sealants when ambient temperature is less than 40 degrees F. Maintain this minimum temperature during and 48 hours after installation.

1.9 WARRANTY

- A. See Section 01 7800 CLOSEOUT SUBMITTALS, for additional warranty requirements.
- B. Correct defective Work within a five year period after Date of Substantial Completion.
- C. Provide five year manufacturer warranty against failure of glass seal on insulating glass units, including interpane dusting or misting. Include provision for replacement of failed units.
- D. Warranty shall include language relating to watertightness and air tightness.
- E. Provide twenty year manufacturer warranty against excessive degradation of exterior finish. Include provision for replacement of units with excessive fading, chalking, or flaking.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers:
 - 1. Kawneer North America; Product Trifab 451t (Exterior), [Basis of Design]: www.kawneer.com.
 - 2. Oldcastle BuildingEnvelope: www.oldcastlebe.com.
 - 3. YKK AP America, Inc. : www.ykkap.com.

2.2 ALUMINUM-FRAMED STOREFRONT

- A. Aluminum-Framed Storefront: Factory fabricated, factory finished aluminum framing members with infill, and related flashings, anchorage and attachment devices.
 - 1. Include structural reinforcing in mullions as required.
 - 2. Include solid back frame closure at end of storefront runs, sides and top of storefront.
 - 3. Glazing Rabbet: For 1 inch insulating glazing for exterior applications. As indicated for interior applications.
 - 4. Glazing Position:

- a. Exterior: Outside glazed, exterior plane, unless indicated otherwise.
- 5. Provide miscellaneous framing as indicated on drawings.
- 6. Water Leakage Test Pressure Differential: 12 lbf/sq ft.
- 7. Air Infiltration Test Pressure Differential: 6.24 psf.
- 8. Finish: Class I color anodized.
 - a. Factory finish all surfaces that will be exposed in completed assemblies.
 - b. Coat concealed metal surfaces that will be in contact with cementitious materials or dissimilar metals with bituminous paint.
- 9. Fabrication: Joints and corners flush, hairline, and weatherproof, accurately fitted and secured; prepared to receive anchors and hardware; fasteners and attachments concealed from view; reinforced as required for imposed loads.
- 10. Construction: Eliminate noises caused by wind and thermal movement, prevent vibration harmonics, and prevent "stack effect" in internal spaces.
- 11. System Internal Drainage: Drain to the exterior by means of a weep drainage network any water entering joints, condensation occurring in glazing channel, and migrating moisture occurring within system.
- 12. Expansion/Contraction: Provide for expansion and contraction within system components caused by cycling temperature range of 170 degrees F over a 12 hour period without causing detrimental effect to system components, anchorages, and other building elements.
- 13. Movement: Allow for movement between storefront and adjacent construction, without damage to components or deterioration of seals.
- 14. Perimeter Clearance: Minimize space between framing members and adjacent construction while allowing expected movement.

2.3 COMPONENTS

- A. Aluminum Framing Members: Tubular aluminum sections, thermally broken with interior section insulated from exterior, drainage holes and internal weep drainage system.
 - 1. Framing members for interior applications need not be thermally broken.
 - 2. Glazing Stops: Flush.
 - 3. Cross-Section: $2 \times 4-1/2$ inch nominal dimension, unless noted otherwise.
- B. Glazing: As specified in Section 08 8000.

- 1. For Exterior Framing: Type IG-1.
- C. Oversize Sliding Storefront Doors: Full glazed extruded aluminum frame, operable panels and fixed panels (OXXO); manual operation; bottom rollers; optional low profile ADA compliant sill track; weatherstripped.
 - 1. Configuration and Size: As indicated on drawings.
 - 2. Design Wind Load: Same as for storefront.
 - 3. Glazing Thickness: 1 inch.
 - 4. Stile and Frame Face Width: 4-1/2 inches.
- D. Provide filler panel to close back of frame.
- E. Sub-Sill: At all sill locations (whether or not indicated on the Drawings) provide matching extruded aluminum sub-sill with end dams.

2.4 PERFORMANCE REQUIREMENTS

- A. Design and size components to withstand the specified load requirements without damage or permanent set, when tested in accordance with ASTM E 330, using loads 1.5 times the design wind loads and 10 second duration of maximum load.
 - 1. Member Deflection: Limit member deflection to flexure limit of glass in any direction, with full recovery of glazing materials.
- B. Movement: Accommodate movement between storefront and perimeter framing and deflection of lintel, without damage to components or deterioration of seals.
- C. Air Infiltration: Limit air infiltration through assembly to 0.06 cu ft/min/sq ft of wall area, measured at specified differential pressure across assembly in accordance with ASTM E 283.
- D. Water Leakage: None, when measured in accordance with ASTM E 331 at specified pressure differential.
- E. System Internal Drainage: Drain to the exterior by means of a weep drainage network any water entering joints, condensation occurring in glazing channel, and migrating moisture occurring within system.
- F. Expansion/Contraction: Provide for expansion and contraction within system components caused by cycling temperature range of 170 degrees F over a 12 hour period without causing detrimental effect to system components, anchorages, and other building elements.

2.5 MATERIALS

A. Extruded Aluminum: ASTM B221 (ASTM B221M).

- B. Fasteners: Stainless steel.
- C. Perimeter Sealant: Type[____]specified in Section 07 9010 Joint Sealers.
- D. Glazing Gaskets: Type to suit application to achieve weather, moisture, and air infiltration requirements.
- E. Glazing Accessories: As specified in Section 08 8000 Glazing.

2.6 FINISHES

- A. Class I Color Anodized Finish: AAMA 611 AA-M12C22A44 Electrolytically deposited colored anodic coating not less than 0.7 mils thick.
- B. Superior Performing Organic Coatings: AAMA 2605 multiple coat, thermally cured polyvinylidene fluoride (PVDF) system.
 - 1. Polyvinylidene fluoride (PVDF) multi-coat thermoplastic fluoropolymer coating system, including minimum 70 percent PVDF color topcoat and minimum total dry film thickness of 0.9 mil; color and gloss as selected from manufacturer's full range of colors.
- C. Color:
 - 1. Exterior: Shall be selected from the manufacturer's full range of standard and premium color and finish selections.

2.7 FABRICATION

- A. Fabricate components with minimum clearances and shim spacing around perimeter of assembly, yet enabling installation and dynamic movement of perimeter seal.
- B. Accurately fit and secure joints and corners. Make joints flush, hairline, and weatherproof.
- C. Prepare components to receive anchor devices. Fabricate anchors.
- D. Coat concealed metal surfaces that will be in contact with cementitious materials or dissimilar metals with bituminous paint.
- E. Arrange fasteners and attachments to conceal from view.
- F. Reinforce components internally for door hardwareand door operators.
- G. Increase gauge or reinforce framing members as required for imposed loads and span conditions.
- H. Finishing: Apply factory finish to all surfaces that will be exposed in completed assemblies.
 - 1. Touch-up surfaces cut during fabrication so that no natural aluminum is visible in completed

assemblies, including joint edges.

I. Fit and seal primary frame joints prior to installing filler panel.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify dimensions, tolerances, and method of attachment with other work.
- B. Verify that wall openings and adjoining air and vapor seal materials are ready to receive work of this section.

3.2 INSTALLATION

- A. Install wall system in accordance with manufacturer's instructions.
- B. Attach to structure to permit sufficient adjustment to accommodate construction tolerances and other irregularities.
- C. Provide alignment attachments and shims to permanently fasten system to building structure.
- D. Align assembly plumb and level, free of warp or twist. Maintain assembly dimensional tolerances, aligning with adjacent work.
- E. Provide thermal isolation where components penetrate or disrupt building insulation.
- F. Install sill flashings. Turn up ends and edges; seal to adjacent work to form water tight dam.
- G. Where fasteners penetrate sill flashings, make watertight by seating and sealing fastener heads to sill flashing.
- H. Coordinate attachment and seal of perimeter air and vapor barrier materials.
- I. Pack fibrous insulation in shim spaces at perimeter of assembly to maintain continuity of thermal barrier.
- J. Install hardware using templates provided.
- K. Install glass and infill panels in accordance with Section 08 8000, using glazing method required to achieve performance criteria.
- L. Install perimeter sealant in accordance with Section 07 9005.
- M. Touch-up minor damage to factory applied finish; replace components that cannot be satisfactorily repaired.

3.3 TOLERANCES

A. Maximum Variation from Plumb: 0.06 inch per 3 feet non-cumulative or 0.06 inch per 10 feet,

whichever is less.

B. Maximum Misalignment of Two Adjoining Members Abutting in Plane: 1/32 inch.

3.4 FIELD QUALITY CONTROL

- A. Water-Spray Test: Provide water spray quality test of installed storefront components in accordance with AAMA 501.2 during construction process and before installation of interior finishes.
 - 1. Perform a minimum of two tests in each designated area as indicated on drawings.
 - 2. Conduct tests in each area prior to 10 percent and 50 percent completion of this work.
 - 3. Extent: 10% of installed storefront units. It a storefront unit fails water testing, then the unit shall be repaired and re-tested at contractor's expense. For every storefront unit that fails AAMA 501.2 testing, an additional unit shall be added to testing schedule.
- B. Test installed storefront additionally in accordance with ASTM E1105-00 Standard Test Method for Field Determination of Water Penetration of Installed Exterior Windows, Skylights, Doors, and Curtain Walls, by Uniform or Cyclic Static Air Pressure Difference. Testing shall include elements of storefront system, and air and watertight transitions between storefront and water/air barrier coating behind adjacent veneer/claddings.
 - 1. Perform this testing after installation of water/air barrier coating on sheathing behind veneer/claddings, but before veneer/claddings are installed.
 - 2. Static pressure differential testing shall be performed at not less than 2/3 of the pressure differential scheduled for ASTM E331 testing.

3.5 ADJUSTING

A. Adjust operating hardware and sash for smooth operation.

3.6 CLEANING

- A. Remove protective material from pre-finished aluminum surfaces.
- B. Remove excess sealant by method acceptable to sealant manufacturer.

3.7 **PROTECTION**

A. Protect installed products from damage until Date of Substantial Completion.

END OF SECTION 08 4313

SECTION 087100 DOOR HARDWARE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes commercial door hardware for the following:
 - 1. Swinging doors.
- B. Door hardware includes, but is not necessarily limited to, the following:
 - 1. Mechanical door hardware.
 - 2. Electromechanical door hardware.
- C. Related Sections:
 - 1. Division 08 Section "Hollow Metal Doors and Frames".
 - 2. Division 08 Section "Flush Wood Doors".
 - 3. Division 08 Section "Aluminum-Framed Entrances and Storefronts".
- D. Codes and References: Comply with the version year adopted by the Authority Having Jurisdiction.
 - 1. ANSI A117.1 Accessible and Usable Buildings and Facilities.
 - 2. ICC/IBC International Building Code.
 - 3. NFPA 70 National Electrical Code.
 - 4. NFPA 80 Fire Doors and Windows.
 - 5. NFPA 101 Life Safety Code.
 - 6. NFPA 105 Installation of Smoke Door Assemblies.
 - 7. State Building Codes, Local Amendments.
- E. Standards: All hardware specified herein shall comply with the following industry standards as applicable. Any undated reference to a standard shall be interpreted as referring to the latest edition of that standard:
 - 1. ANSI/BHMA Certified Product Standards A156 Series.
 - 2. UL10C Positive Pressure Fire Tests of Door Assemblies.
 - 3. ANSI/UL 294 Access Control System Units.
 - 4. UL 305 Panic Hardware.
 - 5. ANSI/UL 437- Key Locks.

1.3 SUBMITTALS

- A. Product Data: Manufacturer's product data sheets including installation details, material descriptions, dimensions of individual components and profiles, operational descriptions and finishes.
- B. Door Hardware Schedule: Prepared by or under the supervision of supplier, detailing fabrication and assembly of door hardware, as well as procedures and diagrams. Coordinate the final Door Hardware Schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.
 - 1. Format: Comply with scheduling sequence and vertical format in DHI's "Sequence and Format for the Hardware Schedule."
 - 2. Organization: Organize the Door Hardware Schedule into door hardware sets indicating complete designations of every item required for each door or opening. Organize door hardware sets in same order as in the Door Hardware Sets at the end of Part 3. Submittals that do not follow the same format and order as the Door Hardware Sets will be rejected and subject to resubmission.
 - 3. Content: Include the following information:
 - a. Type, style, function, size, label, hand, and finish of each door hardware item.
 - b. Manufacturer of each item.
 - c. Fastenings and other pertinent information.
 - d. Location of door hardware set, cross-referenced to Drawings, both on floor plans and in door and frame schedule.
 - e. Explanation of abbreviations, symbols, and codes contained in schedule.
 - f. Mounting locations for door hardware.
 - g. Door and frame sizes and materials.
 - h. Warranty information for each product.
 - 4. Submittal Sequence: Submit the final Door Hardware Schedule at earliest possible date, particularly where approval of the Door Hardware Schedule must precede fabrication of other work that is critical in the Project construction schedule. Include Product Data, Samples, Shop Drawings of other work affected by door hardware, and other information essential to the coordinated review of the Door Hardware Schedule.
- C. Shop Drawings: Details of electrified access control hardware indicating the following:
 - 1. Wiring Diagrams: Upon receipt of approved schedules, submit detailed system wiring diagrams for power, signaling, monitoring, communication, and control of the access control system electrified hardware. Differentiate between manufacturer-installed and field-installed wiring. Include the following:
 - a. Elevation diagram of each unique access controlled opening showing location and interconnection of major system components with respect to their placement in the respective door openings.
 - b. Complete (risers, point-to-point) access control system block wiring diagrams.
 - c. Wiring instructions for each electronic component scheduled herein.
 - 2. Electrical Coordination: Coordinate with related sections the voltages and wiring details required at electrically controlled and operated hardware openings.

- D. Keying Schedule: After a keying meeting with the owner has taken place prepare a separate keying schedule detailing final instructions. Submit the keying schedule in electronic format. Include keying system explanation, door numbers, key set symbols, hardware set numbers and special instructions. Owner must approve submitted keying schedule prior to the ordering of permanent cylinders/cores.
- E. Informational Submittals:
 - 1. Product Test Reports: Indicating compliance with cycle testing requirements, based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified independent testing agency.
- F. Operating and Maintenance Manuals: Provide manufacturers operating and maintenance manuals for each item comprising the complete door hardware installation in quantity as required in Division 01, Closeout Procedures.

1.4 QUALITY ASSURANCE

- A. Manufacturers Qualifications: Engage qualified manufacturers with a minimum 5 years of documented experience in producing hardware and equipment similar to that indicated for this Project and that have a proven record of successful in-service performance.
- B. Certified Products: Where specified, products must maintain a current listing in the Builders Hardware Manufacturers Association (BHMA) Certified Products Directory (CPD).
- C. Installer Qualifications: A minimum 3 years documented experience installing both standard and electrified door hardware similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.
- D. Door Hardware Supplier Qualifications: Experienced commercial door hardware distributors with a minimum 5 years documented experience supplying both mechanical and electromechanical hardware installations comparable in material, design, and extent to that indicated for this Project. Supplier recognized as a factory direct distributor by the manufacturers of the primary materials with a warehousing facility in Project's vicinity. Supplier to have on staff a certified Architectural Hardware Consultant (AHC) available during the course of the Work to consult with Contractor, Architect, and Owner concerning both standard and electromechanical door hardware and keying.
- E. Source Limitations: Obtain each type and variety of door hardware specified in this section from a single source unless otherwise indicated.
 - 1. Electrified modifications or enhancements made to a source manufacturer's product line by a secondary or third party source will not be accepted.
 - 2. Provide electromechanical door hardware from the same manufacturer as mechanical door hardware, unless otherwise indicated.
- F. Each unit to bear third party permanent label demonstrating compliance with the referenced standards.
- G. Keying Conference: Conduct conference to comply with requirements in Division 01 Section "Project Meetings." Keying conference to incorporate the following criteria into the final keying schedule document:
 - 1. Function of building, purpose of each area and degree of security required.

- 2. Plans for existing and future key system expansion.
- 3. Requirements for key control storage and software.
- 4. Installation of permanent keys, cylinder cores and software.
- 5. Address and requirements for delivery of keys.
- H. Pre-Submittal Conference: Conduct coordination conference in compliance with requirements in Division 01 Section "Project Meetings" with attendance by representatives of Supplier(s), Installer(s), and Contractor(s) to review proper methods and the procedures for receiving, handling, and installing door hardware.
 - 1. Prior to installation of door hardware, conduct a project specific training meeting to instruct the installing contractors' personnel on the proper installation and adjustment of their respective products. Product training to be attended by installers of door hardware (including electromechanical hardware) for aluminum, hollow metal and wood doors. Training will include the use of installation manuals, hardware schedules, templates and physical product samples as required.
 - 2. Inspect and discuss electrical roughing-in, power supply connections, and other preparatory work performed by other trades.
 - 3. Review sequence of operation narratives for each unique access controlled opening.
 - 4. Review and finalize construction schedule and verify availability of materials.
 - 5. Review the required inspecting, testing, commissioning, and demonstration procedures
- I. At completion of installation, provide written documentation that components were applied to manufacturer's instructions and recommendations and according to approved schedule.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Inventory door hardware on receipt and provide secure lock-up and shelving for door hardware delivered to Project site. Do not store electronic access control hardware, software or accessories at Project site without prior authorization.
- B. Tag each item or package separately with identification related to the final Door Hardware Schedule, and include basic installation instructions with each item or package.
- C. Deliver, as applicable, permanent keys, cylinders, cores, access control credentials, software and related accessories directly to Owner via registered mail or overnight package service. Instructions for delivery to the Owner shall be established at the "Keying Conference".

1.6 COORDINATION

- A. Templates: Obtain and distribute to the parties involved templates for doors, frames, and other work specified to be factory prepared for installing standard and electrified hardware. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing hardware to comply with indicated requirements.
- B. Door and Frame Preparation: Doors and corresponding frames are to be prepared, reinforced and prewired (if applicable) to receive the installation of the specified electrified, monitoring, signaling and access control system hardware without additional in-field modifications.

1.7 WARRANTY

- A. General Warranty: Reference Division 01, General Requirements. Special warranties specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.
- B. Warranty Period: Written warranty, executed by manufacturer(s), agreeing to repair or replace components of standard and electrified door hardware that fails in materials or workmanship within specified warranty period after final acceptance by the Owner. Failures include, but are not limited to, the following:
 - 1. Structural failures including excessive deflection, cracking, or breakage.
 - 2. Faulty operation of the hardware.
 - 3. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
 - 4. Electrical component defects and failures within the systems operation.
- C. Standard Warranty Period: One year from date of Substantial Completion, unless otherwise indicated.
- D. Special Warranty Periods:
 - 1. Ten years for extra heavy duty cylindrical (bored) locks and latches.
 - 2. Five years for exit hardware.
 - 3. Twenty five years for manual overhead door closer bodies.
 - 4. Five years for motorized electric latch retraction exit devices.
 - 5. Two years for electromechanical door hardware, unless noted otherwise.

1.8 MAINTENANCE SERVICE

A. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions as needed for Owner's continued adjustment, maintenance, and removal and replacement of door hardware.

PART 2 - PRODUCTS

2.1 SCHEDULED DOOR HARDWARE

- A. General: Provide door hardware for each door to comply with requirements in Door Hardware Sets and each referenced section that products are to be supplied under.
- B. Designations: Requirements for quantity, item, size, finish or color, grade, function, and other distinctive qualities of each type of door hardware are indicated in the Door Hardware Sets at the end of Part 3. Products are identified by using door hardware designations, as follows:
 - 1. Named Manufacturer's Products: Product designation and manufacturer are listed for each door hardware type required for the purpose of establishing requirements. Manufacturers' names are abbreviated in the Door Hardware Schedule.
- C. Substitutions: Requests for substitution and product approval for inclusive mechanical and electromechanical door hardware in compliance with the specifications must be submitted in writing and

in accordance with the procedures and time frames outlined in Division 01, Substitution Procedures. Approval of requests is at the discretion of the architect, owner, and their designated consultants.

2.2 HANGING DEVICES

- A. Hinges: ANSI/BHMA A156.1 certified butt hinges with number of hinge knuckles and other options as specified in the Door Hardware Sets.
 - 1. Quantity: Provide the following hinge quantity:
 - a. Two Hinges: For doors with heights up to 60 inches.
 - b. Three Hinges: For doors with heights 61 to 90 inches.
 - c. Four Hinges: For doors with heights 91 to 120 inches.
 - d. For doors with heights more than 120 inches, provide 4 hinges, plus 1 hinge for every 30 inches of door height greater than 120 inches.
 - 2. Hinge Size: Provide the following, unless otherwise indicated, with hinge widths sized for door thickness and clearances required:
 - a. Widths up to 3'0": 4-1/2" standard or heavy weight as specified.
 - b. Sizes from 3'1" to 4'0": 5" standard or heavy weight as specified.
 - 3. Hinge Weight and Base Material: Unless otherwise indicated, provide the following:
 - a. Exterior Doors: Heavy weight, non-ferrous, ball bearing or oil impregnated bearing hinges unless Hardware Sets indicate standard weight.
 - b. Interior Doors: Standard weight, steel, ball bearing or oil impregnated bearing hinges unless Hardware Sets indicate heavy weight.
 - 4. Hinge Options: Comply with the following:
 - a. Non-removable Pins: With the exception of electric through wire hinges, provide set screw in hinge barrel that, when tightened into a groove in hinge pin, prevents removal of pin while door is closed; for the all out-swinging lockable doors.
 - 5. Manufacturers:
 - a. Hager Companies (HA).
 - b. McKinney (MK).
 - c. Stanley Hardware (ST).
- B. Continuous Geared Hinges: ANSI/BHMA A156.26 Grade 1-600 certified continuous geared hinge. with minimum 0.120-inch thick extruded 6063-T6 aluminum alloy hinge leaves and a minimum overall width of 4 inches. Hinges are non-handed, reversible and fabricated to template screw locations. Factory trim hinges to suit door height and prepare for electrical cut-outs.
 - 1. Manufacturers:
 - a. Bommer Industries (BO).
 - b. Hager Companies (HA).
 - c. Pemko (PE).

2.3 POWER TRANSFER DEVICES

- A. Concealed Quick Connect Electric Power Transfers: Provide concealed wiring pathway housing mortised into the door and frame for low voltage electrified door hardware. Furnish with MolexTM standardized plug connectors and sufficient number of concealed wires (up to 12) to accommodate the electrified functions specified in the Door Hardware Sets. Connectors plug directly to through-door wiring harnesses for connection to electric locking devices and power supplies. Wire nut connections are not acceptable.
 - 1. Manufacturers:
 - a. Pemko (PE) EL-CEPT Series.
 - b. Securitron (SU) EL-CEPT Series.
 - c. Von Duprin (VD) EPT-10 Series.
- B. Electric Door Wire Harnesses: Provide electric/data transfer wiring harnesses with standardized plug connectors to accommodate up to twelve (12) wires. Connectors plug directly to through-door wiring harnesses for connection to electric locking devices and power supplies. Provide sufficient number and type of concealed wires to accommodate electric function of specified hardware. Provide a connector for through-door electronic locking devices and from hinge to junction box above the opening. Wire nut connections are not acceptable. Determine the length required for each electrified hardware component for the door type, size and construction, minimum of two per electrified opening.
 - 1. Provide one each of the following tools as part of the base bid contract:
 - a. McKinney (MK) Electrical Connecting Kit: QC-R001.
 - b. McKinney (MK) Connector Hand Tool: QC-R003.
 - 2. Manufacturers:
 - a. Hager Companies (HA) Quick Connect.
 - b. McKinney (MK) QC-C Series.
 - c. Stanley Hardware (ST) WH Series.

2.4 CYLINDERS AND KEYING

- A. General: Cylinder manufacturer to have minimum (10) years experience designing secured master key systems and have on record a published security keying system policy.
- B. Source Limitations: Obtain each type of keyed cylinder and keys from the same source manufacturer as locksets and exit devices, unless otherwise indicated.
- C. Cylinder Types: Original manufacturer cylinders able to supply the following cylinder formats and types:
 - 1. Threaded mortise cylinders with rings and cams to suit hardware application.
 - 2. Rim cylinders with back plate, flat-type vertical or horizontal tailpiece, and raised trim ring.
 - 3. Bored or cylindrical lock cylinders with tailpieces as required to suit locks.
 - 4. Tubular deadlocks and other auxiliary locks.
 - 5. Mortise and rim cylinder collars to be solid and recessed to allow the cylinder face to be flush and be free spinning with matching finishes.
 - 6. Keyway: Match Facility Standard.

- D. Keying System: Each type of lock and cylinders to be factory keyed.
 - 1. Supplier shall conduct a "Keying Conference" to define and document keying system instructions and requirements.
 - 2. Furnish factory cut, nickel-silver large bow permanently inscribed with a visual key control number as directed by Owner.
 - 3. Existing System: Field verify and key cylinders to match Owner's existing system.
- E. Key Quantity: Provide the following minimum number of keys:
 - 1. Change Keys per Cylinder: Three (3).
 - 2. Master Keys (per Master Key Level/Group): Five (5).
 - 3. Construction Keys (where required): Ten (10).
- F. Construction Keying: Provide construction master keyed cylinders.
- G. Key Registration List (Bitting List):
 - 1. Provide keying transcript list to Owner's representative in the proper format for importing into key control software.
 - 2. Provide transcript list in writing or electronic file as directed by the Owner.

2.5 KEY CONTROL

- A. Key Control Cabinet: Provide a key control system including envelopes, labels, and tags with self-locking key clips, receipt forms, 3-way visible card index, temporary markers, permanent markers, and standard metal cabinet. Key control cabinet shall have expansion capacity of 150% of the number of locks required for the project.
 - 1. Manufacturers:
 - a. Lund Equipment (LU).
 - b. MMF Industries (MM).
 - c. Telkee (TK).

2.6 MECHANICAL LOCKS AND LATCHING DEVICES

- A. Cylindrical Locksets, Grade 1 (Heavy Duty): ANSI/BHMA A156.2, Series 4000, Operational Grade 1 Certified Products Directory (CPD) listed.
 - 1. Vertical Impact: Exceed 100 vertical impacts (20 times ANSI/BHMA A156.2 requirements).
 - 2. Furnish with solid cast levers, standard 2 3/4" backset, and 1/2" (3/4" at rated paired openings) throw brass or stainless steel latchbolt.
 - 3. Locks are to be non-handed and fully field reversible.
 - 4. Manufacturers:
 - a. Corbin Russwin Hardware (RU) CLX3300 Series.
 - b. Sargent Manufacturing (SA) 10X Line.

c. Schlage (SC) - ND Series.

2.7 LOCK AND LATCH STRIKES

- A. Strikes: Provide manufacturer's standard strike with strike box for each latch or lock bolt, with curved lip extended to protect frame, finished to match door hardware set, unless otherwise indicated, and as follows:
 - 1. Flat-Lip Strikes: For locks with three-piece antifriction latchbolts, as recommended by manufacturer.
 - 2. Extra-Long-Lip Strikes: For locks used on frames with applied wood casing trim.
 - 3. Aluminum-Frame Strike Box: Provide manufacturer's special strike box fabricated for aluminum framing.
 - 4. Double-lipped strikes: For locks at double acting doors. Furnish with retractable stop for rescue hardware applications.
- B. Standards: Comply with the following:
 - 1. Strikes for Mortise Locks and Latches: BHMA A156.13.
 - 2. Strikes for Bored Locks and Latches: BHMA A156.2.
 - 3. Strikes for Auxiliary Deadlocks: BHMA A156.36.
 - 4. Dustproof Strikes: BHMA A156.16.

2.8 CONVENTIONAL EXIT DEVICES

- A. General Requirements: All exit devices specified herein shall meet or exceed the following criteria:
 - 1. At doors not requiring a fire rating, provide devices complying with NFPA 101 and listed and labeled for "Panic Hardware" according to UL305. Provide proper fasteners as required by manufacturer including sex nuts and bolts at openings specified in the Hardware Sets.
 - 2. Where exit devices are required on fire rated doors, provide devices complying with NFPA 80 and with UL labeling indicating "Fire Exit Hardware". Provide devices with the proper fasteners for installation as tested and listed by UL. Consult manufacturer's catalog and template book for specific requirements.
 - 3. Except on fire rated doors, provide exit devices with hex key dogging device to hold the pushbar and latch in a retracted position. Provide optional keyed cylinder dogging on devices where specified in Hardware Sets.
 - 4. Devices must fit flat against the door face with no gap that permits unauthorized dogging of the push bar. The addition of filler strips is required in any case where the door light extends behind the device as in a full glass configuration.
 - 5. Flush End Caps: Provide flush end caps made of architectural metal in the same finish as the devices as in the Hardware Sets. Plastic end caps will not be acceptable.
 - 6. Lever Operating Trim: Where exit devices require lever trim, furnish manufacturer's heavy duty escutcheon trim with threaded studs for thru-bolts.

- a. Lock Trim Design: As indicated in Hardware Sets, provide finishes and designs to match that of the specified locksets.
- b. Where function of exit device requires a cylinder, provide a cylinder (Rim or Mortise) as specified in Hardware Sets.
- 7. Vertical Rod Exit Devices: Where surface or concealed vertical rod exit devices are used at interior openings, provide as less bottom rod (LBR) unless otherwise indicated. Provide dust proof strikes where thermal pins are required to project into the floor.
- 8. Narrow Stile Applications: At doors constructed with narrow stiles, or as specified in Hardware Sets, provide devices designed for maximum 2" wide stiles.
- 9. Dummy Push Bar: Nonfunctioning push bar matching functional push bar.
- 10. Rail Sizing: Provide exit device rails factory sized for proper door width application.
- 11. Through Bolt Installation: For exit devices and trim as indicated in Door Hardware Sets.
- B. Conventional Push Rail Exit Devices (Heavy Duty): ANSI/BHMA A156.3, Grade 1 Certified Products Directory (CPD) listed panic and fire exit hardware devices furnished in the functions specified in the Hardware Sets. Exit device latch to be stainless steel, pullman type, with deadlock feature.
 - 1. Manufacturers:
 - a. Arrow (AW) 3700/3800/3900, 4800/4900 Series.
 - b. Corbin Russwin Hardware (RU) ED4000 / ED5000 Series.
 - c. Sargent Manufacturing (SA) 80 Series.
- C. Security Push Rail Exit Devices (Heavy Duty): ANSI/BHMA A156.3, Grade 1 Certified Products Directory (CPD) listed rim panic and fire exit hardware devices furnished in the functions specified in the Hardware Sets. Exit device latch to be constructed of high grade, heat treated, corrosion resistant nickel steel alloy, and have a full 3/4" throw projection with slide action positive deadlocking.
 - 1. Static Load Force Resistance: Minimum 3000 lbs certified independent tested.
 - 2. Manufacturers:
 - a. Corbin Russwin Hardware (RU) ED4000S / ED5000S Series.
- D. Tube Steel Removable Mullions: ANSI/BHMA A156.3 removable steel mullions with malleable-iron top and bottom retainers and a primed paint finish.
 - 1. Provide keyed removable feature where specified in the Hardware Sets.
 - 2. Provide stabilizers and mounting brackets as required.
 - 3. Provide electrical quick connection wiring options as specified in the hardware sets.
 - 4. Manufacturers:
 - a. Same as exit device manufacturer.

2.9 ELECTROMECHANICAL EXIT DEVICES

- A. Electromechanical Push Rail Exit Devices (Heavy Duty): ANSI/BHMA A156.3, Grade 1 Certified Products Directory (CPD) listed panic and fire exit hardware devices subject to same compliance standards and requirements as mechanical exit devices. Electrified exit devices to be of type and design as specified below and in the hardware sets.
 - 1. Energy Efficient Design: Provide devices which have a holding current draw of 15mA maximum, and can operate on either 12 or 24 volts. Locks are to be field configurable for fail safe or fail secure operation.
 - 2. Where conventional power supplies are not sufficient, include any specific controllers required to provide the proper inrush current.
 - 3. Motorized Electric Latch Retraction: Devices with an electric latch retraction feature must use motors which have a maximum current draw of 600mA. Solenoid driven latch retraction is not acceptable.
 - 4. Manufacturers:
 - a. Corbin Russwin Hardware (RU) ED5000 Series.
 - b. Sargent Manufacturing (SA) 80 Series.
 - c. Yale (YA) 7000 Series.

2.10 DOOR CLOSERS

- A. All door closers specified herein shall meet or exceed the following criteria:
 - 1. General: Door closers to be from one manufacturer, matching in design and style, with the same type door preparations and templates regardless of application or spring size. Closers to be non-handed with full sized covers.
 - 2. Standards: Closers to comply with UL-10C for Positive Pressure Fire Test and be U.L. listed for use of fire rated doors.
 - 3. Size of Units: Comply with manufacturer's written recommendations for sizing of door closers depending on size of door, exposure to weather, and anticipated frequency of use. Where closers are indicated for doors required to be accessible to the Americans with Disabilities Act, provide units complying with ANSI ICC/A117.1.
 - 4. Closer Arms: Provide heavy duty, forged steel closer arms unless otherwise indicated in Hardware Sets.
 - 5. Closers shall not be installed on exterior or corridor side of doors; where possible install closers on door for optimum aesthetics.
 - 6. Closer Accessories: Provide door closer accessories including custom templates, special mounting brackets, spacers and drop plates as required for proper installation. Provide through-bolt and security type fasteners as specified in the hardware sets.
- B. Door Closers, Surface Mounted (Large Body Cast Iron): ANSI/BHMA A156.4, Grade 1 Certified Products Directory (CPD) listed surface mounted, heavy duty door closers with complete spring power

adjustment, sizes 1 thru 6; and fully operational adjustable according to door size, frequency of use, and opening force. Closers to be rack and pinion type, one piece cast iron body construction, with adjustable backcheck and separate non-critical valves for closing sweep and latch speed control.

- 1. Manufacturers:
 - a. Corbin Russwin Hardware (RU) DC8000 Series.
 - b. Norton Rixson (NO) 9500 Series.
 - c. Sargent Manufacturing (SA) 281 Series.

2.11 ARCHITECTURAL TRIM

- A. Door Protective Trim
 - 1. General: Door protective trim units to be of type and design as specified below or in the Hardware Sets.
 - 2. Size: Fabricate protection plates (kick, armor, or mop) not more than 2" less than door width (LDW) on stop side of single doors and 1" LDW on stop side of pairs of doors, and not more than 1" less than door width on pull side. Coordinate and provide proper width and height as required where conflicting hardware dictates. Height to be as specified in the Hardware Sets.
 - 3. Where plates are applied to fire rated doors with the top of the plate more than 16" above the bottom of the door, provide plates complying with NFPA 80. Consult manufacturer's catalog and template book for specific requirements for size and applications.
 - 4. Protection Plates: ANSI/BHMA A156.6 certified protection plates (kick, armor, or mop), fabricated from the following:
 - a. Stainless Steel: 300 grade, 050-inch thick.
 - 5. Options and fasteners: Provide manufacturer's designated fastener type as specified in the Hardware Sets. Provide countersunk screw holes.
 - 6. Manufacturers:
 - a. Hiawatha, Inc. (HI).
 - b. Rockwood (RO).
 - c. Trimco (TC).

2.12 DOOR STOPS AND HOLDERS

- A. General: Door stops and holders to be of type and design as specified below or in the Hardware Sets.
- B. Door Stops and Bumpers: ANSI/BHMA A156.16, Grade 1 certified door stops and wall bumpers. Provide wall bumpers, either convex or concave types with anchorage as indicated, unless floor or other types of door stops are specified in Hardware Sets. Do not mount floor stops where they will impede traffic. Where floor or wall bumpers are not appropriate, provide overhead type stops and holders.
 - 1. Manufacturers:

- a. Hiawatha, Inc. (HI).
- b. Rockwood (RO).
- c. Trimco (TC).

2.13 ARCHITECTURAL SEALS

- A. General: Thresholds, weatherstripping, and gasket seals to be of type and design as specified below or in the Hardware Sets. Provide continuous weatherstrip gasketing on exterior doors and provide smoke, light, or sound gasketing on interior doors where indicated. At exterior applications provide non-corrosive fasteners and elsewhere where indicated.
- B. Smoke Labeled Gasketing: Assemblies complying with NFPA 105 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for smoke control ratings indicated, based on testing according to UL 1784.
 - 1. Provide smoke labeled perimeter gasketing at all smoke labeled openings.
- C. Fire Labeled Gasketing: Assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing according to UL-10C.
 - 1. Provide intumescent seals as indicated to meet UL10C Standard for Positive Pressure Fire Tests of Door Assemblies, and NPFA 252, Standard Methods of Fire Tests of Door Assemblies.
- D. Sound-Rated Gasketing: Assemblies that are listed and labeled by a testing and inspecting agency, for sound ratings indicated.
- E. Replaceable Seal Strips: Provide only those units where resilient or flexible seal strips are easily replaceable and readily available from stocks maintained by manufacturer.
- F. Manufacturers:
 - 1. National Guard Products (NG).
 - 2. Pemko (PE).
 - 3. Reese Enterprises, Inc. (RE).

2.14 ELECTRONIC ACCESSORIES

- A. Networked Contactless Smart Card Readers: Contactless smart cards reader to securely read access control data from 13.56 MHz contactless smart cards. The contactless smart card reader is designed for use in access control applications by providing:
 - 1. Secure access control data exchange between the smart card and the reader utilizing key diversification and mutual authentication routines.
 - 2. Contactless smart card reader to be designed for low current operation to enable migration from most legacy proximity applications without the need to replace existing access control panels and/or power supplies. Operating voltage: 5-16 VDC. Current requirements: 55 mA Avg, 116 mA Peak at 12 VDC.
 - 3. Universal compatibility with most access control systems and backwards compatibility with legacy 125 KHz proximity access control formats.
 - 4. Product construction suitable for both indoor and outdoor applications.

- 5. Customizable behavior for indicator lights and audible tones.
- 6. Manufacturers (13.56 MHz iClass):
 - a. Corbin Russwin Hardware (RU) 744F709/744F719 Series.
 - b. HID Global (HD) R10/R40 Series.
 - c. Sargent Manufacturing (SA) 6100/6120 Series.
- B. Door Position Switches: Door position magnetic reed contact switches specifically designed for use in commercial door applications. On recessed models the contact and magnetic housing snap-lock into a 1" diameter hole. Surface mounted models include wide gap distance design complete with armored flex cabling. Provide SPDT, N/O switches with optional Rare Earth Magnet installation on steel doors with flush top channels.
 - 1. Manufacturers:
 - a. Sargent Manufacturing (SA) 3280 Series.
 - b. Security Door Controls (SD) DPS Series.
 - c. Securitron (SU) DPS Series.
- C. Intelligent Switching Power Supplies: Provide power supplies with single, dual or multi-voltage configurations at 12 and/or 24VDC. Power Supply shall have battery backup function with an integrated battery charging circuit. The power supply shall have a standard, integrated Fire Alarm Interface (FAI). The power supply shall provide capability for secondary voltage, power distribution, direct lock control and network monitoring through add on modules. The power supply shall be expandable up to 16 individually protected outputs. Output modules shall provide individually protected, continuous outputs and/or individually protected, relay controlled outputs. Network modules shall provide remote monitoring functions such as status reporting, fault reporting and information logging.
 - 1. Provide the least number of units, at the appropriate amperage level, sufficient to exceed the required total draw for the specified electrified hardware and access control equipment.
 - 2. Manufacturers:
 - a. Securitron (SU) AQL Series.
 - b. Altronix (AS) Maximal 11F.

2.15 FABRICATION

A. Fasteners: Provide door hardware manufactured to comply with published templates generally prepared for machine, wood, and sheet metal screws. Provide screws according to manufacturers recognized installation standards for application intended.

2.16 FINISHES

A. Standard: Designations used in the Hardware Sets and elsewhere indicate hardware finishes complying with ANSI/BHMA A156.18, including coordination with traditional U.S. finishes indicated by certain manufacturers for their products.

- B. Provide quality of finish, including thickness of plating or coating (if any), composition, hardness, and other qualities complying with manufacturer's standards, but in no case less than specified by referenced standards for the applicable units of hardware
- C. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine scheduled openings, with Installer present, for compliance with requirements for installation tolerances, labeled fire door assembly construction, wall and floor construction, and other conditions affecting performance.
- B. Notify architect of any discrepancies or conflicts between the door schedule, door types, drawings and scheduled hardware. Proceed only after such discrepancies or conflicts have been resolved in writing.

3.2 PREPARATION

- A. Hollow Metal Doors and Frames: Comply with ANSI/DHI A115 series.
- B. Wood Doors: Comply with ANSI/DHI A115-W series.

3.3 INSTALLATION

- A. Install each item of mechanical and electromechanical hardware and access control equipment to comply with manufacturer's written instructions and according to specifications.
 - 1. Installers are to be trained and certified by the manufacturer on the proper installation and adjustment of fire, life safety, and security products including: hanging devices; locking devices; closing devices; and seals.
- B. Mounting Heights: Mount door hardware units at heights indicated in following applicable publications, unless specifically indicated or required to comply with governing regulations:
 - 1. Standard Steel Doors and Frames: DHI's "Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames."
 - 2. DHI TDH-007-20: Installation Guide for Doors and Hardware.
 - 3. Where indicated to comply with accessibility requirements, comply with ANSI A117.1 "Accessibility Guidelines for Buildings and Facilities."
 - 4. Provide blocking in drywall partitions where wall stops or other wall mounted hardware is located.
- C. Retrofitting: Install door hardware to comply with manufacturer's published templates and written instructions. Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation of surface protective trim units with finishing work specified in Division 9 Sections. Do not install surface-mounted items until finishes have been completed on substrates involved.

- D. Thresholds: Set thresholds for exterior and acoustical doors in full bed of sealant complying with requirements specified in Division 7 Section "Joint Sealants."
- E. Storage: Provide a secure lock up for hardware delivered to the project but not yet installed. Control the handling and installation of hardware items so that the completion of the work will not be delayed by hardware losses before and after installation.

3.4 FIELD QUALITY CONTROL

A. Field Inspection (Punch Report): Reference Division 01 Sections "Closeout Procedures". Produce project punch report for each installed door opening indicating compliance with approved submittals and verification hardware is properly installed, operating and adjusted. Include list of items to be completed and corrected, indicating the reasons or deficiencies causing the Work to be incomplete or rejected.

3.5 ADJUSTING

A. Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.

3.6 CLEANING AND PROTECTION

- A. Protect all hardware stored on construction site in a covered and dry place. Protect exposed hardware installed on doors during the construction phase. Install any and all hardware at the latest possible time frame.
- B. Clean adjacent surfaces soiled by door hardware installation.
- C. Clean operating items as necessary to restore proper finish. Provide final protection and maintain conditions that ensure door hardware is without damage or deterioration at time of owner occupancy.

3.7 DEMONSTRATION

A. Instruct Owner's maintenance personnel to adjust, operate, and maintain mechanical and electromechanical door hardware.

3.8 DOOR HARDWARE SETS

- A. The hardware sets represent the design intent and direction of the owner and architect. They are a guideline only and should not be considered a detailed hardware schedule. Discrepancies, conflicting hardware and missing items should be brought to the attention of the architect with corrections made prior to the bidding process. Omitted items not included in a hardware set should be scheduled with the appropriate additional hardware required for proper application and functionality.
 - 1. Quantities listed are for each pair of doors, or for each single door.
 - 2. The supplier is responsible for handing and sizing all products.

- 3. Where multiple options for a piece of hardware are given in a single line item, the supplier shall provide the appropriate application for the opening.
- 4. At existing openings with new hardware the supplier shall field inspect existing conditions prior to the submittal stage to verify the specified hardware will work as required. Provide alternate solutions and proposals as needed.
- B. Manufacturer's Abbreviations:
 - MK McKinney
 PE Pemko
 SU Securitron
 RU Corbin Russwin
 RO Rockwood
 HG HID Global

Hardware Sets

Set: 1.0

Doors: 100A, 100B, 101C, 101D Description: PAIR - EXTERIOR - LOBBY, CORRIDOR (ACCESS CONTROL)

2	Continuous Hinge	CFM_SLF-HD1 PT x Length Required		PE	
2	Electric Power Transfer	EL-CEPT Cast		SU	4
1	Key Removable Mullion	CR910KM x Length Required		RU	
1	Rim Exit Device, Nightlatch	ED5200S VT957ET M110 M92 MELR M109	630	RU	4
1	Rim Exit Device, Dummy	ED5200S VT950ET M110 M92 MELR M109	630	RU	4
2	Cylinder	As Required to Match Existing D1 Key System	626	RU	
2	Surface Closer	DC8210 A11 M54	689	RU	
2	Kick Plate	K1050 10" high CSK BEV	US32D	RO	
2	Door Stop	467-RKW	Black	RO	
1	Threshold	2009APK x Length Required x MSES25SS	B PE		
1	Mullion Gasketing	5110BL x Door Height		PE	
1	Gasketing	2891AS (head)		PE	
2	Gasketing	290AS (jambs)		PE	
2	Sweep	3452CNB x Length Required		PE	
2	Astragal	29324CNB x Door Height		PE	
2	ElectroLynx Harness [door]	QC-C**** (length / type as required)		MK	4
2	ElectroLynx Harness [frame]	QC-C1500P		MK	4
2	Door Position Switch	DPS-M / W-BK		SU	4
1	Signo Reader	20 / 40 (as req'd per application)	BLK	HG	4
1	Power Supply	AQL Series (Type & Size as Required)		SU	4
1	Wiring/Point-to-Point Diagram				

- 1 Elevation Diagram
- 1 Riser Diagram

Notes:

-Provide necessary collars/rings, cams and tailpieces/spindles for all cylinders.

-Coordinate with electrical, alarm and security contractors.

-Access control panel, security management software and credentials by Security Contractor.

Operational Narrative (Local AHJ should always be consulted and sign off on the operation):

1. Doors normally closed and secure.

2. Authorized access by card reader retracting exit device latches for predetermined time limit. Exit device latches

can be electrically held retracted for open access.

3. Egress free for immediate exit.

4. REX switch in push rails allow authorized exit without alarm condition.

5. Door position switches monitor open/closed status.

6. Exit device latches release (fail secure) in event of power loss. Keyed cylinder override for emergency access.

Set: 2.0

Doors: 119 Description: SGL - ELECTRICAL ROOM

3	Hinge, Full Mortise	TA2714	US26D	MK
1	Fire Rated Rim Exit, Storeroom	ED5200A PR959ET M110 M109	630	RU
1	Cylinder	As Required to Match Existing D1 Key System	626	RU
1	Surface Closer	DC8210 A3 M54	689	RU
1	Kick Plate	K1050 10" high CSK BEV	US32D	RO
1	Door Stop	400/403/446 (as req'd per application)	US26D	RO
1	Gasketing	S88D (Head & Jambs)		PE

Notes:

-Provide necessary collars/rings, cams and tailpieces/spindles for all cylinders.

-Knurling: Where required by local code provide knurling or abrasive coating to all levers on doors leading to hazardous areas such as electrical rooms, mechanical rooms, boiler and furnace rooms, janitor closets, and as otherwise required.

Set: 3.0

Doors: 101F, 125 Description: DBLE EGRESS - CORRIDOR

2	Continuous Hinge	CFM_SLF-HD1 x Fire Pins x Length Requ	uired	PE
2	Fire Rated Conc Vert Rod, Exit Only	ED5800A EO M110 M109	630	RU
2	Surface Closer	DC8210 A3 M54	689	RU
2	Armor Plate	K1050 F 36" high CSK BEV	US32D	RO
2	Wall Stop	415	US26D	RO
1	Gasketing	S88D (Head & Jambs)		PE
1	Overlapping Steel Astragal	Provided By Door Manufacturer		

Set: 4.0

Doors: 101A, 101B Description: PAIR - CORRIDOR

2	Continuous Hinge	CFM_SLF-HD1 x Length Required		PE
1	Key Removable Mullion	CR910KM x Length Required		RU
2	Rim Exit Device, Classroom	ED5200 PR955ET M110 M52 M109	630	RU
5	Cylinder	As Required to Match Existing D1 Key System	626	RU
2	Surface Closer	DC8210 A4 M54	689	RU
2	Kick Plate	K1050 10" high CSK BEV	US32D	RO
2	Door Stop	467-RKW	Black	RO
1	Mullion Gasketing	5110BL x Door Height		PE
2 Silencer

608-RKW

RO

Notes:

-Provide necessary collars/rings, cams and tailpieces/spindles for all cylinders.

Set: 5.0

Doors: 124A, 124B Description: SGL - CORRIDOR

Hinge, Full Mortise, Hvy Wt	T4A3786	US26D	MK
Fire Rated Rim Exit, Classroom	ED5200A PR955ET M110 M109	630	RU
Cylinder	As Required to Match Existing D1 Key System	626	RU
Surface Closer	DC8210 A3 M54	689	RU
Kick Plate	K1050 10" high CSK BEV	US32D	RO
Door Stop	400/403/446 (as req'd per application)	US26D	RO
Gasketing	S88D (Head & Jambs)		PE
	Hinge, Full Mortise, Hvy Wt Fire Rated Rim Exit, Classroom Cylinder Surface Closer Kick Plate Door Stop Gasketing	Hinge, Full Mortise, Hvy WtT4A3786Fire Rated Rim Exit, ClassroomED5200A PR955ET M110 M109CylinderAs Required to Match Existing D1 Key SystemSurface CloserDC8210 A3 M54Kick PlateK1050 10" high CSK BEVDoor Stop400/403/446 (as req'd per application)GasketingS88D (Head & Jambs)	Hinge, Full Mortise, Hvy WtT4A3786US26DFire Rated Rim Exit, ClassroomED5200A PR955ET M110 M109630CylinderAs Required to Match Existing D1 Key System626Surface CloserDC8210 A3 M54689Kick PlateK1050 10" high CSK BEVUS32DDoor Stop400/403/446 (as req'd per application)US26DGasketingS88D (Head & Jambs)S88D (Head & Jambs)

Notes:

-Provide necessary collars/rings, cams and tailpieces/spindles for all cylinders.

Set: 6.0

Doors: 101E Description: SGL - STAIR

Hinge, Full Mortise, Hvy Wt	T4A3786	US26D	MK
Fire Rated Rim Exit, Passage	ED5200A PR910ET M110 M109	630	RU
Surface Closer	DC8210 A3 M54	689	RU
Kick Plate	K1050 10" high CSK BEV	US32D	RO
Door Stop	400/403/446 (as req'd per application)	US26D	RO
Gasketing	S88D (Head & Jambs)		PE
	Hinge, Full Mortise, Hvy Wt Fire Rated Rim Exit, Passage Surface Closer Kick Plate Door Stop Gasketing	Hinge, Full Mortise, Hvy WtT4A3786Fire Rated Rim Exit, PassageED5200A PR910ET M110 M109Surface CloserDC8210 A3 M54Kick PlateK1050 10" high CSK BEVDoor Stop400/403/446 (as req'd per application)GasketingS88D (Head & Jambs)	Hinge, Full Mortise, Hvy WtT4A3786US26DFire Rated Rim Exit, PassageED5200A PR910ET M110 M109630Surface CloserDC8210 A3 M54689Kick PlateK1050 10" high CSK BEVUS32DDoor Stop400/403/446 (as req'd per application)US26DGasketingS88D (Head & Jambs)

Set: 7.0

Doors: 104, 121 Description: SGL - SAFE, STORAGE

3	Hinge, Full Mortise	TA2714	US26D	MK
1	Storeroom Lock	CLX3357 PZD D1	626	RU
1	Door Stop	400/403/446 (as req'd per application)	US26D	RO
3	Silencer	608-RKW		RO

<u>Set: 8.0</u>

Doors: 107A, 107B Description: SGL - RECORDS

3	Hinge, Full Mort	ise TA2714	US26D	MK
1	Storeroom Lock	CLX3357 PZD D1	626	RU
1	Surface Closer	DC8200 M54 / DC8210 M54 (mount as req'd per application)	689	RU
1	Kick Plate	K1050 10" high CSK BEV	US32D	RO
1	Door Stop	400/403/446 (as req'd per application)	US26D	RO
3	Silencer	608-RKW		RO

Notes:

-Where possible install closer on door for optimum aesthetics.

Set: 9.0

Doors: 116, 120 Description: SGL - JANITOR, IT

3	Hinge, Full Mort	ise TA2714	US26D	MK
1	Storeroom Lock	CLX3357 PZD D1	626	RU
1	Surface Closer	DC8200 M54 / DC8210 M54 (mount as req'd per application)	689	RU
1	Kick Plate	K1050 10" high CSK BEV	US32D	RO
1	Door Stop	400/403/446 (as req'd per application)	US26D	RO
1	Gasketing	S88D (Head & Jambs)		PE

Notes:

-Closers shall not be installed on corridor side of doors; where possible install closer on door for optimum aesthetics. -Knurling: Where required by local code provide knurling or abrasive coating to all levers on doors leading to hazardous areas such as electrical rooms, mechanical rooms, boiler and furnace rooms, janitor closets, and as otherwise required.

Set: 10.0

Doors: 115 Description: SGL - STORAGE

3	Hinge, Full Mortise	TA2714	US26D	MK
1	Storeroom Lock	CLX3357 PZD D1	626	RU
1	Surface Closer	DC8210 A4 M54	689	RU
1	Kick Plate	K1050 10" high CSK BEV	US32D	RO
1	Gasketing	S88D (Head & Jambs)		PE

Set: 11.0

Doors: 105, 106, 108, 109, 122 Description: SGL - OFFICE

3	Hinge, Full Mort	ise TA2714	US26D	MK
1	Entrance Lock	CLX3351 PZD D1	626	RU
1	Surface Closer	DC8200 M54 / DC8210 M54 (mount as req'd per application)	689	RU
1	Kick Plate	K1050 10" high CSK BEV	US32D	RO
1	Door Stop	400/403/446 (as req'd per application)	US26D	RO
1	Gasketing	S88D (Head & Jambs)		PE

Notes:

-Closers shall not be installed on corridor side of doors; where possible install closer on door for optimum aesthetics.

Set: 12.0

Doors: 102 Description: SGL - RECEPTION

3	Hinge, Full Mort	ise TA2714	US26D	MK
1	Classroom Lock	CLX3355 PZD D1	626	RU
1	Surface Closer	DC8200 M54 / DC8210 M54 (mount as req'd per application)	689	RU
1	Kick Plate	K1050 10" high CSK BEV	US32D	RO
1	Door Stop	400/403/446 (as req'd per application)	US26D	RO
1	Gasketing	S88D (Head & Jambs)		PE

Notes:

-Closers shall not be installed on corridor side of doors; where possible install closer on door for optimum aesthetics.

<u>Set: 13.0</u> Doors: 113 Description: SGL - NURSE

3	Hinge, Full Mort	ise TA2714	US26D	MK
1	Classroom Intrue	ler Lock CLX3352 PZD D1	626	RU
1	Surface Closer	DC8200 M54 / DC8210 M54 (mount as req'd per application)	689	RU
1	Kick Plate	K1050 10" high CSK BEV	US32D	RO
1	Door Stop	400/403/446 (as req'd per application)	US26D	RO
1	Gasketing	S88D (Head & Jambs)		PE

Notes:

-Closers shall not be installed on corridor side of doors; where possible install closer on door for optimum aesthetics.

Set: 14.0

Doors: 103, 112 Description: SGL - TOILET

3	Hinge, Full Mortise	TA2714	US26D	MK
1	Privacy Lock	CLX3320 PZD	626	RU
1	Mop Plate	K1050 4" high CSK BEV	US32D	RO
1	Door Stop	400/403/446 (as req'd per application)	US26D	RO
3	Silencer	608-RKW		RO

Set: 15.0

Doors: 117, 118 Description: SGL - WOMEN, MEN

3	Hinge, Full Mort	ise TA2714	US26D	MK
1	Privacy Lock	CLX3320 PZD	626	RU
1	Surface Closer	DC8200 M54 / DC8210 M54 (mount as req'd per application)	689	RU
1	Kick Plate	K1050 10" high CSK BEV	US32D	RO
1	Mop Plate	K1050 4" high CSK BEV	US32D	RO
1	Door Stop	400/403/446 (as req'd per application)	US26D	RO
1	Gasketing	S88D (Head & Jambs)		PE

Notes:

-Closers shall not be installed on corridor side of doors; where possible install closer on door for optimum aesthetics.

Set: 16.0

Doors: 110, 111 Description: SGL - CONFERENCE, WORKROOM

3	Hinge, Full Mort	ise TA2714	US26D	MK
1	Passage Latch	CLX3310 PZD	626	RU
1	Surface Closer	DC8200 M54 / DC8210 M54 (mount as req'd per application)	689	RU
1	Kick Plate	K1050 10" high CSK BEV	US32D	RO
1	Door Stop	400/403/446 (as req'd per application)	US26D	RO
1	Gasketing	S88D (Head & Jambs)		PE

Notes:

-Closers shall not be installed on corridor side of doors; where possible install closer on door for optimum aesthetics.

END OF SECTION 087100

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SECTION 08 8000 GLAZING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Insulating glass units.
- B. Glazing units.
- C. Glazing compounds.

1.2 RELATED REQUIREMENTS

- A. Section 07 9010 Joint Sealers: Sealants for other than glazing purposes.
- B. Section 08 1416 FLUSH WOOD DOORS: Glazed lites in doors.
- C. Section 08 4313 ALUMINUM FRAMED STOREFRONTS: Glazing provided as part of storefront assembly.

1.3 REFERENCE STANDARDS

- A. 16 CFR 1201 Safety Standard for Architectural Glazing Materials Current Edition.
- B. ANSI Z97.1 American National Standard for Safety Glazing Materials Used in Buildings Safety Performance Specifications and Methods of Test 2015.
- C. ASTM C864 Standard Specification for Dense Elastomeric Compression Seal Gaskets, Setting Blocks, and Spacers 2005 (Reapproved 2019).
- D. ASTM C920 Standard Specification for Elastomeric Joint Sealants 2018.
- E. ASTM C1036 Standard Specification for Flat Glass 2021.
- F. ASTM C1048 Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass 2018.
- G. ASTM C1193 Standard Guide for Use of Joint Sealants 2016.
- H. ASTM C1376 Standard Specification for Pyrolytic and Vacuum Deposition Coatings on Flat Glass 2021.
- I. ASTM E1300 Standard Practice for Determining Load Resistance of Glass in Buildings 2016.
- J. ASTM E2190 Standard Specification for Insulating Glass Unit Performance and Evaluation 2010.
- K. GANA (SM) GANA Sealant Manual 2008.

- L. NFRC 100 Procedure for Determining Fenestration Product U-factors 2017.
- M. NFRC 200 Procedure for Determining Fenestration Product Solar Heat Gain Coefficient and Visible Transmittance at Normal Incidence 2014, with Errata (2017).
- N. NFRC 300 Test Method for Determining the Solar Optical Properties of Glazing Materials and Systems 2017.

14 ADMINISTRATIVE REQUIREMENTS

A. Preinstallation Meeting: Convene a preinstallation meeting one week before starting work of this section; require attendance by each of the affected installers.

15 SUBMITTALS

- A. See Section 01 3000 ADMINISTRATIVE REQUIREMENTS, for submittal procedures.
- B. Product Data on Glazing Compounds and Accessories: Provide chemical, functional, and environmental characteristics, limitations, special application requirements, and identify available colors.
- C. Samples: Submit one samples 12 by 12 inch in size of glass units.
- D. Certificate: Certify that products of this section meet or exceed specified requirements.
- E. Manufacturer's qualification statement.
- F. Installer's qualification statement.
- G. Warranty Documentation: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

1.6 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years of documented experience.
 - 1. Provide certified glass products through ANSI accredited certifications that include plant audits and independent laboratory performance testing.
 - a. Insulating Glass Certification Council (IGCC).
 - b. Safety Glazing Certification Council (SGCC).
- B. Installer Qualifications: Company specializing in performing work of the type specified and with at least three years documented experience.
 - 1. Provide company, field supervisors, and installers that hold active ANSI accredited certifications in appropriate categories for work specified.

- a. North American Contractor Certification (NACC) for glazing contractors.
- b. Equivalent independent third-party ANSI accredited certification.
- C. Testing Agency Qualifications: Independent firm specializing in performing testing and inspections of the type specified in this section.

1.7 FIELD CONDITIONS

- A. Do not install glazing when ambient temperature is less than 40 degrees F.
- B. Maintain minimum ambient temperature before, during and 24 hours after installation of glazing compounds.

1.8 WARRANTY

- A. See Section 01 7800 CLOSEOUT SUBMITTALS, for additional warranty requirements.
- B. Insulating Glass Units: Provide a five (5) year manufacturer warranty to include coverage for seal failure, interpane dusting or misting, including providing products to replace failed units.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Float Glass Manufacturers:
 - 1. AGC Glass Company North America, Inc: www.us.agc.com.
 - 2. Guardian Industries Corp: www.sunguardglass.com.
 - 3. Pilkington North America Inc: www.pilkington.com/na.
 - 4. PPG Industries, Inc: www.ppgideascapes.com.
- B. PERFORMANCE REQUIREMENTS EXTERIOR GLAZING ASSEMBLIES
 - 1. Provide type and thickness of exterior glazing assemblies to support assembly dead loads, and to withstand live loads caused by positive and negative wind pressure acting normal to plane of glass.
 - a. Comply with ASTM E1300 for design load resistance of glass type, thickness, dimensions, and maximum lateral deflection of supported glass.
 - b. Provide glass edge support system sufficiently stiff to limit the lateral deflection of supported glass edges to less than 1/175 of their lengths under specified design load.
 - c. Glass thicknesses listed are minimum.

- 2. Vapor Retarder and Air Barrier Seals: Provide completed assemblies that maintain continuity of building enclosure vapor retarder and air barrier.
 - a. In conjunction with vapor retarder and joint sealer materials described in other sections.
- 3. Thermal and Optical Performance: Provide exterior glazing products with performance properties as indicated. Performance properties are in accordance with manufacturer's published data as determined with the following procedures and/or test methods:
 - a. Center of Glass U-Value: Comply with NFRC 100 using Lawrence Berkeley National Laboratory (LBNL) WINDOW 6.3 computer program.
 - b. Center of Glass Solar Heat Gain Coefficient (SHGC): Comply with NFRC 200 using Lawrence Berkeley National Laboratory (LBNL) WINDOW 6.3 computer program.
 - c. Solar Optical Properties: Comply with NFRC 300 test method.

C. GLASS MATERIALS

- 1. Float Glass: Provide float glass based glazing unless otherwise indicated.
 - a. Annealed Type: ASTM C1036, Type I Transparent Flat, Class 1 Clear, Quality Q3.
 - b. Kind FT Fully Tempered Type: Complies with ASTMC1048.
 - c. Fully Tempered Safety Glass: Complies with ANSI Z97.1 or 16 CFR 1201 criteria for safety glazing used in hazardous locations.
 - d. Thicknesses: As indicated; provide greater thickness as required for exterior glazing wind load design.

D. INSULATING GLASS UNITS

- 1. Manufacturers:
 - a. Glass: Any of the manufacturers specified for float glass.
- 2. Fabricator: Certified by glass manufacturer for type of glass, coating, and treatment involved and capable of providing specified warranty.
- 3. Insulating Glass Units: Types as indicated.
 - a. Durability: Certified by an independent testing agency to comply with ASTM E2190.
 - b. Coated Glass: Comply with requirements of ASTM C1376 for pyrolytic (hard-coat) or magnetic sputter vapor deposition (soft-coat) type coatings on flat glass; coated vision glass, Kind CV; coated overhead glass, Kind CO; or coated spandrel glass, Kind CS.
 - c. Metal Edge Spacers: Aluminum, bent and soldered corners.

- d. Spacer Color: Black.
- e. Edge Seal:
 - 1) Dual-Sealed System: Provide polyisobutylene sealant as primary seal applied between spacer and glass panes, and silicone, polysulfide, or polyurethane sealant as secondary seal applied around perimeter.
- f. Color: Black.
- g. Purge interpane space with argon.
- 4. Type IG-1 Insulating Glass Units: Vision glass, double glazed.
 - a. Applications: Exterior glazing unless otherwise indicated.
 - b. Space between lites filled with air.
 - c. Outboard Lite: Annealed float glass, 1/4 inch thick, minimum.
 - 1) Tint: Solar Grey or Solar Bronze
 - 2) Coating: Low-E (passive type), on #2 surface.
 - d. Inboard Lite: Annealed float glass, 1/4 inch thick, minimum.
 - 1) Tint: Clear
 - e. Total Thickness: 1 inch.
 - f. Thermal Transmittance (U-Value): 0.29
 - g. Visible Light Transmittance (VLT): 38
 - h. Solar Heat Gain Coefficient (SHGC): 0.23

E. GLAZING COMPOUNDS

- 1. Silicone Sealant: Single component; neutral curing; capable of water immersion without loss of properties; nonbleeding, nonstaining; ASTM C920 Type S, Grade NS, Class 25, Uses M, A, and G; with cured Shore A hardness range of 15 to 25; black color.
- F. ACCESSORIES
 - 1. Setting Blocks: Silicone, with 80 to 90 Shore A durometer hardness; ASTM C864 Option II. Length of 0.1 inch for each square foot of glazing or minimum 4 inch by width of glazing rabbet space minus 1/16 inch by height to suit glazing method and pane weight and area.

2. Glazing Splines: Resilient silicone extruded shape to suit glazing channel retaining slot; ASTM C864 Option II; color black.

PART 3 EXECUTION

3.1 VERIFICATION OF CONDITIONS

- A. Verify the condition of all existing exterior glaxing to remain.
- B. Verify that openings for glazing are correctly sized and within tolerances, including those for size, squareness, and offsets at corners.
- C. Verify that the minimum required face and edge clearances are being provided.
- D. Verify that surfaces of glazing channels or recesses are clean, free of obstructions that may impede moisture movement, weeps are clear, and support framing is ready to receive glazing system.
- E. Verify that sealing between joints of glass framing members has been completed effectively.
- F. Proceed with glazing system installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Clean existing glazing from exterior surface of the existing windows to remain, and prepare the surface and frame for re-glazing.
- B. Clean contact surfaces with appropriate solvent and wipe dry within maximum of 24 hours before glazing. Remove coatings that are not tightly bonded to substrates.
- C. Seal porous glazing channels or recesses with substrate compatible primer or sealer.
- D. Prime surfaces scheduled to receive sealant where required for proper sealant adhesion.

33 INSTALLATION, GENERAL

- A. Install glazing in compliance with written instructions of glass, gaskets, and other glazing material manufacturers, unless more stringent requirements are indicated, including those in glazing referenced standards.
- B. Install glazing sealants in accordance with ASTM C1193, GANA (SM), and manufacturer's instructions.
- C. Do not exceed edge pressures around perimeter of glass lites as stipulated by glass manufacturer.
- D. Set glass lites of system with uniform pattern, draw, bow, and similar characteristics.
- E. Set glass lites in proper orientation so that coatings face exterior or interior as indicated.

F. Prevent glass from contact with any contaminating substances that may be the result of construction operations such as, and not limited to the following; weld splatter, fire-safing, plastering, mortar droppings, etc.

34 INSTALLATION - DRY GLAZING METHOD (TAPE AND GASKET SPLINE GLAZING)

- A. Application New Exterior Glazed: Set glazing infills from the exterior of the building.
- B. Cut glazing tape to length; install on glazing pane. Seal corners by butting tape and sealing junctions with butyl sealant.
- C. Place setting blocks at 1/4 points with edge block no more than 6 inch from corners.
- D. Rest glazing on setting blocks and push against fixed stop with sufficient pressure to attain full contact.
- E. Install removable stops without displacing glazing spline. Exert pressure for full continuous contact.
- F. Carefully trim protruding tape with knife.

35 INSTALLATION - WET GLAZING METHOD (SEALANT AND SEALANT)

- A. Application Existing Exterior Glazed: Maintain existing glazing infills from the exterior of the building.
- B. Fill gaps between glazing and stops with [____]sealant to depth of bite on glazing, but not more than 3/8 inch below sight line to ensure full contact with glazing and continue the air and vapor seal.
- C. Apply sealant to uniform line, flush with sight line. Tool or wipe sealant surface smooth.

3.6 FIELD QUALITY CONTROL

- A. Glass and Glazing product manufacturers to provide field surveillance of the installation of their products.
- B. Monitor and report installation procedures and unacceptable conditions.

3.7 CLEANING

- A. Remove excess glazing materials from finish surfaces immediately after application using solvents or cleaners recommended by manufacturers.
- B. Remove nonpermanent labels immediately after glazing installation is complete.
- C. Clean glass and adjacent surfaces after sealants are fully cured.
- D. Clean glass on both exposed surfaces not more than 4 days prior to Date of Substantial Completion in accordance with glass manufacturer's written recommendations.

3.8 **PROTECTION**

- A. After installation, mark pane with an 'X' by using removable plastic tape or paste; do not mark heat absorbing or reflective glass units.
- B. Remove and replace glass that is damaged during construction period prior to Date of Substantial Completion.

END OF SECTION 08 8000

SECTION 09 21 16 GYPSUM BOARD ASSEMBLIES

PART 1 GENERAL

1.01 RELATED REQUIREMENTS

- A. Section 05 40 00 Cold-Formed Metal Framing: Exterior wind-load-bearing metal stud framing.
- B. Section 06 10 00 Rough Carpentry: Building framing and sheathing.
- C. Section 06 10 00 Rough Carpentry: Wood blocking product and execution requirements.
- D. Section 07 21 00 Thermal Insulation: Acoustic insulation.
- E. Section 07 92 00 Joint Sealants: Sealing acoustical gaps in construction other than gypsum board or plaster work.

1.02 REFERENCE STANDARDS

- A. AISI S100-12 North American Specification for the Design of Cold-Formed Steel Structural Members 2012.
- B. ANSI A108.11 American National Standard Specifications for Interior Installation of Cementitious Backer Units 2018.
- C. ANSI A118.9 American National Standard Specifications for Test Methods and Specifications for Cementitious Backer Units 1999 (Reaffirmed 2016).
- D. ASTM B221 Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes 2020.
- E. ASTM C208 Standard Specification for Cellulosic Fiber Insulating Board 2012, with Editorial Revision (2019).
- F. ASTM C475/C475M Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board 2017.
- G. ASTM C514 Standard Specification for Nails for the Application of Gypsum Board 2004 (Reapproved 2020).
- H. ASTM C645 Standard Specification for Nonstructural Steel Framing Members 2018.
- I. ASTM C754 Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products 2020.
- J. ASTM C840 Standard Specification for Application and Finishing of Gypsum Board 2020.
- K. ASTM C954 Standard Specification for Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Steel Studs From 0.033 in. (0.84 mm) to 0.112 in. (2.84 mm) in Thickness 2018.
- L. ASTM C1002 Standard Specification for Steel Self-Piercing Tapping Screws for Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs 2020.
- M. ASTM C1047 Standard Specification for Accessories For Gypsum Wallboard and Gypsum Veneer Base 2019.
- N. ASTM C1177/C1177M Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing 2017.
- O. ASTM C1178/C1178M Standard Specification for Coated Glass Mat Water-Resistant Gypsum Backing Panel 2018.

- P. ASTM C1278/C1278M Standard Specification for Fiber-Reinforced Gypsum Panel 2017.
- Q. ASTM C1280 Standard Specification for Application of Exterior Gypsum Panel Products for Use as Sheathing 2018.
- R. ASTM C1325 Standard Specification for Fiber-Mat Reinforced Cementitious Backer Units 2019.
- S. ASTM C1396/C1396M Standard Specification for Gypsum Board 2017.
- T. ASTM C1629/C1629M Standard Classification for Abuse-Resistant Nondecorated Interior Gypsum Panel Products and Fiber-Reinforced Cement Panels 2019.
- U. ASTM C1658/C1658M Standard Specification for Glass Mat Gypsum Panels 2019, with Ediorial Revision (2020).
- V. ASTM D3273 Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber 2016.
- W. ASTM E84 Standard Test Method for Surface Burning Characteristics of Building Materials 2021a.
- X. ASTM E90 Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements 2009 (Reapproved 2016).
- Y. ASTM E119 Standard Test Methods for Fire Tests of Building Construction and Materials 2020.
- Z. ASTM E413 Classification for Rating Sound Insulation 2016.
- AA. GA-216 Application and Finishing of Gypsum Panel Products 2018.
- BB. GA-600 Fire Resistance and Sound Control Design Manual, 22nd edition 2018.
- CC. ICC-ES AC38 Acceptance Criteria for Water-Resistive Barriers 2016, with Editorial Revision (2019).

1.03 QUALITY ASSURANCE

A. Copies of Documents at Site: Maintain at the project site a copy of each referenced document that prescribes execution requirements.

PART 2 PRODUCTS

2.01 GYPSUM BOARD ASSEMBLIES

- A. Provide completed assemblies complying with ASTM C840 and GA-216.
- B. Interior Partitions: Provide completed assemblies with the following characteristics:
 - 1. Acoustic Attenuation: STC of 45-49 calculated in accordance with ASTM E413, based on tests conducted in accordance with ASTM E90.
- C. Shaft Walls at HVAC Shafts: Provide completed assemblies with the following characteristics:
 - 1. Air Pressure Within Shaft: Sustained loads of 5 lbf/sq ft (0.24 kPa) with maximum midspan deflection of L/240.
 - 2. Acoustic Attenuation: STC of 35-39 calculated in accordance with ASTM E413, based on tests conducted in accordance with ASTM E90.
- D. Shaft Walls at Elevator Shafts: Provide completed assemblies with the following characteristics:
 - 1. Air Pressure Within Shaft: Intermittent loads of 5 lbf/sq ft (0.24 kPa) with maximum midspan deflection of L/240.

- 2. Acoustic Attenuation: STC of 35-39 calculated in accordance with ASTM E413, based on tests conducted in accordance with ASTM E90.
- E. Fire Rated Assemblies: Provide completed assemblies complying with applicable code.
 - 1. UL Assembly Numbers: Provide construction equivalent to that listed for the particular assembly in the current UL (FRD).

2.02 METAL FRAMING MATERIALS

- A. Manufacturers Metal Framing, Connectors, and Accessories:
 - 1. Clarkwestern Dietrich Building Systems LLC: www.clarkdietrich.com.
 - 2. Marino: www.marinoware.com.
 - 3. Dale Industries.
 - 4. Bostwick Steel Framing co..
 - 5. Milcor Division, Inryco.
 - 6. Harrison Manufacturing Co.
 - 7. United Stated Gypsum Company
 - 8. Substitutions: See Section 01 60 00 Product Requirements. No dimpled or embossed studs claiming equivalency shall be accepted.
- B. Non-Loadbearing Framing System Components: ASTM C645; galvanized sheet steel, of size and properties necessary to comply with ASTM C754 for the spacing indicated, with maximum deflection of wall framing of L/120 at 5 psf (L/120 at 240 Pa).
 - 1. Studs: "C" shaped with flat or formed websMetal studs at interior partiions shall be 3-5/8", min. 22 gauge or 6", min. 20 gauge. Studs shall be spaced at 16" O.C. unless otherwise noted..
 - 2. Runners: U shaped, sized to match studs.
 - 3. Ceiling Channels: C-shaped.
 - 4. Furring: Hat-shaped sections, minimum depth of 7/8 inch (22 mm).
 - 5. Resilient Furring Channels: Single or double leg configuration; 1/2 inch (12 mm) channel depth.
- C. Shaft Wall Studs and Accessories: ASTM C645; galvanized sheet steel, of size and properties necessary to comply with ASTM C754 and specified performance requirements. Use double studs or 6" studs for chase walls, piping , and conduits.
- D. Partition Head To Structure Connections: Provide track fastened to structure with legs of sufficient length to accommodate deflection, for friction fit of studs cut short and fastened as indicated on drawings.
- E. Preformed Top Track Firestop Seal:
 - 1. Provide components UL-listed for use in UL-listed fire-rated head of partition joint systems indicated on drawings.

2.03 BOARD MATERIALS

- A. Manufacturers Gypsum-Based Board:
 - 1. American Gypsum Company: www.americangypsum.com.
 - 2. CertainTeed Corporation: www.certainteed.com.
 - 3. Continental Building Products: www.continental-bp.com.
 - 4. Georgia-Pacific Gypsum: www.gpgypsum.com.
 - 5. National Gypsum Company: www.nationalgypsum.com/#sle.
 - 6. USG Corporation: www.usg.com.
 - 7. Substitutions: See Section 01 60 00 Product Requirements.

- B. Gypsum Wallboard: Paper-faced gypsum panels as defined in ASTM C1396/C1396M; sizes to minimize joints in place; ends square cut.
 - 1. Application: Use for vertical surfaces and ceilings, unless otherwise indicated.
 - 2. Glass mat faced gypsum panels as defined in ASTM C1658/C1658M, suitable for paint finish, of the same core type and thickness may be substituted for paper-faced board.
 - 3. Unfaced fiber-reinforced gypsum panels as defined in ASTM C1278/C1278M, suitable for paint finish, of the same core type and thickness may be substituted for paper-faced board.
 - 4. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.
 - a. Mold-resistant board is required whenever board is being installed before the building is enclosed and conditioned.
 - b. Mold resistant board is required at mechanical rooms/ clostes, restrooms, janitor closets, within 4 feet of any sinks or drinking fountains..
 - 5. Thickness:
 - a. Vertical Surfaces: 5/8 inch (16 mm).
 - 6. Mold Resistant Paper Faced Products:
 - a. American Gypsum Company; M-Bloc.
 - b. American Gypsum Company; M-Bloc Type X.
 - c. Continental Building Products; Mold Defense.
 - d. Continental Building Products; Mold Defense Type X.
 - e. Georgia-Pacific Gypsum; ToughRock Mold-Guard.
 - f. Georgia-Pacific Gypsum; ToughRock Fireguard X Mold-Guard.
 - g. National Gypsum Company; Gold Bond XP Gypsum Board.
 - h. National Gypsum Company; Gold Bond 3/4" Ultra-Shield FS XP Gypsum Board.
 - i. Substitutions: See Section 01 60 00 Product Requirements.
 - 7. Glass Mat Faced Products:
 - a. Continental Building Products; Weather Defense Platinum Interior.
 - b. Continental Building Products; Weather Defense Platinum Interior Type X.
 - c. Georgia-Pacific Gypsum; DensArmor Plus.
 - d. Georgia-Pacific Gypsum; DensArmor Plus Fireguard C.
 - e. National Gypsum Company; Gold Bond eXP Interior Extreme Gypsum Panel.
 - f. National Gypsum Company; Gold Bond eXP Fire-Shield Interior Extreme Gypsum Panel.
 - g. USG Corporation; USG Sheetrock Brand Glass-Mat Panels Mold Tough.
 - h. Substitutions: See Section 01 60 00 Product Requirements.
- C. Impact Resistant Wallboard:
 - 1. Application: All exposed interior gypusm board walls. Typical for all walls up to 10'-0" A.F.F..
 - 2. Surface Abrasion: Level 3, minimum, when tested in accordance with ASTM C1629/C1629M.
 - 3. Soft Body Impact: Level 3, minimum, when tested in accordance with ASTM C1629/C1629M.
 - 4. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.
 - 5. Type: Fire resistance rated Type X, UL or WH listed.
 - 6. Thickness: 5/8 inch (16 mm).
 - 7. Edges: Tapered.
- D. Backing Board For Wet Areas: One of the following products:

- 1. Application: Surfaces behind tile in wet areas including mechanical closets, restrooms, janitor closets, and within 4' of sinks and drinking fountains..
- 2. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.
- 3. ANSI Cement-Based Board: Non-gypsum-based; aggregated Portland cement panels with glass fiber mesh embedded in front and back surfaces complying with ANSI A118.9 or ASTM C1325.
 - a. Thickness: 1/2 inch (12.7 mm).
- 4. Glass Mat Faced Board: Coated glass mat water-resistant gypsum backing panel as defined in ASTM C1178/C1178M.
 - a. Standard Type: Thickness 5/8 inch (16 mm).
 - b. Fire Resistant Type: Type X core, thickness 5/8 inch (16 mm).
 - c. Products:
 - 1) Georgia-Pacific Gypsum; DensShield Tile Backer.
 - 2) National Gypsum Company; Gold Bond eXP Tile Backer.
 - 3) Substitutions: See Section 01 60 00 Product Requirements.
- E. Ceiling Board: Special sag resistant gypsum ceiling board as defined in ASTM C1396/C1396M; sizes to minimize joints in place; ends square cut.
 - 1. Application: Ceilings, unless otherwise indicated.
 - 2. Thickness: 1/2 inch (13 mm).
 - 3. Edges: Tapered.
- F. Exterior Sheathing Board: Sizes to minimize joints in place; ends square cut.
 - 1. Application: Exterior sheathing, unless otherwise indicated.
 - 2. Edges: Square.
- G. Exterior Soffit Board: Exterior gypsum soffit board as defined in ASTM C1396/C1396M; sizes to minimize joints in place; ends square cut.
 - 1. Application: Ceilings and soffits in protected exterior areas, unless otherwise indicated.
 - 2. Types: Regular and Type X, in locations indicated.
 - 3. Type X Thickness: 5/8 inch (16 mm).
 - 4. Type C Thickness: 5/8 inch (16 mm).
 - 5. Regular Type Thickness: 1/2 inch (13 mm).
 - 6. Edges: Tapered.
- H. Shaftwall and Coreboard: Type X; 1 inch (25 mm) thick by 24 inches (610 mm) wide, beveled long edges, ends square cut.
 - 1. Paper-Faced Type: Gypsum shaftliner board or gypsum coreboard as defined ASTM C1396/C1396M; water-resistant faces.
 - 2. Glass Mat Faced Type: Glass mat shaftliner gypsum panel or glass mat coreboard gypsum panel as defined in ASTM C1658/C1658M.
 - 3. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.

2.04 GYPSUM WALLBOARD ACCESSORIES

- A. Acoustic Insulation: As specified in Section 07 21 00.
- B. Acoustic Sealant: Acrylic emulsion latex or water-based elastomeric sealant; do not use solvent-based non-curing butyl sealant.
- C. Water-Resistive Barrier: As specified in Section 07 25 00.
- D. Beads, Joint Accessories, and Other Trim: ASTM C1047, rigid plastic, galvanized steel, or rolled zinc, unless noted otherwise.

- 1. Corner Beads: Low profile, for 90 degree outside corners.
- 2. Wall Mounted Deflection Beads: Flexible gasket and bead with 1-1/8 inch (29 mm) flange.
- E. Joint Materials: ASTM C475/C475M and as recommended by gypsum board manufacturer for project conditions.
 - 1. Fiberglass Tape: 2 inch (50 mm) wide, coated glass fiber tape for joints and corners, except as otherwise indicated.
 - 2. Joint Compound: Setting type, field-mixed.
- F. Screws for Fastening of Gypsum Panel Products to Cold-Formed Steel Studs Less than 0.033 inch (0.84 mm) in Thickness and Wood Members: ASTM C1002; self-piercing tapping screws, corrosion resistant.
- G. Screws for Fastening of Gypsum Panel Products to Steel Members from 0.033 to 0.112 inch (0.84 to 2.84 mm) in Thickness: ASTM C954; steel drill screws, corrosion resistant.
- H. Anchorage to Substrate: Tie wire, nails, screws, and other metal supports, of type and size to suit application; to rigidly secure materials in place.
- I. Exterior Soffit Vents: One piece, perforated, ASTM B221 6063 T5 alloy aluminum, with edge suitable for direct application to gypsum board and manufactured especially for soffit application. Provide continuous vent.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that project conditions are appropriate for work of this section to commence.

3.02 SHAFT WALL INSTALLATION

- A. Shaft Wall Framing: Install in accordance with manufacturer's installation instructions.
 - 1. Fasten runners to structure with short leg to finished side, using appropriate power-driven fasteners at not more than 24 inches (600 mm) on center.
 - 2. Install studs at spacing required to meet performance requirements.
- B. Shaft Wall Liner: Cut panels to accurate dimension and install sequentially between special friction studs.
 - 1. Seal perimeter of shaft wall and penetrations with acoustical sealant.

3.03 FRAMING INSTALLATION

- A. Metal Framing: Install in accordance with ASTM C754 and manufacturer's instructions.
- B. Suspended Ceilings and Soffits: Space framing and furring members as indicated.
 - 1. Level ceiling system to a tolerance of 1/1200.
 - 2. Laterally brace entire suspension system.
 - 3. Install bracing as required at exterior locations to resist wind uplift.
- C. Studs: Space studs at 16 inches on center (at 406 mm on center).
 - 1. Extend partition framing to structure unless otherwise noted..
 - 2. Partitions Terminating at Structure: Attach extended leg top runner to structure, maintain clearance between top of studs and structure, and brace both flanges of studs with continuous bridging.
- D. Openings: Reinforce openings as required for weight of doors or operable panels, using not less than double studs at jambs.

- E. Standard Wall Furring: Install at concrete and masonry walls scheduled to receive gypsum board, not more than 4 inches (100 mm) from floor and ceiling lines and abutting walls. Secure in place on alternate channel flanges at maximum 24 inches (600 mm) on center.
- F. Acoustic Furring: Install resilient channels at maximum 24 inches (600 mm) on center. Locate joints over framing members.
- G. Furring for Fire Ratings: Install as required for fire resistance ratings indicated and to GA-600 requirements.
- H. Blocking: Install fire-rated wood blocking for support of:
 - 1. Framed openings.
 - 2. Wall mounted cabinets.
 - 3. Plumbing fixtures.
 - 4. Toilet partitions.
 - 5. Toilet accessories.
 - 6. Wall mounted door hardware.
 - 7. Wall mounted marker & tack boards
 - 8. Wall mounted T.V.s, projectors, or projector screens

3.04 ACOUSTIC ACCESSORIES INSTALLATION

- A. Acoustic Insulation: Place tightly within spaces, around cut openings, behind and around electrical and mechanical items within partitions, and tight to items passing through partitions.
- B. Acoustic Sealant: Install in accordance with manufacturer's instructions.
 - 1. Place one bead continuously on substrate before installation of perimeter framing members.
 - 2. Place continuous bead at perimeter of each layer of gypsum board.
 - 3. Seal around all penetrations by conduit, pipe, ducts, and rough-in boxes, except where firestopping is provided.

3.05 BOARD INSTALLATION

- A. Comply with ASTM C840, GA-216, and manufacturer's instructions. Install to minimize butt end joints, especially in highly visible locations.
- B. Single-Layer Non-Rated: Install gypsum board in most economical direction, with ends and edges occurring over firm bearing.
 - 1. Exception: Tapered edges to receive joint treatment at right angles to framing.
- C. Fire-Rated Construction: Install gypsum board in strict compliance with requirements of assembly listing.
- D. Exposed Gypsum Board in Interior Wet Areas: Seal joints, cut edges, and holes with waterresistant sealant.
- E. Exterior Sheathing: Comply with ASTM C1280. Install sheathing vertically, with edges butted tight and ends occurring over firm bearing.
 - 1. Seal joints, cut edges, and holes with water-resistant sealant.
 - 2. Paper-Faced Sheathing: Immediately after installation, protect from weather by application of water-resistive barrier.
- F. Exterior Soffits: Install exterior soffit board perpendicular to framing, with staggered end joints over framing members or other solid backing.
 - 1. Seal joints, cut edges, and holes with water resistant sealant.

- G. Cementitious Backing Board: Install over steel framing members and plywood substrate where indicated, in accordance with ANSI A108.11 and manufacturer's instructions.
- H. Installation on Metal Framing: Use screws for attachment of gypsum board except face layer of non-rated double-layer assemblies, which may be installed by means of adhesive lamination.

3.06 INSTALLATION OF TRIM AND ACCESSORIES

- A. Control Joints: Place control joints consistent with lines of building spaces and as indicated.
 - 1. Not more than 30 feet (10 meters) apart on walls and ceilings over 50 feet (16 meters) long.
 - 2. At exterior soffits, not more than 30 feet (10 meters) apart in both directions.
- B. Corner Beads: Install at external corners, using longest practical lengths.
- C. Edge Trim: Install at locations where gypsum board abuts dissimilar materials.
- D. Exterior Soffit Vents: Install according to manufacturer's written instructions and in locations indicated on drawings. Provide vent area specified.

3.07 JOINT TREATMENT

- A. Glass Mat Faced Gypsum Board and Exterior Glass Mat Faced Sheathing: Use fiberglass joint tape, embed and finish with setting type joint compound.
- B. Finish gypsum board in accordance with levels defined in ASTM C840, as follows:
 - 1. Level 4: Walls and ceilings to receive paint finish or wall coverings, unless otherwise indicated.
 - 2. Level 3: Walls to receive textured wall finish.
 - 3. Level 2: In utility areas, behind cabinetry, and on backing board to receive tile finish.
 - 4. Level 1: Fire rated wall areas above finished ceilings, whether or not accessible in the completed construction.
- C. Tape, fill, and sand exposed joints, edges, and corners to produce smooth surface ready to receive finishes.
 - 1. Feather coats of joint compound so that camber is maximum 1/32 inch (0.8 mm).
 - 2. Taping, filling, and sanding is not required at surfaces behind adhesive applied ceramic tile and fixed cabinetry.
 - 3. Taping, filling and sanding is not required at base layer of double layer applications.
- D. Fill and finish joints and corners of cementitious backing board as recommended by manufacturer.

3.08 TOLERANCES

A. Maximum Variation of Finished Gypsum Board Surface from True Flatness: 1/8 inch in 10 feet (3 mm in 3 m) in any direction.

END OF SECTION

SECTION 09 30 00 TILING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Tile for floor applications.
- B. Tile for wall applications.
- C. Ceramic accessories.

1.02 RELATED REQUIREMENTS

- A. Section 07 92 00 Joint Sealants: Sealing joints between tile work and adjacent construction and fixtures.
- B. Section 09 21 16 Gypsum Board Assemblies: Tile backer board.

1.03 REFERENCE STANDARDS

- A. ANSI A108.1a American National Standard Specifications for Installation of Ceramic Tile in the Wet-Set Method, with Portland Cement Mortar 2017.
- B. ANSI A108.1b American National Standard Specifications for Installation of Ceramic Tile on a Cured Portland Cement Mortar Setting Bed with Dry-Set or Latex-Portland Cement Mortar 2017.
- C. ANSI A108.1c Specifications for Contractors Option: Installation of Ceramic Tile in the Wet-Set Method with Portland Cement Mortar or Installation of Ceramic Tile on a Cured Portland Cement Mortar Bed with Dry-Set or Latex-Portland Cement 1999 (Reaffirmed 2016).
- D. ANSI A108.2 American National Standard General Requirements: Materials, Environmental and Workmanship 2019.
- E. ANSI A108.4 American National Standard Specifications for Installation of Ceramic Tile with Organic Adhesives or Water Cleanable Tile-Setting Epoxy Adhesive 2009 (Revised).
- F. ANSI A108.5 American National Standard Specifications for Installation of Ceramic Tile with Dry-Set Portland Cement Mortar or Latex-Portland Cement Mortar 1999 (Reaffirmed 2010).
- G. ANSI A108.6 American National Standard Specifications for Installation of Ceramic Tile with Chemical Resistant, Water Cleanable Tile-Setting and -Grouting Epoxy 1999 (Reaffirmed 2010).
- H. ANSI A108.8 American National Standard Specifications for Installation of Ceramic Tile with Chemical Resistant Furan Resin Mortar and Grout 1999 (Reaffirmed 2010).
- I. ANSI A108.9 American National Standard Specifications for Installation of Ceramic Tile with Modified Epoxy Emulsion Mortar/Grout 1999 (Reaffirmed 2010).
- J. ANSI A108.10 American National Standard Specifications for Installation of Grout in Tilework 2017.
- K. ANSI A108.12 American National Standard for Installation of Ceramic Tile with EGP (Exterior Glue Plywood) Latex-Portland Cement Mortar 1999 (Reaffirmed 2010).
- L. ANSI A108.13 American National Standard for Installation of Load Bearing, Bonded, Waterproof Membranes for Thin-Set Ceramic Tile and Dimension Stone 2005 (Reaffirmed 2016).

- M. ANSI A108.19 American National Standard Specifications for Interior Installation of Gauged Porcelain Tiles and Gauged Porcelain Tile Panels/Slabs by the Thin-Bed Method Bonded with Modified Dry-Set Cement Mortar or Improved Modified Dry-Set Cement Mortar 2020.
- N. ANSI A118.1 American National Standard Specifications for Dry-Set Cement Mortar 2012 (Revised).
- O. ANSI A118.3 American National Standard Specifications for Chemical Resistant, Water Cleanable Tile-Setting and -Grouting Epoxy and Water Cleanable Tile-Setting Epoxy Adhesive 2013 (Revised).
- P. ANSI A118.4 American National Standard Specifications for Modified Dry-Set Cement Mortar 2012 (Revised).
- Q. ANSI A118.7 American National Standard Specifications for High Performance Cement Grouts for Tile Installation 2010 (Reaffirmed 2016).
- R. ANSI A137.1 American National Standard Specifications for Ceramic Tile 2019.
- S. ASTM C373 Standard Test Methods for Determination of Water Absorption and Associated Properties by Vacuum Method for Pressed Ceramic Tiles and Glass Tiles and Boil Method for Extruded Ceramic Tiles and Non-tile Fired Ceramic Whiteware Products 2018.
- T. ASTM C1178/C1178M Standard Specification for Coated Glass Mat Water-Resistant Gypsum Backing Panel 2018.
- U. ASTM F710 Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring 2019, with Editorial Revision (2020).
- V. ASTM F1869 Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride 2016a.
- W. TCNA (HB) Handbook for Ceramic, Glass, and Stone Tile Installation 2019.

1.04 SUBMITTALS

- A. See Section 01 30 00 Administrative Requirements, for submittal procedures.
- B. Product Data: Provide manufacturers' data sheets on tile, mortar, grout, and accessories. Include instructions for using grouts and adhesives.
- C. Shop Drawings: Indicate tile layout, patterns, color arrangement, perimeter conditions, junctions with dissimilar materials, control and expansion joints, thresholds, ceramic accessories, and setting details.
- D. Samples: Mount tile and apply grout on two plywood panels, minimum 18 by 18 inches (457 by 457 mm) in size illustrating pattern, color variations, and grout joint size variations.
- E. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
- F. Master Grade Certificate: Submit for each type of tile, signed by the tile manufacturer and tile installer.
- G. Maintenance Data: Include recommended cleaning methods, cleaning materials, and stain removal methods.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the types of products specified in this section, with minimum five years of documented experience.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Protect adhesives from freezing or overheating in accordance with manufacturer's instructions.

1.07 FIELD CONDITIONS

- A. Do not install solvent-based products in an unventilated environment.
- B. Maintain ambient and substrate temperature above 50 degrees F (10 degrees C) and below 100 degrees F (38 degrees C) during installation and curing of setting materials.

PART 2 PRODUCTS

2.01 TILE

- A. Manufacturers:
 - 1. Giotile: www.giotile.com/#sle
 - 2. Crossville Tile: www.crossvillestudios.com/#sle
 - 3. Substitutions: Not permitted unless product matches basis of design in color, texture, and is approved by the architect.
- B. Quarry Tile: ANSI A137.1 standard grade.
 - 1. Moisture Absorption: 0 to 0.5 percent as tested in accordance with ASTM C373.
 - 2. Size: 6 by 6 inch (152 by 152 mm), nominal.
 - 3. Thickness: 1/2 inch (12.7 mm), nominal.
 - 4. Surface Finish: Unglazed.
 - 5. Color(s): As indicated on drawings.
 - 6. Pattern: Field Tile.
 - 7. Trim Units: Matching cove base shapes in sizes coordinated with field tile.
 - 8. Products:
 - a. Crossville Studios Quarry Basics, www.crossvillestudios.com/#sle..
- C. Porcelain Wall Tile: ANSI A137.1 standard grade.
 - 1. Moisture Absorption: 0 to 0.5 percent as tested in accordance with ASTM C373.
 - 2. Size: As indicated on drawings.
 - 3. Color(s): As indicated on drawings.
 - 4. Pattern: As indicated on drawings.
 - 5. Products:
 - a. Giotile Workshop, www.giotile.com/#sle.

2.02 TRIM AND ACCESSORIES

- A. Metal Trim:Satin Anodized Aluminum, style and dimensions as indicated on drawings, for setting using tile mortar or adhesive.
 - 1. Applications:
 - a. Transition between floor finishes of different heights.
 - b. Thresholds at door openings.
 - 2. Manufacturers:
 - a. Schluter-Systems: www.schluter.com
 - 1) Schluter RENO-TK, AETK
 - (a) Profile with sloped exposed surface, 1/4" (6 mm) deep channel below exposed surface, integrated trapezoid-perforated anchoring leg, and integrated grout joint spacer.
 - (b) Provide with straight anchoring leg
 - 2) Schluter RENO-U
 - (a) Profile with sloped exposed surface, 5/32" (4 mm) tall leading edge, integrated trapezoid-perforated anchoring leg, and integrated grout joint spacer.

2.03 SETTING MATERIALS

- A. Manufacturers:
 - 1. ARDEX Engineered Cements: www.ardexamericas.com.
 - 2. Bostik Inc: www.bostik-us.com.
 - 3. Custom Building Products: www.custombuildingproducts.com.
 - 4. LATICRETE International, Inc: www.laticrete.com/sle.
 - 5. ProSpec, an Oldcastle brand: www.prospec.com.
 - 6. Substitutions: See Section 01 60 00 Product Requirements.
- B. Latex-Portland Cement Mortar Bond Coat: ANSI A118.4.
 - 1. Products:
 - a. ARDEX Engineered Cements; ARDEX X 5: www.ardexamericas.com/#sle.
 - b. Custom Building Products; ProLite Premium Rapid Setting Large Format Tile Mortar, with Multi-Surface Bonding
 - Primer: www.custombuildingproducts.com/#sle.
 - c. Substitutions: See Section 01 60 00 Product Requirements.
- C. Mortar Bed Materials: Pre-packaged mix of Portland cement, sand, latex additive, and water.
 - 1. Products:
 - a. LATICRETE International, Inc; LATICRETE 3701 Fortified Mortar Bed: www.laticrete.com/#sle.
 - b. Proflex Products, Inc; MSI Mud Set Installation: www.proflex.us/#sle.
 - c. Substitutions: See Section 01 60 00 Product Requirements.

2.04 GROUTS

- A. Manufacturers:
 - 1. ARDEX Engineered Cements: www.ardexamericas.com.
 - 2. Bostik Inc: www.bostik-us.com.
 - 3. LATICRETE International, Inc; LATICRETE PERMACOLOR Grout: www.laticrete.com/#sle.
 - 4. Substitutions: See Section 01 60 00 Product Requirements.
- B. High Performance Polymer Modified Grout: ANSI A118.7 polymer modified cement grout.
 - 1. Applications: Use this type of grout where indicated and where no other type of grout is indicated.
 - 2. Use sanded grout for joints 1/8 inch (3.2 mm) wide and larger; use unsanded grout for joints less than 1/8 inch (3.2 mm) wide.
 - 3. Color(s): As indicated on drawings.
- C. Epoxy Grout: ANSI A118.3 chemical resistant and water-cleanable epoxy grout.
 - 1. Applications: All wall and floor tile.
 - 2. Color(s): As indicated on drawings.
 - 3. Products:
 - a. Mapei, www.mapei.com/#sle.

2.05 MAINTENANCE MATERIALS

- A. Tile Sealant: Gunnable, silicone, siliconized acrylic, or urethane sealant; moisture and mildew resistant type.
 - 1. Applications: Between tile and plumbing fixtures.
 - 2. Color(s): As selected by Architect from manufacturer's full line.

- B. Grout Sealer: Liquid-applied, moisture and stain protection for existing or new Portland cement grout.
 - 1. Composition: Water-based colorless silicone.
- C. Tile Sealer: Stain protection for natural stone and concrete tile.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that subfloor surfaces are smooth and flat within the tolerances specified for that type of work and are ready to receive tile.
- B. Verify that wall surfaces are smooth and flat within the tolerances specified for that type of work, are dust-free, and are ready to receive tile.
- C. Verify that subfloor surfaces are dust free and free of substances that could impair bonding of setting materials to subfloor surfaces.

3.02 PREPARATION

- A. Protect surrounding work from damage.
- B. Vacuum clean surfaces and damp clean.
- C. Seal substrate surface cracks with filler. Level existing substrate surfaces to acceptable flatness tolerances.
- D. Prepare substrate surfaces for adhesive installation in accordance with adhesive manufacturer's instructions.

3.03 INSTALLATION - GENERAL

- A. Install tile, thresholds, and stair treads and grout in accordance with applicable requirements of ANSI A108.1a through ANSI A108.19, manufacturer's instructions, and TCNA (HB) recommendations.
- B. Lay tile to pattern indicated on Finish Drawings. Do not interrupt tile pattern through openings.
- C. Cut and fit tile to penetrations through tile, leaving sealant joint space. Form corners and bases neatly. Align floor joints.
- D. Place tile joints uniform in width, subject to variance in tolerance allowed in tile size. Make grout joints without voids, cracks, excess mortar or excess grout, or too little grout.
- E. Form internal angles square and external angles bullnosed.
- F. Install thresholds where indicated.
- G. Sound tile after setting. Replace hollow sounding units.
- H. Keep control and expansion joints free of mortar, grout, and adhesive.
- I. Prior to grouting, allow installation to completely cure; minimum of 48 hours.
- J. Grout tile joints unless otherwise indicated. Use standard grout unless otherwise indicated.
- K. At changes in plane and tile-to-tile control joints, use tile sealant instead of grout, with either bond breaker tape or backer rod as appropriate to prevent three-sided bonding.

3.04 INSTALLATION - FLOORS - THIN-SET METHODS

- A. Over interior concrete substrates, install in accordance with TCNA (HB) Method F113, dry-set or latex-Portland cement bond coat, with standard grout, unless otherwise indicated.
 - 1. Use uncoupling membrane under all tile unless other underlayment is indicated.

- 2. Where waterproofing membrane is indicated, install in accordance with TCNA (HB) Method F122, with latex-Portland cement grout.
- 3. Where epoxy bond coat and grout are indicated, install in accordance with TCNA (HB) Method F131.

3.05 INSTALLATION - WALL TILE

- A. Over cementitious backer units on studs, install in accordance with TCNA (HB) Method W244, using membrane at toilet rooms.
- B. Over coated glass mat backer board on studs, install in accordance with TCNA (HB) Method W245.
- C. Over gypsum wallboard on wood or metal studs install in accordance with TCNA (HB) Method W243, thin-set with dry-set or latex-Portland cement bond coat, unless otherwise indicated.
 - 1. Where mortar bed is indicated, install in accordance with TCNA (HB) Method W222, one coat method.
 - 2. Where waterproofing membrane is indicated other than at showers and bathtub walls, install in accordance with TCNA (HB) Method W222, one coat method.

3.06 CLEANING

A. Clean tile and grout surfaces.

3.07 PROTECTION

A. Do not permit traffic over finished floor surface for 4 days after installation.

END OF SECTION

SECTION 09 51 00 ACOUSTICAL CEILINGS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Suspended metal grid ceiling system.

1.02 REFERENCE STANDARDS

- A. ASTM C635/C635M Standard Specification for the Manufacture, Performance, and Testing of Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings 2017.
- B. ASTM C636/C636M Standard Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-In Panels 2013.
- C. ASTM E580/E580M Standard Practice for Installation of Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels in Areas Subject to Earthquake Ground Motions 2020.
- D. ASTM E1264 Standard Classification for Acoustical Ceiling Products 2019.
- E. CHPS (HPPD) High Performance Products Database Current Edition at www.chps.net/.
- F. NFPA 286 Standard Methods of Fire Tests for Evaluating Contribution of Wall and Ceiling Interior Finish to Room Fire Growth 2019.
- G. UL (GGG) GREENGUARD Gold Certified Products Current Edition.

1.03 SUBMITTALS

- A. See Section 01 30 00 Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Indicate grid layout and related dimensioning.
- C. Product Data: Provide data on suspension system components.
- D. Samples: Submit two samples 4 inch (101.6 mm) in size illustrating material and finish of acoustical units.
- E. Manufacturer's Installation Instructions: Indicate special procedures.
- F. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
 - 1. See Section 01 60 00 Product Requirements, for additional provisions.
 - 2. Extra Acoustical Units: Quantity equal to 5 percent of total installed.

1.04 FIELD CONDITIONS

A. Maintain uniform temperature of minimum 60 degrees F (16 degrees C), and maximum humidity of 40 percent prior to, during, and after acoustical unit installation.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Acoustic Tiles/Panels:
 - 1. CertainTeed Corporation: www.certainteed.com.
 - 2. Substitutions: Not permitted unless product matches basis of design in color, texture and is approved by the architect.
- B. Suspension Systems:
 - 1. Same as for acoustical units.

2.02 ACOUSTICAL UNITS

A. Acoustical Units - General: ASTM E1264, Class A.

- 1. Units for Installation in Fire-Rated Suspension System: Listed and classified for the fire-resistive assembly as part of suspension system.
- 2. VOC Content: As specified in Section 01 61 16.
- 3. VOC Content: Certified as Low Emission by one of the following:
 - a. Product listing in UL (GGG).
 - b. Product listing in CHPS (HPPD).
- B. Products:
 - 1. As indicated on drawings.

2.03 SUSPENSION SYSTEM(S)

A. Metal Suspension Systems - General: Complying with ASTM C635/C635M; die cut and interlocking components, with stabilizer bars, clips, splices, perimeter moldings, and hold down clips as required.

2.04 ACCESSORIES

- A. Support Channels and Hangers: Galvanized steel; size and type to suit application, seismic requirements, and ceiling system flatness requirement specified.
- B. Perimeter Moldings: Same material and finish as grid.
 - 1. At Exposed Grid: Provide L-shaped molding for mounting at same elevation as face of grid.
 - 2. At Concealed Grid: Provide concealed molding.
- C. Acoustical Sealant For Perimeter Moldings: Non-hardening, non-skinning, for use in conjunction with suspended ceiling system.
- D. Touch-up Paint: Type and color to match acoustical and grid units.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Verify that layout of hangers will not interfere with other work.

3.02 INSTALLATION - SUSPENSION SYSTEM

- A. Install suspension system in accordance with ASTM C636/C636M, ASTM E580/E580M, and manufacturer's instructions and as supplemented in this section.
- B. Rigidly secure system, including integral mechanical and electrical components, for maximum deflection of 1:360.
- C. Locate system on room axis according to reflected plan.
- D. Install after major above-ceiling work is complete. Coordinate the location of hangers with other work.
- E. Hang suspension system independent of walls, columns, ducts, pipes and conduit. Where carrying members are spliced, avoid visible displacement of face plane of adjacent members.
- F. Where ducts or other equipment prevent the regular spacing of hangers, reinforce the nearest affected hangers and related carrying channels to span the extra distance.
- G. Do not support components on main runners or cross runners if weight causes total dead load to exceed deflection capability.
- H. Do not eccentrically load system or induce rotation of runners.

- I. Perimeter Molding: Install at intersection of ceiling and vertical surfaces and at junctions with other interruptions.
 - 1. Install in bed of acoustical sealant.
 - 2. Use longest practical lengths.
 - 3. Overlap corners.
- J. Form expansion joints as detailed. Form to accommodate plus or minus 1 inch (25 mm) movement. Maintain visual closure.

3.03 INSTALLATION - ACOUSTICAL UNITS

- A. Install acoustical units in accordance with manufacturer's instructions.
- B. Fit acoustical units in place, free from damaged edges or other defects detrimental to appearance and function.
- C. Fit border trim neatly against abutting surfaces.
- D. Install units after above-ceiling work is complete.
- E. Install acoustical units level, in uniform plane, and free from twist, warp, and dents.
- F. Cutting Acoustical Units:
 - 1. Make field cut edges of same profile as factory edges.
- G. Where round obstructions occur, provide preformed closures to match perimeter molding.
- H. Install hold-down clips on each panel to retain panels tight to grid system; comply with fire rating requirements.

3.04 TOLERANCES

- A. Maximum Variation from Flat and Level Surface: 1/8 inch in 10 feet (3 mm in 3 m).
- B. Maximum Variation from Plumb of Grid Members Caused by Eccentric Loads: 2 degrees.

END OF SECTION

SECTION 09 65 00 RESILIENT FLOORING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Resilient tile flooring.
- B. Resilient base.
- C. Resilient stair accessories.
- D. Installation accessories.

1.02 REFERENCE STANDARDS

- A. ASTM D6329 Standard Guide for Developing Methodology for Evaluating the Ability of Indoor Materials to Support Microbial Growth Using Static Environmental Chambers 1998 (Reapproved 2015).
- B. ASTM E492 Standard Test Method for Laboratory Measurement of Impact Sound Transmission Through Floor-Ceiling Assemblies Using the Tapping Machine 2009, with Editorial Revision (2016).
- C. ASTM E648 Standard Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source 2019a, with Editorial Revision (2020).
- D. ASTM F710 Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring 2019, with Editorial Revision (2020).
- E. ASTM F1066 Standard Specification for Vinyl Composition Floor Tile 2004 (Reapproved 2018).
- F. ASTM F1861 Standard Specification for Resilient Wall Base 2021.
- G. ASTM F2169 Standard Specification for Resilient Stair Treads 2015 (Reapproved 2020).
- H. NFPA 253 Standard Method of Test for Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source 2019.
- I. NSF 332 Sustainability Assessment for Resilient Floor Coverings 2015.

1.03 SUBMITTALS

- A. See Section 01 30 00 Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on specified products, describing physical and performance characteristics; including sizes, patterns and colors available; and installation instructions.
- C. Shop Drawings: Indicate seaming plans and floor patterns.
- D. Selection Samples: Submit manufacturer's complete set of color samples for Architect's initial selection.
- E. Certification: Prior to installation of flooring, submit written certification by flooring manufacturer and adhesive manufacturer that condition of sub-floor is acceptable.
- F. Maintenance Data: Include maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning, stripping, and re-waxing.
- G. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
 - 1. See Section 01 60 00 Product Requirements, for additional provisions.
 - 2. Extra Flooring Material:Quantity equivalent to 5 percent of each type and color.
 - 3. Extra Stair Materials: Quantity equivalent to 5 percent of each type and color.

H. Warranty: Provide sample manufacturer warranty.

1.04 DELIVERY, STORAGE, AND HANDLING

- A. Upon receipt, immediately remove any shrink-wrap and check materials for damage and the correct style, color, quantity and run numbers.
- B. Store all materials off of the floor in an acclimatized, weather-tight space.
- C. Maintain temperature in storage area between 55 degrees F (13 degrees C) and 85 degrees F (29 degrees C).

1.05 FIELD CONDITIONS

- A. Install resilient products after other finishing operations, including painting, have been completed.
- B. Maintain ambient temperatures within range recommended by manufacturer, but not less than 65 deg F (18 deg C) or more than 85 deg F (29 deg C) in spaces to receive resilient products during the following time periods:
 - 1. 48 hours before installation
 - 2. During installation
 - 3. 48 hours after installation
- C. Maintain the ambient relative humidity between 40% and 60% during installation.
- D. Until substantial completion, maintain ambient temperatures within range recommended by manufacturer, but not less than 55 dg F (13 deg C) or more than 85 deg F (29 deg C).

PART 2 PRODUCTS

2.01 TILE FLOORING

- A. Resilient Vinyl Enhanced Tile Flooring
 - 1. Color Essence Resilient Vinyl Enhanced Tile Flooring with the following physical characteristics:
 - a. Complies with requirements for ASTM F 1066, Class 3 (Surface Pattern) Standard Specification for Vinyl Composition Floor Tile
 - b. Wear layer/Overall thickness: 1/8" (3.2 mm)
 - c. Tile size: 12" x 12" (30.5 x 30.5 cm)
 - d. Color: As indicated on drawings.
 - e. Installation: As indicated on drawings.
 - f. Slip Resistance: ADA Compliant
 - g. Polyurethane Reinforced wear surface with Tritonite Finish
 - h. ASTM F 970, Standard Test Method for Static Load Limit 400 PSI (modified for higher load)
 - i. ASTM E 648, Standard Test method for Critical Radiant Flux of 0.45 watts/cm2 or greater, Class I
 - j. Warranty: 10 year Manufacturer's Warranty
 - k. Color Essence is available as slip resistant tile
 - 1. Color Essence may be installed with Tarkett 800 Pressure Sensitive Adhesive.

2.02 STAIR COVERING

- A. Stair Treads with Integral Risers: Rubber; full height of riser, full width and depth of tread in one piece; tapered thickness.
 - 1. Manufacturers:

- a. Basis of Design: Johnsonite, a Tarkett Company; Raise Round: www.johnsonite.com.
- b. Substitutions: See Section 01 60 00 Product Requirements.
- 2. Minimum Requirements: Comply with ASTM F2169, Type TS, rubber, vulcanized thermoset.
- 3. Critical Radiant Flux (CRF): Minimum 0.45 watt per square centimeter, when tested in accordance with ASTM E648 or NFPA 253.
- 4. Nominal Thickness: 210" inch (5.33 mm) to .153" (3.89 mm) tapered.
- 5. Nosing: Square.
- 6. Color: As indicated on drawings.

2.03 RESILIENT BASE

- A. Resilient Base: Type TP, rubber, thermoplastic; top set Style B, Cove.
 - 1. Manufacturers:
 - a. Basis of Design: Johnsonite, a Tarkett Company: www.johnsonite.com.
 - b. Substitutions: Not permitted.
 - 2. Critical Radiant Flux (CRF): Minimum 0.45 watt per square centimeter, when tested in accordance with ASTM E648 or NFPA 253.
 - 3. Height: 4 inch (100 mm).
 - 4. Height at Lockers: 6 inch (150mm).
 - 5. Thickness: 0.125 inch (3.2 mm).
 - 6. Finish: Satin.
 - 7. Length: Roll.
 - 8. Style: As indicated on drawings.
 - 9. Color: As indicated on drawings.

2.04 ACCESSORIES

- A. Subfloor Filler: White premix latex; type recommended by adhesive material manufacturer.
- B. Primers, Adhesives, and Seam Sealer: Waterproof; types recommended by flooring manufacturer.
- C. Moldings, Transition and Edge Strips: As indicated on drawings.
- D. Floor Polish for Static Control Flooring: Fluid-applied polish, intended to protect electrical properties of flooring, as recommended by static control flooring manufacturer.
- E. Sealer and Wax: Types recommended by flooring manufacturer.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that surfaces are flat to tolerances acceptable to flooring manufacturer, free of cracks that might telegraph through flooring, clean, dry, and free of curing compounds, surface hardeners, and other chemicals that might interfere with bonding of flooring to substrate.
- B. Verify that wall surfaces are smooth and flat within the tolerances specified for that type of work, are dust-free, and are ready to receive resilient base.
- C. Cementitious Sub-floor Surfaces: Verify that substrates are dry enough and ready for resilient flooring installation by testing for moisture and pH.
 - 1. Test in accordance with ASTM F710.
 - 2. Obtain instructions if test results are not within limits recommended by resilient flooring manufacturer and adhesive materials manufacturer.

D. Verify that required floor-mounted utilities are in correct location.

3.02 PREPARATION

- A. Prepare floor substrates as recommended by flooring and adhesive manufacturers.
- B. Remove sub-floor ridges and bumps. Fill minor low spots, cracks, joints, holes, and other defects with sub-floor filler to achieve smooth, flat, hard surface.
- C. Prohibit traffic until filler is fully cured.
- D. Clean substrate.

3.03 INSTALLATION - GENERAL

- A. Starting installation constitutes acceptance of sub-floor conditions.
- B. Install in accordance with manufacturer's written instructions.Use manufacturer's recommended adhesives.

3.04 INSTALLATION - TILE FLOORING

- A. Mix tile from container to ensure shade variations are consistent when tile is placed, unless otherwise indicated in manufacturer's installation instructions.
- B. Lay flooring with joints and seams parallel to building lines to produce symmetrical pattern.
- C. Trowelable Leveling and Patching Compounds: Latex-modified, Portland cement based or blended hydraulic-cement-based formulation.
- D. Adhesives: As recommended by manufacturer.

3.05 INSTALLATION - RESILIENT BASE

- A. Fit joints tightly and make vertical. Maintain minimum dimension of 18 inches (45 mm) between joints.
- B. Miter internal corners. At external corners, use premolded units. At exposed ends, use premolded units.
- C. Install base on solid backing. Bond tightly to wall and floor surfaces.
- D. Scribe and fit to door frames and other interruptions.

3.06 INSTALLATION - STAIR COVERINGS

- A. Install stair coverings in one piece for full width and depth of tread.
- B. Adhesives: As recommended by manufacturer.
- C. Adhere over entire surface. Fit accurately and securely.

3.07 CLEANING

- A. Remove excess adhesive from floor, base, and wall surfaces without damage.
- B. Clean, seal, and wax in accordance with manufacturer's written instructions. Provide 5 Coats of wax to VCT flooring.
- C. Perform the following operations immediately after completing resilient product installation:
 - 1. Remove adhesive and other blemishes from exposed surfaces.
 - 2. Sweep and vacuum surfaces thoroughly.
 - 3. Damp-mop surfaces to remove marks and soil.
- D. Wait 72 hours after installation before performing initial cleaning
- E. Begin regular maintenance program after the initial cleaning.

3.08 PROTECTION

- A. Prohibit traffic on resilient flooring for 24 hours after installation.
- B. Protect resilient products from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.
- C. Prohibit heavy traffic, rolling loads, or furniture placement on resilient flooring for 72 hours after installation.

END OF SECTION

SECTION 09 84 30 SOUND-ABSORBING WALL AND CEILING UNITS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Sound-absorbing panels.
- B. Mounting accessories.

1.02 REFERENCE STANDARDS

A. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials 2021a.

1.03 SUBMITTALS

- A. See Section 01 30 00 Administrative Requirements, for submittal procedures.
- B. Product Data: Manufacturer's printed data sheets for products specified.
- C. Shop Drawings: Fabrication and installation details, panel layout, and fabric orientation.
- D. Selection Samples: Manufacturer's color charts for fabric covering, indicating full range of fabrics, colors, and patterns available.

1.04 DELIVERY, STORAGE, AND HANDLING

- A. Protect acoustical units from moisture during shipment, storage, and handling. Deliver in factory-wrapped bundles; do not open bundles until units are needed for installation.
- B. Store units flat, in dry, well-ventilated space; do not stand on end.
- C. Protect edges from damage.

PART 2 PRODUCTS

2.01 FABRIC-COVERED SOUND-ABSORBING UNITS

- A. Manufacturers:
 - 1. Basis of Design: Owens Corning Conwed Designscape: www.conweddesignscape.com/#sle.
 - 2. TECHLITE; Accent Fabric Wrapped Panels: www.techlite.com/#sle.
 - 3. Substitutions: See Section 01 60 00 Product Requirements.
- B. Sound Absorbing Units: Prefinished, factory assembled fabric-covered panels.
 - 1. Surface Burning Characteristics: Flame spread index of 25 or less and smoke developed index of 450 or less, when tested in accordance with ASTM E84.
- C. Fabric-Covered Acoustical Panels for Walls and Ceilings:
 - Panel Core: Manufacturer's standard rigid or semi-rigid fiberglass core.
 a. Facing: 1/16 inch (1.6 mm) impact-resistant surface laminated to core.
 - 2. Panel Size: As indicated on drawings.
 - 3. Panel Thickness: As required to meet required acoustical performance.
 - 4. Edges: Perimeter edges reinforced by a formulated resin hardener.
 - 5. Fabric: IFR Xorel.
 - 6. Color: As indicated on drawings.
 - 7. Patterns: Where fabric with directional or repeating patterns or fabric with directional weave is used, mark for installation in same direction.
 - 8. Mounting Method: Direct applied with adhesive.
2.02 FABRICATION

- A. Fabric Wrapped, General: Fabricate panels to sizes and configurations as indicated, with fabric facing installed without sagging, wrinkles, blisters, or visible seams.
- B. Tolerances: Fabricate to finished tolerance of plus or minus 1/16 inch (1.6 mm) for thickness, overall length and width, and squareness from corner to corner.

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine substrates for conditions detrimental to installation of acoustical units. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 INSTALLATION

- A. Install acoustical units in locations as indicated, following manufacturer's installation instructions.
- B. Align panels accurately, with edges plumb and top edges level. Scribe to fit accurately at adjoining work and penetrations.

3.03 CLEANING

A. Clean fabric facing upon completion of installation from dust and other foreign materials, following manufacturer's instructions.

END OF SECTION

SECTION 09 90 00 PAINTING AND COATING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Surface preparation.
- B. Field application of paints, stains, varnishes, and other coatings.
- C. Scope: Finish all interior and exterior surfaces exposed to view, unless fully factory-finished and unless otherwise indicated, including the following:
 - 1. Both sides and edges of plywood backboards for electrical and telecom equipment before installing equipment.
 - 2. Elevator pit ladders.
 - 3. Exposed surfaces of steel lintels and ledge angles.
 - 4. Surfaces inside cabinets.
 - 5. Prime surfaces to receive wall coverings.
 - 6. Mechanical and Electrical:
 - a. In finished areas, paint all insulated and exposed pipes, conduit, boxes, insulated and exposed ducts, hangers, brackets, collars and supports, mechanical equipment, and electrical equipment, unless otherwise indicated.
 - b. On the roof and outdoors, paint all equipment that is exposed to weather or to view, including that which is factory-finished.
 - c. Paint interior surfaces of air ducts and convector and baseboard heating cabinets that are visible through grilles and louvers with one coat of flat black paint to visible surfaces.
 - d. Paint dampers exposed behind louvers, grilles, and convector and baseboard cabinets to match face panels.
- D. Do Not Paint or Finish the Following Items:
 - 1. Items fully factory-finished unless specifically so indicated; materials and products having factory-applied primers are not considered factory finished.
 - 2. Items indicated to receive other finishes.
 - 3. Items indicated to remain unfinished.
 - 4. Fire rating labels, equipment serial number and capacity labels, and operating parts of equipment.
 - 5. Non-metallic roofing and flashing.
 - 6. Floors, unless specifically so indicated.
 - 7. Ceramic and other tiles.
 - 8. Brick, architectural concrete, cast stone, integrally colored plaster and stucco.
 - 9. Glass.
 - 10. Concealed pipes, ducts, and conduits.

1.2 RELATED REQUIREMENTS

- A. Section 05 50 00 Metal Fabrications: Shop-primed items.
- B. Section 05 51 00 Metal Stairs and Railings: Shop-primed items.

1.3 REFERENCE STANDARDS

- A. 40 CFR 59, Subpart D National Volatile Organic Compound Emission Standards for Architectural Coatings; U.S. Environmental Protection Agency; current edition.
- B. ASTM D4442 Standard Test Methods for Direct Moisture Content Measurement of Wood and Wood-Base Materials; 2007.
- C. GreenSeal GS-11 Paints and Coatings; 2013.

1.4 SUBMITTALS

- A. See Section 01 30 00 Administrative Requirements, for submittal procedures.
- B. Product Data: Provide complete list of all products to be used, with the following information for each:
 - 1. Manufacturer's name, product name and/or catalog number, and general product category (e.g. "alkyd enamel").
 - 2. MPI product number (e.g. MPI #47).
 - 3. Cross-reference to specified paint system(s) product is to be used in; include description of each system.
- C. Samples: Submit three paper "draw down" samples, 8-1/2 by 11 inches in size, illustrating range of colors available for each finishing product specified.
 - 1. Where sheen is specified, submit samples in only that sheen.
- D. Certification: By manufacturer that all paints and coatings comply with VOC limits specified.
- E. Certification: By manufacturer that all paints and coatings do not contain any of the prohibited chemicals specified; GreenSeal GS-11 certification is not required but if provided shall constitute acceptable certification.
- F. Manufacturer's Instructions: Indicate special surface preparation procedures.
- G. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
 - 1. See Section 01 60 00 Product Requirements, for additional provisions.
 - 2. Extra Paint and Coatings: 1 gallon of each color; store where directed.
 - 3. Label each container with color in addition to the manufacturer's label.

1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified, with minimum three years documented experience.
- B. Applicator Qualifications: Company specializing in performing the type of work specified with minimum three years experience.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.

- B. Container Label: Include manufacturer's name, type of paint, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.
- C. Paint Materials: Store at minimum ambient temperature of 45 degrees F and a maximum of 90 degrees F, in ventilated area, and as required by manufacturer's instructions.

1.7 FIELD CONDITIONS

- A. Do not apply materials when surface and ambient temperatures are outside the temperature ranges required by the paint product manufacturer.
- B. Follow manufacturer's recommended procedures for producing best results, including testing of substrates, moisture in substrates, and humidity and temperature limitations.
- C. Do not apply exterior coatings during rain or snow, or when relative humidity is outside the humidity ranges required by the paint product manufacturer.
- D. Minimum Application Temperatures for Latex Paints: 45 degrees F for interiors; 50 degrees F for exterior; unless required otherwise by manufacturer's instructions.
- E. Minimum Application Temperature for Varnish Finishes: 65 degrees F for interior or exterior, unless required otherwise by manufacturer's instructions.
- F. Provide lighting level of 80 ft candles measured mid-height at substrate surface.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Provide all paint and coating products used in any individual system from the same manufacturer; no exceptions.
- B. Paints:
 - 1. Benjamin Moore & Co: www.benjaminmoore.com/#sle.
 - 2. PPG Paints: www.ppgpaints.com/#sle.
 - 3. Sherwin-Williams Company: www.sherwin-williams.com/#sle.
- C. Primer Sealers: Same manufacturer as top coats.
- D. Block Fillers: Same manufacturer as top coats.
- E. Substitutions: See Section 01 60 00 Product Requirements.

2.2 PAINTS AND COATINGS - GENERAL

A. Paints and Coatings: Ready mixed, unless intended to be a field-catalyzed coating.

- 1. Provide paints and coatings of a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating, with good flow and brushing properties, and capable of drying or curing free of streaks or sags.
- 2. Supply each coating material in quantity required to complete entire project's work from a single production run.
- 3. Do not reduce, thin, or dilute coatings or add materials to coatings unless such procedure is specifically described in manufacturer's product instructions.
- B. Primers: As follows unless other primer is required or recommended by manufacturer of top coats; where the manufacturer offers options on primers for a particular substrate, use primer categorized as "best" by the manufacturer.
 - 1. Gypsum Board: Interior Institutional Low Odor/VOC Primer Sealer; MPI #149.
 - 2. Concrete: Interior Institutional Low Odor/VOC Primer Sealer; MPI #149.
 - 3. Concrete Masonry: Interior/Exterior Latex Block Filler; MPI #4.
 - 4. Wood: Interior Alkyd Primer Sealer; MPI #45.
 - 5. Steel, Uncoated: Interior Rust-Inhibitive Water Based Primer; MPI #107.
 - 6. Steel -- Shop Primer: Interior/Exterior Quick Dry Alkyd Primer for Metal; MPI #76.
 - 7. Galvanized Steel: Interior Water Based Galvanized Primer; MPI #134.
 - 8. Aluminum: Interior/Exterior Quick Dry Primer for Aluminum; MPI #95.
- C. Volatile Organic Compound (VOC) Content:
 - Provide coatings that comply with the most stringent requirements specified in the following:

 40 CFR 59, Subpart D--National Volatile Organic Compound Emission Standards for Architectural Coatings.
 - 2. Determination of VOC Content: Testing and calculation in accordance with 40 CFR 59, Subpart D (EPA Method 24), exclusive of colorants added to a tint base and water added at project site; or other method acceptable to authorities having jurisdiction.
- D. Sheens: Provide the sheens specified; where sheen is not specified, sheen will be selected later by Architect from the manufacturer's full line.
- E. Colors: To be selected from manufacturer's full range of available colors.
 - 1. Selection to be made by Architect after award of contract.
 - 2. In finished areas, finish pipes, ducts, conduit, and equipment the same color as the wall/ceiling they are mounted on/under.
 - 3. In utility areas, finish equipment, piping, conduit, and exposed duct work in colors according to the color coding scheme indicated.

2.3 PAINT SYSTEMS - EXTERIOR

- A. Paint E-OP All Exterior Surfaces Indicated to be Painted, Unless Otherwise Indicated: Including concrete, concrete masonry, primed wood, and primed metal.
 - 1. Preparation as specified by manufacturer.
 - 2. Two top coats and one coat primer recommended by manufacturer.
 - 3. Semi-Gloss: MPI gloss level 5; use this sheen at all locations.
- B. Paint CE-OP-2A Masonry/Concrete, Opaque, Alkyd, 2 Coat:
 - 1. Two coats of block filler.

- 2. Semi-gloss: One coat of alkyd enamel.
- C. Paint ME-OP-3A Ferrous Metals, Unprimed, Alkyd, 3 Coat:
 - 1. One coat of alkyd primer.
 - 2. Semi-gloss: Two coats of alkyd enamel.
- D. Paint ME-OP-2A Ferrous Metals, Primed, Alkyd, 2 Coat:
 - 1. Touch-up with rust-inhibitive primer recommended by top coat manufacturer.
 - 2. Semi-gloss: Two coats of alkyd enamel.
- E. Paint MgE-OP-3A Galvanized Metals, Alkyd, 3 Coat:
 - 1. One coat galvanize primer.
 - 2. Semi-gloss: Two coats of alkyd enamel.
- F. Paint MaE-OP-3A Aluminum , Unprimed, Alkyd, 3 Coat:
 - 1. One coat etching primer.
 - 2. Semi-gloss: Two coats of alkyd enamel.
- G. Paint E-Pav Pavement Marking Paint:
 - 1. Yellow: One coat, with reflective particles .
 - 2. White: One coat, with reflective particles .

2.4 PAINT SYSTEMS - INTERIOR

- A. Paint I-OP All Interior Surfaces Indicated to be Painted, Unless Otherwise Indicated: Including gypsum board, concrete, concrete masonry, brick, wood, plaster, uncoated steel, shop primed steel, galvanized steel, and aluminum.
 - 1. Two top coats and one coat primer.
 - 2. Primer(s): As recommended by manufacturer of top coats.
- B. Paint I-OP-MD-DT Medium Duty Door/Trim: For surfaces subject to frequent contact by occupants, including metals and wood:
 - 1. Medium duty applications include doors, door frames, railings, handrails, guardrails, and balustrades.
 - 2. Two top coats and one coat primer.
 - 3. Top Coat(s): Interior Epoxy-Modified Latex; MPI #115, 215.
 - 4. Semi-Gloss: MPI gloss level 5; use this sheen at all locations.
 - 5. Primer(s): As recommended by manufacturer of top coats.
- C. Paint I-OP-MD-WC Medium Duty Vertical/Overhead: Including gypsum board, plaster, concrete, concrete masonry, uncoated steel, shop primed steel, galvanized steel, and aluminum.
 - 1. Two top coats and one coat primer.
 - 2. Top Coat(s): Institutional Low Odor/VOC Interior Latex; MPI #143-148.
 - 3. Eggshell: MPI gloss level 3; use this sheen at all locations.
 - 4. Primer(s): As recommended by manufacturer of top coats.

- D. Paint I-OP-DF Dry Fall: Metals; exposed structure and overhead-mounted services where painted exposed structure is scheduled, including shop primed steel deck, structural steel, metal fabrications, galvanized ducts, galvanized conduit, and galvanized piping.
 - 1. Shop primer by others.
 - 2. One top coat; white.
 - 3. Top Coat: Latex Dry Fall; MPI #118, 155, 226.
 - 4. Flat: MPI gloss level 1; use this sheen at all locations.
- E. Paint I-TR -W Transparent Finish on Wood, Unless Otherwise Indicated:
 - 1. 2 top coats over stain.
 - 2. Stain: Semi-Transparent Stain for Wood; MPI #90.
 - 3. Top Coat(s): Polyurethane Varnish, Moisture Cured, Gloss; MPI #31.
 - 4. Gloss: MPI gloss level 6; use this sheen at all locations.
- F. Paint WI-OP-3L Wood, Opaque, Latex, 3 Coat:
 - 1. One coat of latex primer sealer.
 - 2. Semi-gloss: Two coats of latex enamel.
- G. Paint CI-OP-3L Concrete/Masonry, Opaque, Latex, 3 Coat:
 - 1. Two coats of block filler.
 - 2. Semi-gloss: Two coats of latex enamel.
- H. Paint MI-OP-3L Ferrous Metals, Unprimed, Latex, 3 Coat:
 - 1. One coat of latex primer.
 - 2. Semi-gloss: Two coats of latex enamel.
- I. Paint MI-OP-2L Ferrous Metals, Primed, Latex, 2 Coat:
 - 1. Touch-up with latex primer.
 - 2. Semi-gloss: Two coats of latex enamel.
- J. Paint MaI-OP-3L Aluminum, Unprimed, Latex, 3 Coat:
 - 1. One coat etching primer.
 - 2. Semi-gloss: Two coats of latex enamel.
- K. Paint CI-OP-3E Concrete/Masonry, Epoxy Enamel, 3 Coat:
 - 1. One coat of catalyzed epoxy primer.
 - 2. Gloss: Two coats of catalyzed epoxy enamel.
- L. Paint GI-OP-3L Gypsum Board/Plaster, Latex, 3 Coat:
 - 1. One coat of alkyd primer sealer.
 - 2. Eggshell: Two coats of latex enamel.

- 3. Vehicle Type: 100% Acrylic.
- 4. Pigment Type: Titanium Dioxide.
- 5. Volume Solids: 40%.
- 6. Coverage per quart at Recommended Film Thickness: a. 100 – 110 Sq. Ft.
- 7. Recommended Film Thickness:
 - a. Wet: 3.8 mils.
 - b. Dry: 1.5 mils.
- 8. Viscosity: 95 ± 2 KU.
- 9. Flash Point: None.
- 10. Gloss / Sheen: Eggshell.
- 11. Thin With Clean Water

2.5 ACCESSORY MATERIALS

- A. Accessory Materials: Provide all primers, sealers, cleaning agents, cleaning cloths, sanding materials, and clean-up materials required to achieve the finishes specified whether specifically indicated or not; commercial quality.
- B. Patching Material: Latex filler.
- C. Fastener Head Cover Material: Latex filler.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Do not begin application of coatings until substrates have been properly prepared.
- B. Verify that surfaces are ready to receive work as instructed by the product manufacturer.
- C. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially affect proper application.
- D. Test shop-applied primer for compatibility with subsequent cover materials.
- E. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes unless moisture content of surfaces are below the following maximums:
 - 1. Gypsum Wallboard: 12 percent.
 - 2. Plaster and Stucco: 12 percent.
 - 3. Masonry, Concrete, and Concrete Unit Masonry: 12 percent.
 - 4. Interior Wood: 15 percent, measured in accordance with ASTM D4442.

3.2 **PREPARATION**

- A. Clean surfaces thoroughly and correct defects prior to coating application.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
- C. Remove or mask surface appurtenances, including electrical plates, hardware, light fixture trim, escutcheons, and fittings, prior to preparing surfaces or finishing.
- D. Seal surfaces that might cause bleed through or staining of topcoat.
- E. Remove mildew from impervious surfaces by scrubbing with solution of tetra-sodium phosphate and bleach. Rinse with clean water and allow surface to dry.
- F. Concrete and Unit Masonry Surfaces to be Painted: Remove dirt, loose mortar, scale, salt or alkali powder, and other foreign matter. Remove oil and grease with a solution of tri-sodium phosphate; rinse well and allow to dry. Remove stains caused by weathering of corroding metals with a solution of sodium metasilicate after thoroughly wetting with water. Allow to dry.
- G. Gypsum Board Surfaces to be Painted: Fill minor defects with filler compound. Spot prime defects after repair.
- H. Plaster Surfaces to be Painted: Fill hairline cracks, small holes, and imperfections with latex patching plaster. Make smooth and flush with adjacent surfaces. Wash and neutralize high alkali surfaces.
- I. Aluminum Surfaces to be Painted: Remove surface contamination by steam or high pressure water. Remove oxidation with acid etch and solvent washing. Apply etching primer immediately following cleaning.

- J. Galvanized Surfaces to be Painted: Remove surface contamination and oils and wash with solvent. Apply coat of etching primer.
- K. Corroded Steel and Iron Surfaces to be Painted: Prepare using at least SSPC-SP 2 (hand tool cleaning) or SSPC-SP 3 (power tool cleaning) followed by SSPC-SP 1 (solvent cleaning).
- L. Uncorroded Uncoated Steel and Iron Surfaces to be Painted: Remove grease, mill scale, weld splatter, dirt, and rust. Where heavy coatings of scale are evident, remove by hand or power tool wire brushing or sandblasting; clean by washing with solvent. Apply a treatment of phosphoric acid solution, ensuring weld joints, bolts, and nuts are similarly cleaned. Prime paint entire surface; spot prime after repairs.
- M. Shop-Primed Steel Surfaces to be Finish Painted: Sand and scrape to remove loose primer and rust. Feather edges to make touch-up patches inconspicuous. Clean surfaces with solvent. Prime bare steel surfaces. Re-prime entire shop-primed item.
- N. Interior Wood Surfaces to Receive Opaque Finish: Wipe off dust and grit prior to priming. Seal knots, pitch streaks, and sappy sections with sealer. Fill nail holes and cracks after primer has dried; sand between coats. Back prime concealed surfaces before installation.
- O. Interior Wood Surfaces to Receive Transparent Finish: Wipe off dust and grit prior to sealing, seal knots, pitch streaks, and sappy sections with sealer. Fill nail holes and cracks after sealer has dried; sand lightly between coats. Prime concealed surfaces with gloss varnish reduced 25 percent with thinner.

3.3 APPLICATION

- A. Remove unfinished louvers, grilles, covers, and access panels on mechanical and electrical components and paint separately.
- B. Apply products in accordance with manufacturer's instructions.
- C. Do not apply finishes to surfaces that are not dry. Allow applied coats to dry before next coat is applied.
- D. Apply each coat to uniform appearance.
- E. Sand wood and metal surfaces lightly between coats to achieve required finish.
- F. Vacuum clean surfaces of loose particles. Use tack cloth to remove dust and particles just prior to applying next coat.
- G. Wood to Receive Transparent Finishes: Tint fillers to match wood. Work fillers into the grain before set. Wipe excess from surface.
- H. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.

3.4 CLEANING

A. Collect waste material that could constitute a fire hazard, place in closed metal containers, and remove daily from site.

3.5 **PROTECTION**

- A. Protect finished coatings until completion of project.
- B. Touch-up damaged coatings after Substantial Completion.

END OF SECTION

SECTION 10 14 00 SIGNAGE

PART 1 – GENERAL

1.01 RELATED DOCUMENTS:

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
- B. Related work specified elsewhere includes:
 - 1. Section 01 58 13 Project Signs
 - 2. Section 06 10 00 Section 04 20 00 "Unit Masonry"
 - 3. Divisions 22, 23, and 26 (labels, tags, nameplates, etc., for Plumbing, Mechanical, and Electrical equipment, devices, etc.).

1.02 SUMMARY:

- A. This Section includes the following types of signs:
 - 1. Prefinished Cast Aluminum Plaques (2): To be furnished under Base Bid. Details of cast aluminum plaque to be provided by architect and owner after bid date.
 - 2. Dimensional Letters and Numbers Exterior and any Interior:
 - a. Copy: As indicated on the Drawings.
 - b. Architect and Owner will make final letter style selections, and have final approval prior to any fabrication.
 - c. To be furnished under Base Bid.
 - 3. Framed and Unframed Panel Signs: As designed by manufacturer to comply with U.S. Department of Justice Regulations for the "Americans With Disabilities Act of 2010," (ADA; ADA-AG); ANSI A117.1; the "Uniform Federal Accessibility Standards," (UFAS); applicable codes and standards; And revisions and amendments thereto.
 - a. Design: Integral tactile raised letters, numbers, Braille, and/or graphics, as indicated on the Drawings, or if not indicated, as furnished by Architect after Bid Date.
 - b. Fabricated of acrylic plate with graphics chemically welded to sign face, resulting in a homogeneous end product; Except surface-mounted glued-on graphics, etc., are not acceptable.
 - c. To be furnished under Base Bid.

1.03 SUBMITTALS:

- A. General: Submit the following in accordance with conditions of the contract and Division 1 Specification Sections.
 - 1. Product Data: Include manufacturer's construction details relative to materials, dimensions of individual components, profiles, and finishes for each type of sign required.
 - 2. Shop Drawings: Provide shop drawings for fabrication and erection of signs. Include plans, elevations, and large-scale sections of typical members and other components. Show anchors, grounds, reinforcement, accessories, layout, and installation details.
 - a. Provide message list for each sign required, including large-scale details of wording and layout of lettering, graphics, etc.
 - b. For signs supported by or anchored to permanent construction, provide setting drawings, templates, and directions for installation of anchor bolts and other anchors to be installed as a unit of Work in other Sections.
 - 3. Samples: Provide the following samples of each sign component for initial selection of color, pattern and surface texture as required and for verification of compliance with requirements indicated.
 - a. Cast Acrylic Sheet and Plastic Laminate: Manufacturer's color charts consisting of actual sections of material including the full range of colors available for each material required.
 - 4. Samples for verification of color, pattern, and texture selected, and compliance with requirements indicated:

- a. Cast Acrylic Sheet and Plastic Laminate: Provide a sample panel of a sign intended for use on this project, or of not less than 6-inches by 8-inches for each material indicated. Include a panel for each color, texture, and pattern required. On each panel include a representative sample of the graphic image process required, showing graphic style, and colors and finishes of letters, numbers, and other graphic devices.
- 5. Furnish full-size rubbings for metal plaques for final approval prior to fabrication.

1.04 QUALITY ASSURANCE:

- A. Single-Source Responsibility: For each separate type of sign required, obtain signs from 1-source from a single manufacturer.
- B. Design Criteria: The Drawings, and this Section 10 14 00, indicate sizes, profiles, and dimensional requirements of signs. Other signs with deviations from indicated dimensions and profiles may be considered, provided deviations do not change the design concept. The burden of proof of equality is on the proposer.
- C. Signage Products: Products and installation, etc., under the work of this Section shall be in compliance with the more stringent of applicable provisions of the following; And revisions and amendments thereto:
 - 1. Americans With Disabilities Act of 1990 (ADA) "Accessibility Guidelines" (ADA-AG).
 - 2. "2010 ADA Standards for Accessible Design", Published in the Federal Register September 15, 2010.
 - 3. American National Standards Institute (ANSI), ANSI A 117.1, 2003.
 - 4. "Uniform Federal Accessibility Standards" (UFAS);
 - 5. International Building Code, either the latest edition or latest adopted edition of the locality as applicable at the project locale.

1.05 PROJECT CONDITIONS:

A. Verify project conditions and substrates, coordinate placement of blocking and anchorages, etc., as required for proper execution of the work of this Section 10 14 00.

PART 2 - PRODUCTS

2.01 MANUFACTURERS:

- A. Manufacturers: Subject to compliance with requirements, provide products of one of the following:
 1. Manufacturers of Cast Aluminum Plagues:
 - a. Advance Corporation; Braille-Tac Div
 - b. A. R. K. Ramos.
 - c. Gemini Incorporated.
 - d. Leeds Architectural Letters
 - e. Matthews International Corporation; Bronze Division.
 - f. Metal Arts; Div. of L&H Mfg. Co.
 - g. Mills Manufacturing Company.
 - h. Nelson-Harkins Industries.
 - i. Southwell Company (The).
 - 2. Manufacturers of Panel Signs and Wall Mounted Signs:
 - a. ANDCO
 - b. Diskey Architectural Signage.
 - c. Best Sign Systems.
 - d. ASE Inc. (Basis of Design)
 - e. Mohawk Sign Systems.
 - f. Seton Identification Products.
 - g. Supersign Inc.

2.02 MATERIALS:

A. Aluminum Castings: Provide aluminum castings of alloy and temper recommended by the aluminum producer and finisher for the casting process used and for the use and finish indicated.

- B. Cast Acrylic Sheet: Provide manufacturer's standard methyl methacrylate monomer plastic sheet, in sizes and thicknesses indicated, with a minimum flexural strength of 16,000 psi when tested in accordance with ASTM D 790, a minimum allowable continuous service temperature of 176 deg. F (80 deg. C), and of the following general types or equivalent to products used for standard LA100 Acrylic Process by Leeds Architectural Letters, Inc.:
 - 1. White Translucent Sheet: Where sheet material is indicated as "white," provide white translucent sheet of density required to produce uniform brightness and minimum halation effects.
 - 2. Opaque Sheet: Where sheet material is indicated as "opaque," provide colored opaque acrylic sheet in colors and finishes as selected from the manufacturer's standards.
- C. Fasteners: Use concealed fasteners fabricated from metals that are not corrosive to the sign material and mounting surface.
- D. Anchors and Inserts: Use nonferrous metal or hot-dipped galvanized anchors and inserts for exterior installations and elsewhere as required for corrosion resistance. Use toothed steel or lead expansion bolt devices for drilled-in-place anchors. Furnish inserts, as required, to be set into concrete or masonry work.

2.03 CAST METAL PLAQUES:

- A. Plaques One (1) Required (see sample @ end of this specification): Castings shall be free from pits, scale, sand holes, or other defects. Comply with requirements specified for metal, border style, background texture, and finish and with requirements shown for thickness, size, shape, and copy. Hand-tool and buff borders and raised copy to produce the manufacturer's standard satin polished finish. Refer to "Finish" article for other finish requirements.
 - 1. Metal: Aluminum.
 - 2. Border Style: Double raised line border with plain bevel edge, or equivalent priced border, as selected.
 - 3. Background Texture: Manufacturer's standard pebble texture, or as selected.
 - 4. Background Finish: Provide dark statuary finish (anodized aluminum or baked enamel as selected), to comply with the requirement specified for bronze finishes, except provide background texture specified above in lieu of mechanical finish.
 - 5. Back of Plaques: Seal with manufacturer's standard clear, transparent, and non-yellowing lacquer, or similar finish with same characteristics and acceptable to Architect; Two coats minimum.
 - 6. Size: 24" wide x 36" high minimum.

2.04 PANEL SIGNAGE APPLICATION:

- A. Accessibility Compliance: All signs are required to comply with ADAAG and ANSI/ICC A117.1 and applicable building codes, unless otherwise indicated; in the event of conflicting requirements, comply with the most comprehensive and specific requirements.
- B. Room and Door Signs: Provide a sign for every room, whether it has a door or not, not including corridors, lobbies, and similar open areas. Refer to drawings for sign schedule.
 - 1. Sign Type:
 - a. Interior: 3/16" thick blast-etched equal to ASE model BEFG801 Series
 - b. Exterior: 1/4" thick blast-etched equal to ASE model BEFG802 Series
 - 2. Materials
 - a. Fiberglass plate: Glass reinforced, polymerized unsaturated polyester resin, UV inhibited composite.
 - 1) Resistant to abrasion, stains, solvents, and heat.
 - 2) Exceeds the performance characteristics of NEMA LD 3-1995
 - 3) Non-glare matte finish
 - 4) Flexural strength flat 20,400 psi, in accordance with ASTM D790.
 - 3. A Blast-Etched process shall be used to etch away the background to a depth of 1/32 inch leaving the text, symbols, grade 2 Braille, and borders (if applicable) integral with the sign.

- 4. Room names: Identify with room names and numbers to be determined during the submittal phase, not those shown on the drawings.
- C. Specialized Signs (not included in sign schedule):
 - Style and Type: Same as non-classroom signs, including Braille.
 a. Type AREA OF REFUGE-CORRIDOR SIDE:
- D. Text: STAIR NO. XX

a.

- E. AREA OF REFUGE (selected font color).
- F. Image: Stairs and International Handicap Symbol (blue or white)
- G. Location: Corridor side of each 2nd and 3rd floor stair entry doors.
 - Type AREA OF REFUGE-STAIR SIDE (14" wide x 11" high)
- H. Text: AREA OF REFUGE (selected font color).
- I. Instructions (text to be approved by Owner representative and code official)
 - 1) Directions to find other means of egress.
 - 2. Persons able to use the exit stairway shall do so as soon as possible, unless they are assisting others.
 - 3. Use emergency communication system to summon assistance.
 - 4. Directions for use of the emergency communications system.
- J. Image: International Handicap Symbol (blue or white)
- K. Location: Adjacent to communication device at all stairwells.
 - a. Type EVACUATION (14" wide x 11" high):
- L. Text: EVACUATION PLAN.
- M. Insert: Floor plan copy
- N. Location: Adjacent to each elevator at each landing (3 locations)a. Type EXIT:
- O. Text: EXIT
- P. Image: None
- Q. Locations: Adjacent to ALL exterior exit doors, and adjacent to all interior stair access doors (first, second and third floor).
- R. May be combined with enlarged panel sign for room identification. EXIT text and Braille to occur at bottom of enlarged sign.

2.05 FINISHES:

- A. Colors and Surface Textures: For exposed sign material that requires selection of materials with integral or applied colors, surface textures or other characteristics related to appearance, provide color matches indicated, or if not indicated, as selected by the Architect from the manufacturer's standards.
- B. Metal Finishes: Comply with NAAMM "Metal Finishes Manual" for finish designations and applications recommendations.

PART 3 - EXECUTION

3.01 INSTALLATION:

- A. General: Locate sign units and accessories where indicated, using mounting methods of the type described and in compliance with the manufacturer's written instructions.
 - 1. Install signs level, plumb, and at the height indicated, with sign surfaces free from distortion or other defects in appearance.
 - 2. Coordinate proper placement of treated grounds and blocking by the Contractor.
- B. Cast Metal Plaques: Mount plaques using the standard method recommended by the manufacturer for the type of wall surface indicated.

- 1. Concealed Mounting: Mount the plaques by inserting threaded studs into tapped lugs on the back of the plaque. Set in pre-drilled holes filled with quick-setting cement.
- C. Wall Mounted Panel Signs: Attach panel signs to wall surfaces using the methods indicated below:
 - 1. Adhesive Mounting: Use double-sided vinyl tape where recommended by the sign manufacturer to hold the sign securely in place. Where also recommended or as required by project conditions, use liquid silicone adhesive recommended by the sign manufacturer to attach sign units to irregular, porous, or vinyl-covered surfaces.
 - 2. Mounting height: 60-inches above finished floor (A.F.F.) to top of sign.
- D. Multiple signs shall align side-by-side or stacked vertically, as indicated, or if not indicated, as directed by the Architect.
- E. Dimensional Characters: Mount characters using standard fastening methods to comply with manufacturer's written instructions for character form, type of mounting, wall construction, and condition of exposure indicated. Provide heavy paper template to establish character spacing and to locate holes for fasteners.
 - 1. Projected Mounting: Mount characters at projection distance from wall surface indicated, or if not indicated, 1/2-inch clear of wall.
 - a. Following installation, clean all signs as recommended in writing by manufacturer.
 - 2. Include cleaning and maintenance instructions in Close-Out Documents turned over to Contractor.

END OF SECTION

SECTION 10 1650

TOILET PARTITIONS

PART 1 - GENERAL

1.1 <u>RELATED DOCUMENTS</u>:

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.
- B. Toilet accessories are indicated on the Drawings and specified in Section 10 "Toilet Accessories".

1.2 DESCRIPTION OF WORK:

- A. Extents of toilet partitions and urinal screens are indicated on drawings.
- B. Types of toilet compartments include floor anchored, overhead braced solid plastic polyethelene (HDPE) toilet partitions and screens.

1.3 <u>SUBMITTALS</u>:

- A. Product Data: Submit manufacturer's current detailed technical data for materials, fabrication, and installation, including catalog cuts of anchors, hardware, fastenings, and accessories.
- B. Shop Drawings: Submit shop drawings for fabrication and erection of toilet partition assemblies not fully described by product drawings, templates, and instructions for installation of anchorage devices built into other work.
- C. Samples: Submit full range of physical color samples for each type of unit required.

1.4 **QUALITY ASSURANCE**:

- A. Field Measurements: Take field measurements prior to preparation of shop drawings and fabrication where possible, to insure proper fitting of work. However, allow for adjustments within specified tolerances wherever taking of field measurements before fabrication might delay work.
- B. Coordination: Furnish inserts and anchorages which must be built into other work for installation of toilet partitions and related work; coordinate delivery with other work to avoid delay.

PART 2 – PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS:

- A. Manufacturer: Subject to compliance with requirements, provide products of one of the following:
 - 1. Accurate Partitions Corp.
 - 2. All American Metal Corp.
 - 3. American Sanitary Partition Corp.
 - 4. Ampco Products Inc.
 - 5. Bobrick Washroom Equipment Co.
 - 6. Flush-Metal Partition Corp.
 - 7. General Partitions Mfg. Corp.
 - 8. Global Steel Products Corp.
 - 9. Knickerbocker Partition Corp.
 - 10. Metpar Corp.
 - 11. Sanymetal Products Co.
- B. Product: Overhead Braced, solid plastic high density polyethelene (HDPE), with "Institutional Hardware" option in satin finished stainless steel, including in part, continuous piano hinge at door, continuous double angle, channel, and double-angle-channel anchorages of panels to walls and standards (pilasters), and other standard and indicated additional items, as manufactured by Bobrick Washroom Equipment, Inc., by one of the above named manufacturers.

2.2 <u>MATERIALS</u>:

- A. Stiles, Panels, Doors, Screens, and Benches
 - 1. Doors, Panels, and Pilasters: High density polyethylene solid plastic; polymer resin construction; water and graffiti resistant; each panel one-piece construction without seams; seamless piece; edges free of milling marks.
 - 2. Color: To be selected from manufacturer's standard colors.
 - 3. Doors, Panels Thickness: 1 inch (25 mm).
 - 4. Nominal. Height: 55 inches (1397 mm) net.
- B. Fabrication
 - Furnish standard doors, panels, screens and stiles fabricated for compartment system. Furnish units with cutouts and drilled holes to receive compartment hardware as indicated.
 - 2. Solid Plastic, High Density Polyethylene: Polymer resin material shall be one seamless piece. All edges shall be free of milling marks.
- C. Hardware
 - Brackets: Continuous stamped stainless steel 54-1/2 inches length (1384 mm) number
 4
 - 2. Hinges: Continuous stainless steel cam 1/4 inch (6 mm) pin- 54-1/2 inches length (1384 mm). Allows doors to fully close for any outswing or handicapped accessible compartments. Inswing doors shall remain open at 20 degrees in rest position.
 - 3. Latch and Keeper: Type 304 cast stainless steel with Number 4 finish; slide latch with combination stop and emergency release feature.
 - 4. Coat Hook: Type 304 cast stainless steel with Number 4 finish; combination hook and bumper on inswinging doors
 - 5. Door Pull: Type 304 cast stainless steel with Number 4 finish.

- D. Leveling Device shall be 3/16" (5mm) hot rolled steel bar; chromate-treated and zinc-plated; throughbolted to base of solid stile.
- E. Stile Shoe shall be one-piece, 4" (102mm) high, type-304, 22-gauge (0.8mm) stainless steel with satinfinish. Top shall have 90° return to stile.
- F. Headrail (Overhead-Braced) shall be satin finish, extruded anodized aluminum (.065" / 1.
 65mm thick) with anti-grip profile.

2.3 <u>FABRICATION</u>:

- A. General: Furnish standard doors, panels, screens, and pilasters fabricated for partition system, unless otherwise indicated. Furnish units with cutouts (if any), drilled holes, and internal reinforcement to receive partition-mounted hardware, accessories, and grab bars as indicated. Partitions shall be provided with toe clearances of 12-inches minimum above the finish floor.
- B. Door Dimensions: Unless otherwise indicated, furnish 28-inches wide inswinging doors for ordinary toilet stalls and 36-inches wide (clear opening) outswinging doors at stalls equipped for use by handicapped.

PART 3 - EXECUTION

3.1 INSTALLATION:

- A. General: Comply with manufacturer's current written instructions and recommendations for procedures and installation sequence. Install partitions rigid, straight, plumb, and level. Provide concealed clearances of not more than 1/4-inch between pilasters and panels, and not more than 1/2-inch between panels and walls (concealed by angle and channel mounting supports). Secure panels to walls with continuous stainless steel channels, double angles, and double-angle-channel supports, as appropriate for the location being anchored, with angle flanges limited to interior of stalls where possible. Secure panels to pilasters with continuous stainless steel channels, double angles, and double-angle-channel supports, as appropriate for the location being anchored, with angle flanges limited to interior of stalls where possible. Align with mounting supports at walls. Secure panels in position with anchoring devices recommended in writing by manufacturer.
- B. Overhead-Braced Partitions: Secure pilasters to floor and level, plumb, and tighten installation with devices furnished. Secure overhead-brace to each pilaster with not less than two fasteners. Hang doors and adjust so that tops of doors are parallel with overhead brace when doors are in closed position.
 - 1. Provide and install additional overhead bracing at exposed sides of panel installations, anchored securely to pilaster at front and directly above side panel to wall at rear of stall.
- C. Screens: Attach with concealed anchoring devices, as recommended in writing by manufacturer to suit supporting wall structure and floor. Set units to provide support and to resist lateral impact. Anchor to floor and wall, and provide overhead bracing same as for overhead-braced partitions.

1. Pilasters shall be in-line with panel, so as not to encroach on clear access to fixture(s) being screened.

3.2 ADJUST AND CLEAN:

- A. Hardware Adjustment: Adjust and lubricate hardware for proper operation. Set hinges on inswinging doors to hold open approximately 30 degrees from closed position when unlatched. Set hinges on outswinging doors (and entrance swing doors) to return to fully closed position.
- B. Clean exposed surfaces of partition systems using materials and methods recommended by manufacturer, and provide protection as necessary to prevent damage during remainder of construction period.

END OF TOILET PARTITIONS

SECTION 10 2000

LOUVERS AND VENTS

PART 1 - GENERAL

1.1 <u>RELATED DOCUMENTS</u>:

- A. Drawings and general provisions of Contract, including General Conditions and Division-1 Specification sections, apply to work of this section.
- B. Related work specified elsewhere includes:
 - 1. Section 7 "Flashing and Sheet Metal"
 - 2. Section 7 "Joint Sealers"
 - 3. Division 15 "Mechanical"

1.2 DESCRIPTION OF WORK:

- A. Work described in this section includes the following:
 - 1. Prefinished extruded aluminum louvers, frames, sills, subsills, screens and related components and work.
 - 2. The extent and configuration of louvers is indicated on the Drawings.
 - 3. Whether or not indicated on the Drawings, provide an Architectural louver as specified herein, complete with accessories, subsill, flashing, etc., in the exterior side of each wall opening (in front of) at each mechanical louver. Refer to Mechanical Drawings for locations of mechanical louvers.
 - 4. Where indicated on the Drawings, provide blanked-off area with matching materials and finishes at rear of louvers and compliant with wind loads, with openings as required for mechanical ductwork or other items indicated.
- B. Note that all louvers are to be installed in rough openings which have been completely flashed around perimeter (i.e.: elastic flashing). Refer to Section 07600 "Flashing and Sheet Metal," for additional information and requirements.

1.3 <u>QUALITY CONTROL</u>:

- A. Comply with SMACNA "Architectural Sheet Metal Manual" recommendations for fabrication, construction details and installation procedures, except as otherwise indicated.
- B. Field Measurements: Verify size, location and placement of louver units prior to fabrication, wherever possible.
- C. Shop Assembly: Coordinate field measurements and shop drawings with fabrication and shop assembly to minimize field adjustments, splicing, mechanical joints and field assembly of units. Pre-assemble units in shop to greatest extent possible and dis-assemble as necessary for

shipping and handling limitations. Clearly mark units for re-assembly and coordinated installation.

1.4 <u>SUBMITTALS</u>:

- A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.
- B. Product Data: Submit manufacturer's specifications; certified test data, where applicable; and installation instructions for required products, including finishes.
- C. Shop Drawings: Submit shop drawings for fabrication and erection of louver units and accessories. Include plans, elevations and details of sections and connections to adjoining work. Indicate materials, finishes, fasteners, joinery and other information to determine compliance with specified requirements.
- D. Samples: Submit 6-inch square samples of each required finish. Prepare samples on metal of same gauge and alloy to be used in work. Where normal color and texture variations are to be expected, include 2 or more units in each sample showing limits of such variations.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS:

- A. Manufacturer: Subject to compliance with requirements, provide products of one of the following:
 - 1. Airline Louvers; Div. Nystrom Building Products, Inc.; Brooklyn Park, MN
 - 2. The Airolite Co., LLC; Marietta, OH
 - 3. All-Lite Architectural Products; Fort Worth, Texas
 - 4. Arrow United Industries; Division of Mestek, Inc.; Wyalusing, PA
 - 5. Construction Specialties, Inc.; Cranford, NJ; (basis of design and quality)
 - 6. Greenheck Fan Corporation; Schofield, WI
 - 7. Industrial Louvers, Inc.; Delano, MN
 - 8. MetalAire Louver Company; Memphis, TN
 - 9. Metal-Aire Louver Company; Montgomery, AL
 - 10. Nystrom Building Products; Brooklyn Park, MN
 - 11. Reliable Products, Inc.; Geneva, AL
 - 12. Ruskin Company; Tomkins PLC; Kansas City, MO

2.2 <u>MATERIALS</u>:

- A. Aluminum Sheet: ASTM B209, Alloy 3003, or 5005 with temper as required for forming, or as otherwise recommended by metal producer to produce required finish.
- B. Aluminum Extrusions: ASTM B 221, Alloy 6063-T5.

- C. Fastenings: Use same material as items fastened, unless otherwise indicated. Fasteners for exterior applications may be stainless steel or aluminum. Provide types, gauges and lengths to suit unit installation conditions. Use Phillips flat-head machine screws for exposed fasteners, unless otherwise indicated.
- D. Anchors and Inserts: Use non-ferrous metal anchors and inserts for exterior installations and elsewhere as required for corrosion resistance. Use steel or lead expansion bolt devices for drilled-in-place anchors. Furnish inserts, as required, to be set into concrete or masonry work.
- E. Bituminous Paint: SSPC-Paint 12 (cold-applied asphalt mastic).

2.3 FABRICATION - GENERAL:

- A. Provide louvers and accessories of design, materials, sizes, depth, arrangement, and metal thicknesses indicated, or if not indicated, as required for optimum performance with respect to airflow; water penetration; strength; durability; and uniform appearance.
- B. Fabricate frames, including integral sills and/or loose sills where indicated, to suit adjacent construction with tolerances for installation, including application of sealants in joints between louvers and adjoining work.
- C. Include supports, anchorages, and accessories required for complete assembly.
- D. Provide sill extensions and loose sills made of same material as louvers, where indicated, or where required for drainage to exterior and to prevent water penetrating to interior.
- E. Join frame members to one another and to stationary louver blades by welding, except where indicated or where field bolted connections between frame members are made necessary by size of louvers. Maintain equal blade spacing, including separation between blades and frames at head and sill, to produce uniform appearance.

2.4 STATIONARY EXTRUDED ALUMINUM WALL LOUVERS:

- A. <u>Horizontal Drainable Blade Architectural Louvers</u> (typical except where specifically indicated otherwise): Size, depth and configuration indicated, with blades of profile, slope and spacing indicated, or if not indicated, to meet performance requirements.
 - 1. Extrusion Thickness: Not less than 0.081" for blades and frames.
 - 2. Louver Depth: 4-inches.
 - 3. Blade Centers: 3-inches, maximum.
 - 4. Blade Angle: 45 degrees.
 - 5. Free Area (4' x 4' Unit): Not less than 8.25 square feet (52%).
 - 6. Product/Manufacturer: Equivalent to Airolite Model K6774 at individual louvers and Model CB6774 at multiple louvers.
 - 7. Provide matching subsill ("sill flashing") with drip at front edge and turned up 1/2-inch at rear edge at all louvers; Set in solid bed of sealant.

B. Provide other shapes and configurations of louvers indicated on the Drawings, equivalent to the design, function, and performance of the louver specified above.

2.5 LOUVER SCREENS:

- A. Provide removable screens for exterior louvers, except those to be provided with enclosed waterproof backs.
- B. Fabricate screen frames of same metal and finish as louver units to which secured, unless otherwise indicated.
 - 1. Provide frames consisting of U-shaped metal for permanently securing screen mesh.
- C. Provide bird screens of 1/4-inch x 1/4-inch square mesh formed with at least 0.063 inch diameter aluminum wire at Mechanical louvers, and provide insect screens of 18-by-16 mesh formed with at least 0.012 inch aluminum wire at any louvers which are not related to Mechanical systems and which function only for attic or other gravity ventilation.
 - 1. Color: Black, or to match louver.
- D. Locate screens on inside face of louvers. Secure screens to louver frames with machine screws, spaced at each corner and at 12-inch o.c. between.

2.6 <u>METAL FINISHES</u>:

- A. General: Comply with the NAAMM "Metal Finishes Manual" for recommendations relative to application and designations of finishes.
- B. Finish designations prefixed by "AA" conform to the system established by the Aluminum Association for designating aluminum finishes.
- C. High Performance Organic Coating: AA-C12C42R1x (Chemical Finish: cleaned with inhibited chemicals; Chemical Finish: chemical conversion coating, acid chromate-fluoride-phosphate pretreatment; Organic Coating: as specified below); Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturer's instructions.
 - Fluoropolymer Coating System: Manufacturer's standard 2-COAT (i.e.: primer and color coat), ; and note that the finish system may be a traditional liquid or powder coat, complying with AAMA 2605; thermo-cured, full-strength 70 percent resin "Kynar 500" coating and 30 percent reflective gloss when tested in accordance with ASTM D 523; Dry film thickness of 1.6-mils, minimum. Provide 2-coat finish on underside of panels where exposed to view in the finished work, and manufacturer's standard primer and wash coating at concealed locations
 - 2. Color and Gloss: As selected by Architect, from manufacturer's FULL LINE of standard non-metallic colors; 15 minimum colors to select from, to include white.

D. Provide samples of final selected finishes for architect's verification; Refer to "Submittals" paragraph above.

PART 3 - EXECUTION

3.1 <u>PREPARATION</u>:

- A. Coordinate setting drawings, diagrams, templates, instructions and directions for installation of anchorages which are to be embedded in concrete or masonry construction. Coordinate delivery of such items to project site.
- B. Verify that all stud framed openings have perimeter elastic flashing, or provide same, as specified in Section 07600 "Flashing and Sheet Metal".

3.2 INSTALLATION:

- A. Locate and place subsills and louver units plumb, level and in proper alignment with adjacent work.
- B. Use concealed anchorages wherever possible. Provide brass or lead washers fitted to screws where required to protect metal surfaces and to make a weather-tight connection.
- C. Form tight joints with exposed connections accurately fitted together. Provide reveals and openings for sealants and joint fillers, as indicated.
- D. Repair finishes damaged by cutting, welding, soldering and grinding operations required for fitting and jointing. Restore finishes so there is no evidence of corrective work. Return items which cannot be refinished in field to shop, make required alterations, and refinish entire unit, or provide new units, at Contractor's option.
- E. Protect galvanized and non-ferrous metal surfaces from corrosion or galvanic action by application of a heavy coating of bituminous paint on surfaces which will be in contact with concrete, masonry, or dissimilar metals.
- F. Refer to Section 07900 "Joint Sealers," for sealants in connection with installation of louvers.

END OF LOUVERS AND VENTS

SECTION 10 3500

FLAGPOLES

PART 1 - GENERAL

1.1 <u>RELATED DOCUMENTS</u>:

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.
- B. Related work specified elsewhere includes:
 - 1. Section 03310 "Concrete"

1.2 <u>SUMMARY</u>:

- A. Extent and location of each type of flagpole is shown on drawings.
- B. Work under this Section includes ground set flagpole, base, lightning protection and ground, fittings, accessories, concrete footing, and all other items necessary or required for a complete and properly functioning installation.

1.3 <u>SUBMITTALS</u>:

- A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.
- B. Product Data: Submit manufacturer's technical data accessories, finishes and installation instructions for each type of flagpole required.

1.4 **QUALITY ASSURANCE**:

- A. Manufacturing Standards: Provide each flagpole as a complete unit produced by a single manufacturer, including fittings accessories, bases and anchorage devices.
- B. Design Criteria: Provide flagpoles and installations constructed to withstand **105-mph** wind velocity minimum when flying one flag of appropriate size. Use heavy pipe sizes if required for flagpole type and height shown.
- C. Pole Construction: Construct pole and ship to site in one piece if possible. If more than one piece is necessary, provide snug- fitting, precision joints with self-aligning, internal splicing sleeve arrangement for weather-tight, hairline field joints.

1.5 DELIVERY, STORAGE AND HANDLING:

A. Comply with manufacturer's current written instructions and recommendations.

- B. Spiral wrap flagpoles with heavy Kraft paper or other protective wrapping and prepare for shipment in hard fiber tube or other protective container.
- C. Deliver flagpoles and accessories completely identified for installation procedure. Handle and store flagpoles to prevent damage or soiling.
- D. Refer to Division 1 Sections "Summary of Work" and "Special Conditions" for additional information and requirements regarding stored materials.

PART 2 - PRODUCTS

2.1 <u>ACCEPTABLE MANUFACTURERS</u>:

- A. Manufacturer: Subject to compliance with requirements, provide products of one of the following:
 - 1. Aabec Pole Div., Morgan-Francis Div., ICC Mfg., Inc.
 - 2. Acme Flagpole Div., Lingo Inc.
 - 3. American Flagpole, Div. of Kearney-National, Inc.
 - 4. Baartol Co., Inc.
 - 5. Concord Industries, Inc.
 - 6. Eder Flag Manufacturing Co.
 - 7. Morgan and Co.

2.2 <u>FLAGPOLE TYPE</u>:

- A. Aluminum Flagpoles: Fabricate aluminum flagpoles from seamless extruded tubing complying with ASTM B 221, alloy 6063-T6, having a minimum wall thickness of 3/16" (0.1875"), tensile strength not less than 30,000 psi and a yield point of 25,000 psi. Heat-treat and age-harden flagpoles after fabrication to comply with ASTM B 597, temper T6.
 - 1. Provide cone tapered aluminum flagpoles; For flying one flag.
 - 2. Exposed Height/Quantity: One at 30'-0", unless other heights are specifically indicated.
 - 3. Manufacturer Basis of Design: American Flagpole, Abingdon, VA; Phone: 1-800-368-7171 or (540) 628-4188, or equivalent by another manufacturer named above. Provide complete with all standard and specified accessories.

30' HEIGHT: TWO REQUIRED
Catalog number: ESR30C61-AA
Exposed height: 30 ft.
Butt diameter: 5 in.
Wall thickness: 0.156 in.
Set depth: 3'-6".
Total length: 33'-6".
Taper: 11'-0"
Top diameter: 3"

Maximum Wind speed with 1 flag: 105 mph Maximum Wind speed with no flag: 170 mph Flag size: US Flag, 6' x 10' Standard NAAMM Finish: Satin ~ See Below.

2.3 <u>FLAGPOLE MOUNTING</u>:

- A. Provide manufacturer's standard base system for the type of flagpole installation required.
 - 1. Foundation Tube: For ground-set flagpoles, provide 0.0635" / 16 gage minimum galvanized corrugated steel tube, or 12 gage rolled steel tube, sized to suit flagpole and installation. Furnish complete with 3/16" welded steel bottom base and support plate, lighting ground spike, and steel centering wedges, all welded construction. Provide loose hardwood wedges at top for plumbing pole after erection. Galvanize steel parts after assembly, including foundation tube. Furnish with 3/16" support plate, and 3/4" (19 mm) diameter x 18" long galvanized steel ground lightning spike, and all standard and installation accessories.
 - a. Provide manufacturer's standard flash collar, finished to match flagpole.

2.4 <u>FINISHES</u>:

- Metal Finishes, General: Comply with National Association of Architectural Manufacturers' (NAAMM) "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Shaft Finish:
 - 1. Natural Satin Finish: Provide fine, mechanical directional-sanded satin finish (AA-M33); buff complying with AA-M20.
 - 2. Buff and seal aluminum surfaces with clear, hardcoat wax.

2.5 <u>FITTINGS</u>:

- A. Finial Ball: Manufacturer's standard flush seam ball, size as indicated or, if not indicated, to match pole butt diameter.
 - 1. Spun aluminum, with gold anodized finish.
- B. Truck: Ball-bearing non-fouling, revolving, double-track assembly of cast metal, finished to match pole shaft.
- C. Cleats: One 9" cast aluminum cleats with stainless steel fasteners, finished to match pole shaft.
- D. Halyards: Provide one continuous halyard for each flagpole, as follows:
 - 1. Nylon, braided, with metal core; Size: 3/8" (No. 12).

E. Halyard Flag Snaps: Provide 2 swivel snaps per halyard (for one flags); stainless steel swivel snap hooks with neoprene covers.

PART 3 - EXECUTION

3.1 INSTALLATION:

- A. Excavation: Excavate for foundation concrete to neat clean lines in undisturbed soil. Provide forms where required due to unstable soil conditions. Remove wood, loose soil, rubbish and other foreign matter from excavation, and moisten earth before placing concrete.
- B. Concrete: Refer to Section 03310 "Concrete," for 3,000 psi concrete and related requirements.
 - 1. Place concrete immediately after mixing. Perform chuting to avoid segregation of mix. Compact concrete in place by use of vibrators to consolidate. Moist-cure exposed concrete for not less than 7 days, or use a non-staining curing compound in freezing weather.
 - 2. Finish trowel exposed concrete surfaces to smooth, dense surface. Provide positive slope for water runoff to base perimeter.
- C. Flagpole Installation: Install flagpoles as shown and in compliance with final shop drawings and manufacturer's current written instructions and recommendations.
 - 1. Provide positive lightning ground for each flagpole installation.
 - a. Paint portions of ground-set flagpole below grade with a heavy coat of bituminous paint, and allow to properly dry and cure, prior to setting in place and pouring concrete base.

END OF FLAGPOLES

SECTION 10522

FIRE EXTINGUISHERS, CABINETS, AND ACCESSORIES

PART 1 - GENERAL

1.1 <u>RELATED DOCUMENTS</u>:

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
- B. Related work specified elsewhere includes:
 - 1. Section 1 "Temporary Facilities"
 - 2. Section 4 "Unit Masonry"
 - 3. Section 6 "Rough Carpentry" (concealed blocking)
 - 4. Section 9 "Gypsum Drywall"
 - 5. Section 9- "Painting"

1.2 <u>SUMMARY</u>:

- A. This Section includes the following:
 - 1. Fire extinguishers.
 - 2. Fire extinguisher cabinets, factory finished.
 - 3. Mounting brackets.

1.3 <u>SUBMITTALS</u>:

- A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.
 - 1. Product data for each type of product specified. For fire extinguisher cabinets include rough-in dimensions, details showing mounting methods, relationships of box and trim to surrounding construction, door hardware, cabinet type and materials, trim style, door construction, panel style, and materials.
 - 2. Where color selections by Architect are required, include color charts showing full range of manufacturer's standard colors and designs available.

1.4 **QUALITY ASSURANCE**:

- A. Single-Source Responsibility: Obtain fire extinguishers, cabinets, and brackets from one source from a single manufacturer.
- B. UL-Listed Products: Provide new portable fire extinguishers which are UL-listed and bear UL "Listing Mark" for type, rating, and classification of extinguisher indicated.

PART 2 - PRODUCTS

2.1 <u>MANUFACTURERS</u>:

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Amerex Corp.
 - 2. J.L. Industries.
 - 3. Larsen's Manufacturing Co.
 - 4. Modern Metal Products by Muckle.
 - 5. Nystrom Building Products
 - 6. Potter-Roemer, Inc.

2.2 <u>FIRE EXTINGUISHERS</u>:

- A. General: Provide fire extinguishers for each extinguisher cabinet and other locations indicated, in colors and finishes selected by Architect from manufacturer's standard, which comply with requirements of governing authorities.
 - 1. Abbreviations indicated below identify extinguisher types related to UL classification and rating system and not necessarily to type and amount of extinguishing material contained in extinguisher.
- B. Extinguishers: Provide equivalent to the following, from one of the above manufacturers.
 - 1. Public and Service Areas:
 - a. Multi-purpose Dry Chemical Type: Larsen's Model No. MP10, UL-rated 4-A:80-B:C, 10-pound nominal capacity, in enameled steel container.
 - b. Mounted in cabinet in public areas and on wall bracket in private and service areas, unless otherwise indicated on the Drawings.
 - c. Cabinet must match wall rating as shown.
- C. Provide tag for each fire extinguisher, which identifies the unit, indicates date charged, and other pertinent data required by authorities having jurisdiction.

2.3 MOUNTING BRACKETS:

A. Provide brackets designed to prevent accidental dislodgement of extinguisher, of sizes required for type and capacity of extinguisher indicated, in manufacturer's standard plated finish: Provide brackets for extinguishers not located in cabinets.

2.4 **FIRE EXTINGUISHER CABINETS**:

- A. General: Provide fire extinguisher cabinets where indicated, of suitable size for housing fire extinguishers of types and capacities indicated.
- B. Product/Manufacturer: Architectural Series, Model No. 2409-6R, semi-recessed design, as manufactured by Larsen's Manufacturing Company; Ft. Lauderdale, Fl.; Phone: (305) 486-3325; or approved equivalent by another manufacturer named above.
 - 1. All steel box with flush Vertical Duo style door glazed with colorless transparent tempered glass and factory pre-finished clear anodized where exterior side of box, door and trim are visible; with white baked acrylic enamel paint finish at interior of box.
 - a. Identify fire extinguisher in cabinet with vertical die-cut red lettering reading "Fire Extinguisher," applied to door. Letter style, size, spacing, and location shall be as selected by Architect from manufacturer's standard arrangements provided with submittals.
 - 2. Verify semi-recessed design with Owner prior to ordering. Provide equivalent surfacemounted cabinet when requested by Owner.

PART 3 - EXECUTION

3.1 INSTALLATION:

- A. Install items included in this section in locations and at mounting heights indicated, or if not indicated, at heights to comply with applicable regulations of governing authorities.
- B. Prepare recesses in walls for fire extinguisher cabinets as required by type and size of cabinet and style of trim and to comply with manufacturer's instructions.
- C. Securely fasten mounting brackets and fire extinguisher cabinets to structure, square and plumb, to comply with manufacturer's instructions, and mounting heights as follows:
 - 1. Fire Extinguisher Cabinets: 4'-0" A.F.F. to horizontal centerline of door handle.
 - 2. Fire Extinguisher Mounting Brackets: 4'-0" A.F.F. to horizontal centerline of bracket release mechanism.
- D. Where exact location of cabinets and bracket-mounted fire extinguishers is not indicated, locate as directed by Architect.
- E. Install one fire extinguisher in each fire extinguisher cabinet and bracket.

END OF FIRE EXTINGUISHERS, CABINETS, AND ACCESSORIES

SECTION 12 32 00 MANUFACTURED WOOD CASEWORK

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Manufactured standard and custom casework, with cabinet hardware.
- B. Countertops.

1.02 RELATED REQUIREMENTS

- A. Section 06 10 00 Rough Carpentry: Blocking and nailers for anchoring casework.
- B. Section 07 92 00 Joint Sealants: Sealing joints between casework and countertops and adjacent walls, floors, and ceilings.
- C. Section 09 21 16 Gypsum Board Assemblies: Reinforcements in metal-framed partitions for anchoring casework.
- D. Section 09 65 00 Resilient Flooring: Resilient wall base.
- E. Section 22 40 00 Plumbing Fixtures: Sinks and fittings installed in casework.

1.03 REFERENCE STANDARDS

- AWI/AWMAC/WI (AWS) Architectural Woodwork Standards, 2nd Edition 2014, with Errata (2016).
- B. AWMAC/WI (NAAWS) North American Architectural Woodwork Standards, U.S. Version 3.1 2017, with Errata (2019).
- C. BHMA A156.9 American National Standard for Cabinet Hardware 2015.
- D. ISFA 2-01 Classification and Standards for Solid Surfacing Material 2013.
- E. NEMA LD 3 High-Pressure Decorative Laminates 2005.

1.04 SUBMITTALS

- A. See Section 01 30 00 Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Indicate casework types, sizes, and locations, using large scale plans, elevations, and cross sections. Include rough-in and anchors and reinforcements, placement dimensions and tolerances, clearances required, and keying information.
- C. Samples for Finish Selection: Fully finished, for color selection. Minimum sample size: 2 inches by 3 inches (51 mm by 75 mm).
 - 1. Plastic laminate samples, for color, texture, and finish selection.
- D. Maintenance Data: Manufacturer's recommendations for care and cleaning.
- E. Maintenance Materials: Furnish the following for Owner's use in maintenance of project:
 1. See Section 01 60 00 Product Requirements, for additional provisions.
- F. Finish touch-up kit for each type and color of materials provided.

1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years of documented experience.
- B. Installer Qualifications: Company specializing in performing work of the type specified in this section, with not less than three years of documented experience and approved by manufacturer.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Protect items provided by this section, including finished surfaces and hardware items during handling and installation. For metal surfaces, use polyethylene film or other protective material standard with the manufacturer.
- B. Acceptance at Site:
 - 1. Do not deliver or install casework until the conditions specified under Part 3, Examination Article of this section have been met. Products delivered to sites that are not enclosed and/or improperly conditioned will not be accepted if warping or damage due to unsatisfactory conditions occurs.
- C. Storage:
 - 1. Store casework in the area of installation. If necessary, prior to installation, temporarily store in another area, meeting the environmental requirements specified under Part 3, "Site Verification of Conditions" Article of this section.

1.07 WARRANTY

- A. See Section 01 78 00 Closeout Submittals, for additional warranty requirements.
- B. Correct defective Work within a five year period after Date of Substantial Completion, at no additional cost to Owner. Defects include, but are not limited to:
 - 1. Ruptured, cracked, or stained finish coating.
 - 2. Discoloration or lack of finish integrity.
 - 3. Cracking or peeling of finish.
 - 4. Delamination of components.
 - 5. Failure of hardware.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Plastic Laminate Casework:
 - 1. Basis of Design: ACS Plastic Laminate Casework: www.advancedcabinetsystems.com/#sle.
 - 2. Substitutions: See Section 01 60 00 Product Requirements.
- B. Music Casework:
 - 1. Basis of Design: TMI Systems Corporation: www.tmisystems.com/#sle.
 - 2. Substitutions: See Section 01 60 00 Product Requirements.

2.02 CASEWORK, GENERAL

- A. Quality Standard: AWI/AWMAC/WI (AWS), unless noted otherwise.
- B. Types: More than one type is required. See drawings for location of each type of casework.
- C. Plastic Laminate Faced Cabinets: Custom Grade.

2.03 FABRICATION

- A. Assembly: Shop assemble casework items for delivery to site in units easily handled and to permit passage through building openings.
- B. Construction: As required for selected grade.
- C. Structural Performance: Safely support the following minimum loads:
 - 1. Base Units: 500 pounds per linear foot (744 kgs/linear m) across the cabinet ends.
 - 2. Suspended Units: 300 pounds (136 kg) static load.

- 3. Drawers: 125 pounds (57 kg), minimum.
- 4. Hanging Wall Cases: 300 pounds (135 kg).
- 5. Shelves: 100 pounds (45 kg), minimum.
- D. Fittings and Fixture Locations: Cut and drill components for fittings and fixtures.
- E. Hardware Application: Factory-machine casework members for hardware that is not surface applied.
- F. Access Panels: Where indicated, for maintenance of utility service and mechanical and electrical components.
- G. Removable back panels on indicated base cabinets. Provide partial height back panels at sink cabinets.
- H. Edging: Fit shelves, doors, and exposed edges with specified edging. Do not use more than one piece for any single length.
- I. Scribes and Fillers: Panels of matching construction and finish, for locations where cabinets do not fit tight to adjacent construction.

2.04 PLASTIC-LAMINATE-CLAD CASEWORK

- A. Plastic-Laminate-Clad Casework: Solid wood and wood panel construction; each unit selfcontained and not dependent on adjacent units or building structure for rigidity; in sizes necessary to avoid field cutting except for scribes and filler panels. Include adjustable levelers for base cabinets.
 - 1. Style: Flush overlay. Ease doors and drawer fronts slightly at edges.
 - 2. Cabinet Nominal Dimensions: Unless otherwise indicated, provide cabinets of widths and heights indicated on drawings, and with following front-to-back dimensions:
 - a. Base Cabinets: 24 inches (610 mm).
 - b. Tall Cabinets: 22 inches (559 mm).
 - c. Wall Cabinets: 13 inches (330 mm).
 - 3. Plastic Laminate: Apply plastic laminate finish in full uninterrupted sheets consistent with manufactured sizes. Fit corners and joints hairline.
 - a. Finish: Matte or suede, gloss rating of 5 to 20.
 - b. Surface Color and Pattern: As indicated on drawings.
 - c. Exposed Interior Surfaces: Thermally fused laminate.
 - 1) Color: White.
 - d. Cap exposed plastic laminate finish edges with material of same finish and pattern.

2.05 BAND CASEWORK

- A. Instrument Storage Cabinets: Modular components in 21" or 27" widths as detailed, inset door design. Compartments sizes and arrangements as shown on drawings.
 - 1. Cabinet body: 3/4 inch (19.1 mm), 47 lb. (21.3 kg) density, ANSI A208.1-1993 grade M3, particleboard core. Back panel 3/8 thick (9.5 mm), recessed ans structurally grooved all four sides of cabinet body, set with hot melt adhesive and 3/4 inch(19.1 mm) thick rear stiffeners. Interior body surfacing, whether open or closed door cabinet, including sides, rear and shelf underbody shall be pressure fused melamine laminate, White. Toe base shall be separate and continuous platform of exterior grade plywood of front, back and intermediates for continuous support and moisture resistance.
 - 2. Fixed Shelf System: LSI Protector Shield high-impact, molded system with continuous ventilation grooves, solid core, and integral 1 1/4 inch (32 mm) diameter 180 degree full radiused front nosing. Shelf shall be 1 1/4 inch (32 mm) total thickness, fixed to

cabinet/divider sides with continuous offset channels to retain and support the shelf. Color, white to match other interior components. Vandal resistant, removable only by authorized personnel.

- 3. Relocatable Shelf System: When so designated by individual product description within the bid documents, or on architectural plans, those cabinets shall be designed with shelves relocatable by facilities personnel. Cabinet bodies shall be factory pre-drilled to accept continuous shelf channel, relocatable to 1 1/4 inch (32 mm) increments. Shelf system remains vandal resistant.
- 4. Heavy Weight Shelf Support: Proved 1 1/4 inch (32 mm) by 1 1/4 inch (32 mm) 14 gauge steel tubing under all shelves in cabinets 36 inch (914 mm) wide and wider, structurally fastened to cabinet end panels, and shelf. Color, white to match other
- 5. Doors: Refer to drawings for type, swing and location. All doors are to inset flush between cabinet/compartment end panels.
 - a. Grille doors: 5/16 inch (7.9 mm) perimeter/reinforcing, and 3/16 inch (4.8 mm) interior vertical wire. Door welded .095 inch (2.4 mm) hinges in White powder coat.
 - b. Hinges: Five knuckle safety tip hinge with 2 3/4 inch (69.9 mm) barrel, heavy gauge .095 inch (2.4 mm) steel with non-loosening specially designed furniture screw attachment. Non-binding design to allow 180 degree door swing. Finished in White epoxy powder coat.
 - c. Hasp: Hasp system shall be of one peice molded high impact cyRex allow construction, no moving parts. Finger grip shall be integral with hasp and of non marring plastic to protect adjacent doors. Attach to door with vandal resistant thrubolt fasteners. Hasp and hasp plate shall contain padlock holes of sufficient size to accommodate all typically available combination/key padlocks. Hasp and hasp plate shall contain mating serrations to keep door in closed position, without padlock or separate mechanism. Color, White. Provide pre-numbered, dual sided labels of contrasting color, with clear cover, integral with hasp, for owner placement. Provide extra set of blank labels for owner customization.
- 6. Edging: Cabinet Body Edging shall be high-impact, color-thru 3 mm PVC, length beveled both sides. Door edging shall be high-impact, color-thru 3 mm PVC, length beveled and corner radiused inside and outside. Edging must be hot melt applied, trimmed, beveled, radiused and buffed by singular automatic machinery for consistency. No exceptions.
- 7. Workmanship: Premium standards of consistent reveals, bevels, and edge treatments. No exposed mechanical fasteners. Color choices at laminate door face and exterior cabinet body end panels shall be from manufacturer's standard 53 colors. Instrument Storage Cabinets shall be shipped factory pre-assembled, including doors of either right or left mounting.

2.06 COUNTERTOPS

- A. Types: More than one type is required. See drawings for location of each type of countertop.
- B. Fabricate in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS), Section 11 Countertops, Custom Grade, unless otherwise noted.
- C. Plastic Laminate Countertops: High pressure decorative laminate sheet bonded to substrate.1. Manufacturer's standard configuration for exposed edges, back and end splashes.
- D. Solid Surfacing Countertops: Solid surfacing sheet or plastic resin casting over continuous substrate.
 - 1. Solid Surfacing Sheet and Plastic Resin Castings: Complying with ISFA 2-01 and NEMA LD 3; acrylic or polyester resin, mineral filler, and pigments; homogenous, non-porous
and capable of being worked and repaired using standard woodworking tools; no surface coating; color and pattern consistent throughout thickness.

2. Manufacturer's standard configuration for exposed edges, back and end splashes.

2.07 CABINET HARDWARE

- A. Comply with BHMA A156.9 requirements.
- B. Locks: Provide locks on casework drawers and doors where indicated. Lock with 5 pin cylinder and 2 keys per lock.
 - 1. Hinged Doors: Cam type lock, bright chromium plated over nickel on base material.
 - 2. Tall Hinged Doors: Three-point latching system.
 - 3. Keying: Key locks alike within a space; key each room separately.
 - 4. Master Key System: All locks operable by master key.
- C. Shelves in Cabinets:
 - 1. Shelf Standards and Rests: Vertical standards with rubber button fitted rests, satin chromium plated over nickel on base material.
- D. Swinging Doors: Hinges, pulls, and catches.
 - 1. Hinges: Visible, number as required by referenced standards for width, height, and weight of door.
 - a. Visible Hinges: Installed on framed cabinet face, and on door face, bright chromium plated over nickel on base material.
 - 2. Pulls: Chrome wire pulls, 4 inches (102 mm) wide.
 - 3. Catches: Magnetic.
- E. Drawers: Pulls and slides.
 - 1. Pulls: Chrome wire pulls, 4 inches (102 mm) wide.
 - 2. Slides: Steel, full extension arms, ball bearings; self-closing; capacity as recommended by manufacturer for drawer height and width.

2.08 MATERIALS

- A. Wood-Based Materials:
 - 1. Solid Wood: Air-dried to 4.5 percent moisture content, then tempered to 6 percent moisture content before use.
- B. Concealed Solid Wood or Plywood: Any species and without defects affecting strength or utility.
- C. High Pressure Decorative Laminate (HPDL): NEMA LD 3, types as recommended for specific applications. complying with Grade requirements, and standard with the manufacturer.
- D. Thermally Fused Laminate (TFL): Melamine resin, NEMA LD 3, Type VGL laminate panels.

2.09 ACCESSORIES

- A. Plastic Edge Banding: Extruded PVC, convex shaped; smooth finish; self locking serrated tongue; of width to match component thickness.
 - 1. Color: As selected by Architect from manufacturer's standard range.

PART 3 EXECUTION

3.01 PREPARATION

A. Large Components: Ensure that large components can be moved into final position without damage to other construction.

3.02 EXAMINATION

- A. Site Verification of Environmental Conditions:
 - 1. Do not deliver casework until the following conditions have been met:
 - a. Building has been enclosed (windows and doors sealed and weather-tight).
 - b. An operational HVAC system that maintains temperature and humidity at occupancy levels has been put in place.
 - c. Ceiling, overhead ductwork, piping, and lighting have been installed.
 - d. Installation areas do not require further "wet work" construction.
- B. For Base Cabinets Installation: Examine floor levelness and flatness of installation space. Do not proceed with installation if encountered floor conditions required more than 1/2 inch (13 mm) leveling adjustment. When installation conditions are acceptable, for each space, establish the high point of the floor. Set and make level and plumb first cabinet in relation to this high point.
- C. For Wall Cabinets Installation: Examine wall surfaces in installation space. Do not proceed with installation if the following conditions are encountered:
 - 1. Maximum variation from plane of masonry wall exceeds 1/4 inch in 10 ft (6 mm/3 m) and 1/2 inch in 20 ft (13 mm/6 m) or more, and/or maximum variation from plumb exceeds 1/4 inch (6 mm)per story.
 - 2. Maximum Variation of finished gypsum board surface from true flatness: 1/8 inch in 10 feet (3 mm in 3 m) in any direction.
- D. Verify adequacy of support framing and anchors.
- E. Verify that service connections are correctly located and of proper characteristics.

3.03 INSTALLATION

- A. Perform installation in accordance with manufacturer's instructions.
- B. Use anchoring devices to suit conditions and substrate materials encountered. Use concealed fasteners to the greatest degree possible. Use exposed fasteners only where allowed by approved shop drawings, or where concealed fasteners are impracticable.
- C. Set casework items plumb and square, securely anchored to building structure.
- D. Align cabinets to adjoining components, install filler and/or scribe panels where necessary to close gaps.
- E. Fasten together cabinets in continuous runs, with joints flush, uniform and tight. Misalignment of adjacent units not to exceed 1/16 inch (1.6 mm). In addition, do not exceed the following tolerances:
 - 1. Variation of Tops of Base Cabinets from Level: 1/16 inch (1.6 mm) in 10 feet (3 m).
 - 2. Variation of Faces of Cabinets from a True Plane: 1/8 inch (3 mm) in 10 feet (3 m).
 - 3. Variation of Adjacent Surfaces from a True Plane (Lippage): 1/32 inch (0.8 mm).
 - 4. Variation in Alignment of Adjacent Door and Drawer Edges: 1/16 inch (1.6 mm).
- F. Base Cabinets: Fasten cabinets to service space framing and/or wall substrates, with fasteners spaced not more than 16 inches (407 mm) on center. Bolt adjacent cabinets together with joints flush, tight, and uniform.
- G. Install hardware uniformly and precisely.
- H. Countertops: Install countertops intended and furnished for field installation in one true plane, with ends abutting at hairline joints, and no raised edges.
- I. Replace units that are damaged, including those that have damaged finishes.

3.04 CLEANING

A. Clean casework and other installed surfaces thoroughly.

3.05 PROTECTION

- A. Do not permit finished casework to be exposed to continued construction activity.
- B. Protect casework and countertops from ongoing construction activities. Prevent workmen from standing on, or storing tools and materials on casework or countertops.
- C. Repair damage, including to finishes, that occurs prior to Date of Substantial Completion, using methods prescribed by manufacturer; replace units that cannot be repaired to like-new condition.

END OF SECTION

SECTION 12 5110

HORIZONTAL LOUVER BLINDS

PART 1 - GENERAL

1.1 <u>RELATED DOCUMENTS</u>:

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
- B. Related work specified elsewhere includes:
 - 1. Section 6 "Rough Carpentry" (concealed preservative pressure treated blocking substrate for anchorage of horizontal louver blind units at stud framing).

1.2 <u>SUMMARY</u>:

- A. This Section includes venetian blind assemblies, at all exterior window openings (1 per window at multiple window unit openings), and at interior openings as indicated.
 - 1. Do not include sidelites to storefront or hollow metal entrance door frames.
 - 2. <u>Refer to Window Blinds Schedule at the end of this Section</u>.

1.3 <u>SUBMITTALS</u>:

- A. General: Submit each item in this Article according to the Conditions of the Contract and Division 1 Specification Sections.
- B. Product data for each type of horizontal louver blind specified. Include printed data on physical characteristics.
- C. Shop drawings showing location and extent of blinds. Show installation details at and relationship to adjoining work. Include elevations indicating blind units. Indicate location of blind controls.
- D. Samples for initial selection in the form of manufacturer's color charts showing the full range of colors, textures, and patterns available for each type of horizontal louver blind indicated.
- E. Samples for verification of the following products, in manufacturer's standard sizes, showing the full range of color, texture, and pattern variations expected. Prepare samples from the same material to be used for the Work.
 - 1. Louver: Manufacturer's standard-size unit, not less than 12 inches (300 mm) long.
 - 2. Valance: Manufacturer's standard-size unit, not less than 12 inches (300 mm long).

- F. Schedule of horizontal louver blinds using same room designations indicated above, and as otherwise indicated on the Drawings.
- G. Maintenance data for horizontal louver blinds to include in the operation and maintenance manual specified in Division 1. Include the following:
 - 1. Methods for maintaining horizontal louver blinds and finishes.
 - 2. Precautions for cleaning materials and methods that could be detrimental to finishes and performance.

1.4 **QUALITY ASSURANCE**:

- A. Fire-Test-Response Characteristics: Provide horizontal louver blinds identical to those tested for the following fire-test-response characteristics as determined by UL or another testing and inspecting agency acceptable to authorities having jurisdiction.
 - 1. Test Method: NFPA 701.
 - 2. Rating: Pass.
- B. Single-Source Responsibility: Obtain each type of horizontal louver blind from one source and by a single manufacturer.

1.5 **PROJECT CONDITIONS:**

- A. Field Measurements: Check actual horizontal louver blind dimensions by accurate field measurements before fabrication, and show recorded measurements on final shop drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
- B. Space Enclosure and Environmental Limitations: Do not install horizontal louver blinds until space is enclosed and weatherproof, wet-work in space is completed and nominally dry, work above ceilings is complete, and ambient temperature and humidity conditions are and will be continuously maintained at values near those indicated for final occupancy.

1.6 EXTRA MATERIALS:

- A. Furnish extra materials described below that match products installed, are packaged with protective covering for storage, and are identified with labels clearly describing contents.
 - 1. Horizontal Louver Blinds: Before installation begins, furnish one (1) full-size unit for each size to be installed.

PART 2 - PRODUCTS

2.1 <u>MANUFACTURERS</u>:

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

- 1. Horizontal Louver Blinds:
 - a. Eastern Standard Corp.
 - b. Faber.
 - c. Hunter Douglas, Inc.
 - d. Joanna Western Mills Co.
 - e. Kirsch.
 - f. Levolor Corp.
 - g. Louverdrape, Inc.
 - h. Nanik.
 - i. Springs Window Fashions Division, Inc.; (Bali-Graber).
 - j. Verosol USA, Inc.

2.2 HORIZONTAL LOUVER BLINDS:

- A. Louvers: Manufacturer's standard units, and as follows:
 - 1. Aluminum, 0.008" thickness.
 - 2. Nominal Louver Width: 1 inch (25 mm) [miniblinds].
 - 3. Tilt Operation: Manual with wand.
 - a. Length of Tilt Control: Approximately 2/3 length of blind.
 - b. Position of Tilt Control: Left side, unless otherwise indicated.
 - 4. Tilt: Full.
- B. Cord-Lock Operation: Cord lock; locks pull cord to stop blind at any position in ascending or descending travel.
 - 1. Position of Cord Lock: Right side, unless otherwise indicated.
- C. Cord Equalizers: Self-aligning to maintain horizontal louver blind position.
- D. Valance: Match color of louvers.
- E. Mounting: Window heads; Anchored securely in place at center and ends.
- F. Colors and Patterns: Where manufacturer's standard products are indicated, provide horizontal louvers complying with the following requirements:
 - 1. Match colors and patterns indicated by referencing manufacturer's standard designations for these characteristics, as selected by Architect from manufacturer's full range of colors and patterns for the type(s) of horizontal louver blinds indicated.

2.3 FABRICATION:

- A. Product Standard and Description: Comply with AWCMA Document 1029, minimum, for each horizontal louver blind unit consisting of louvers, rails, cord locks, tilting mechanisms, tapes, and installation hardware.
- B. Lifting and Tilting Mechanisms: Noncorrosive, self-lubricating materials.
- C. Unit Sizes: Obtain units fabricated in sizes to fill window and other openings as follows, measured at 74 deg F (23 deg C):
 - 1. Blind Units Installed Between (Inside) Jambs: Width equal to 1/4 inch (6 mm) per side or 1/2 inch (12 mm) total, plus or minus 1/8 inch (3 mm), less than jamb to jamb dimension of opening in which each blind is installed. Length equal to 1/4 inch (6 mm), plus or minus 1/8 inch (3 mm), less than head to sill dimension of opening in which each blind is installed.
- D. Installation Fasteners: Not less than 2 fasteners per bracket, fabricated from metal noncorrosive to blind hardware and adjoining construction; support blind units under conditions of normal use.
- E. Hold-Down Brackets: Manufacturer's standard, as indicated.

PART 3 - EXECUTION

3.1 EXAMINATION:

A. Examine substrates, areas, and conditions for compliance with requirements for installation tolerances and other conditions affecting performance of horizontal louver blinds. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 INSTALLATION:

- A. Install blinds level, plumb, and located so exterior louver edges in any position are not closer than 1 inch (25 mm) to interior face of glass lites.
 - 1. Head Mounted: Install headrail on face of opening head.

3.3 ADJUSTING:

A. Adjust components and accessories for proper operation.

3.4 <u>CLEANING</u>:

- A. Clean blind surfaces, according to manufacturer's instructions, after installation.
- B. Remove surplus materials, packaging, rubbish, and debris resulting from installation, and legally dispose of off site. Leave installation areas neat, clean, and ready for use.

3.5 <u>PROTECTION</u>:

A. Provide final protection and maintain conditions in a manner acceptable to manufacturer and Installer that ensure that horizontal louver blinds are without damage or deterioration at the time of Substantial Completion.

END OF HORIZONTAL LOUVER BLINDS

DIVISION 22 – PLUMBING

22 0500 - GENERAL PROVISIONS – PLUMBING 22 1000 - MATERIALS AND METHODS – PLUMBING 22 1500 - THERMAL AND ACOUSTICAL INSULATION FOR PLUMBING SYSTEMS 22 2000 - PLUMBING FIXTURES AND EQUIPMENT

END OF SECTIONS



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SECTION 22 0500

GENERAL PROVISIONS – PLUMBING

PART 1 – GENERAL

1.1 SCOPE:

- A. Provisions of this Section apply to all Plumbing work.
- B. Include the provisions of General Conditions as part of this Section.
- C. Provide all labor, materials, equipment, and services necessary for the completion of all Plumbing work shown or specified, complete and ready for operation, consisting in general of the following:
 - 1. A system of sanitary drain, waste, and vent piping.
 - 2. A system of domestic water piping.
 - 3. A system of natural gas piping.
 - 4. Providing plumbing fixtures and equipment as shown on drawings.
- D. Give required notices, file drawings, obtain and pay for permits, deposits and fees necessary for the installation of the Plumbing work. Obtain and pay for inspections required by laws, ordinances, rules, regulations or public authority having jurisdiction. Obtain and pay for certificates of such inspections, and file such certificates with Owner.
- E. "Provide" means to furnish and install, complete and ready for operation.

1.2 DRAWINGS:

- A. Plumbing Drawings are diagrammatic and subject to requirements of Architectural Drawings and conditions existing in the field. Plumbing Drawings indicate generally the location of components and are not intended to show all fittings or all details of the work.
- B. Follow the drawings closely, coordinate dimensions with Architectural Drawings and field conditions. DO NOT scale Plumbing drawings for location of system components.
- C. Make no changes without Architect's written permission. In case of doubt, obtain Architect's decision before proceeding with work. Failure to follow this instruction shall make the Contractor liable for damage to other work and responsible for removing and repairing defective or mislocated work in proper manner.

D. Contractor for Plumbing work is responsible for coordinating with all trades.

1.3 APPLICABLE CODES AND STANDARDS:

- A. Comply with the current editions of the following Codes and Standards:
 - 1. ANSI/B31.9 Code for Building Services Piping
 - 2. ASME Boiler and Pressure Vessel Code
 - 3. NFPA 13 Installation of Sprinkler Systems
 - 4. NFPA 54 National Fuel Gas Code
 - 5. NFPA 70 National Electrical Code
 - 6. NFPA 90A Installation of Air Conditioning and Ventilating Systems
 - 7. NFPA 101 Safety to Life from Fire in Buildings and Structures
 - 8. Other standards as referenced in other sections of Division 22
 - 9. 2015 International Building Code
 - 10. 2015 International Plumbing Code
 - 11. 2015 International Fuel Gas Code
 - 12. 2015 International Mechanical Code
 - 13. 2015 International Energy Conservation Code

1.4 QUALIFICATIONS OF SUBCONTRACTOR:

- A. The Plumbing Subcontractor shall meet the following minimum qualifications:
 - 1. He shall have been in business as a Plumbing Contractor for at least 3 years prior to the date of opening bids.
 - 2. He shall have a current Master Plumber's Certificate of competency issued by the State of **Alabama** and the City and County in which work occurs.
 - 3. He shall have a satisfactory experience record with Plumbing installation of character and scope comparable with this project and shall have completed three such installations in the past three years.

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4. If the Plumbing Subcontractor, with the Engineer's approval, uses a Sub-Subcontractor to provide another discipline that the Subcontractor does not normally furnish, that Sub-Subcontractor shall meet the same qualifications as the Subcontractor.

1.5 CONFLICTS AND INTERFERENCES:

A. If systems interfere or conflict, the Architect shall decide which equipment to relocate regardless of which was first installed.

1.6 WORKMANSHIP:

A. Do all work in a neat and first-class manner. Remove and replace work not done in such manner as directed by the Architect.

1.7 COOPERATION:

A. Cooperate with all other crafts. Perform work in a timely manner. Do not delay the execution of other work.

1.8 VISITING SITE:

A. Visit site and become familiar with location and various conditions affecting work. No additional allowance will be granted because of lack of knowledge of such conditions.

1.9 MATERIALS:

- A. Unless otherwise noted, provide new, standard, first-grade materials throughout. **Unless** otherwise noted, all pipe, fittings and valves shall be made in the United States of America.
- B. Where materials or products are specified by manufacturer's name, brand, trade name, or catalog reference, such named materials or products shall be the basis of the estimate, without substitution, and shall be furnished under the contract unless requests for equivalents are approved as noted below. Where two or more brands are named the choice of these shall be optional with the Contractor.
- C. Equivalents will be considered only if written request for approval has been received by the Architect (from a general contract bidder) 10 days prior to the date established for receipt of Proposals. Each request shall include the name of the material or equipment for which an equivalent is proposed and a complete description of the proposed equivalent including drawings, cuts, performance and test data, and deviation from the specification and any other information necessary for evaluation. A statement setting forth any changes in other materials, equipment or other Work that incorporation of the equivalent may require shall be included. The burden of proof of the merit of the proposed equivalent is upon the proposer. The Architect's decision of approval or disapproval of a proposed equivalent is final.

- D. If the Architect approves any proposed equivalent prior to receipt of Proposals, approval will be set forth in an Addendum. **DO NOT RELY UPON APPROVALS MADE IN ANY OTHER MANNER.**
- E. No proposed equivalent will be considered after the Contract has been executed, except as described in the General Conditions.
- F. Within 45 days of execution of contract and before ordering materials or equipment, submit to Architect and obtain his approval of a detailed list showing each item which is to be furnished by make, trade name, catalog number, or the like; together with manufacturer's specifications, certified prints, and other data sufficient for making comparisons with items specified. When approved, such schedule shall be of equal force with these specifications in that no variation there from shall be allowed except with Architect's written approval. Submit PDF format files for approval. Provide PDF files of approved data for project close-out.
- G. All pressure vessels shall be constructed and tested in accordance with applicable ASME codes and shall bear ASME stamps. Certificates of inspection and approval shall be submitted to Architect.
- H. Similar items of equipment shall be the product of the same manufacturer.

1.10 SHOP DRAWINGS:

- A. Before starting work, submit and obtain approval of detailed drawings of the following, fully dimensioned (including elevations of piping) and drawn to 1/4" to 1'-0" scale.
 - 1. Complete Plumbing equipment plans showing location of equipment, floor drains, and equipment pads and foundations.
 - 2. Plumbing piping.
- B. Engineers' CAD/electronic drawings files will be available upon request for the convenience of the contractor and for use in preparation of shop drawings. A service fee of \$100.00 per drawing sheet file shall be remitted to the Engineer prior to delivery of CAD/electronic drawing files along with a signed agreement between the Engineer and Contractor.

1.11 RECORD DRAWINGS:

A. When work starts the Architect will furnish two complete sets of white prints of the Plumbing Drawings. All corrections, variations, and deviations, including those required by change orders, if any, must be recorded in colored ink or colored pencil at the end of each working day on these drawings. The marked prints shall be available at all times for the Architect's inspection.

- B. Prior to examining the request for final payment or making any response thereto, the Architect shall receive from the Contractor one complete set of the white prints, marked as stated above, indicating the actual completed installation of the work included under this contract.
 - 1. Accurately show location, size and elevation of new exterior utility work and its relationship to any existing utilities, obstructions, etc., contiguous to the area of work.
 - 2. Block out areas modified by change-order & identify them by change-order number.
 - 3. The Architect will forward the marked white prints to the Consulting Engineers for review. They will then be returned by the Architect to the Contractor for use in preparing record drawings.
- C. When work is completed, the Engineers' CAD/electronic drawing files will be made available upon request for the convenience to the contractor for a service fee of \$100.00 per CAD/electronic drawing sheet file and for use in preparing record drawings. Contractor shall transfer the information from the marked white prints to the CAD files, removing all superseded data in order to show the actual completed conditions.

1.12 PROTECTION OF EQUIPMENT:

- A. During construction, protect Plumbing equipment from damage or deterioration.
- B. When installation is complete, clean equipment and make ready for painting.

1.13 INSTALLATION OF EQUIPMENT:

- A. Install equipment to provide normal service access to all components.
- B. Where drawings show sufficient space for removing components, install equipment to provide such clearance. *Provide space at all equipment power and control panels as required by local codes.*
- C. Install equipment in accordance with manufacturer's instructions. If manufacturer's instructions conflict with contract documents, obtain Architect's decision before proceeding.
- D. All equipment shall be firmly fastened in place.

1.14 EQUIPMENT SUPPORTS:

A. Provide supports for piping and equipment. Hot dip galvanize after fabrication all grillage, supports, etc., located outdoors. Prime coat and paint all grillage, supports, etc. located indoors. Where noted provide 304 stainless steel supports. At the Contractor's option, all grillage, supports, etc. located outdoors may be 304 stainless steel instead of hot dip galvanized.

1.15 FLASHING:

- A. General: Furnish all pitch cups, metal base flashing and counter flashing required for Plumbing Work. Installation of above items is specified in Roofing Section.
- B. Pitch Cups: 20 gauge galvanized steel, at least 8" deep, bases mitered and soldered and extending at least 4" horizontally.
- C. Metal Base Flashing: Galvanized steel for ferrous items, and stainless steel for stainless steel items. Minimum thickness 22 gauge (0.034") galvanized steel, 20 gauge (0.038") stainless steel, 0.032" aluminum. Bases mitered and soldered extending out at least 4" horizontally and 8" vertically.
- D. Metal Counter Flashing: Of material and gauges specified for base flashing, lapping base flashing at least 3".
- E. Vent Pipe and Roof Drain Flashing: Specified in "Roofing Section".

1.16 EXCAVATION & BACKFILLING:

- A. Include all excavation and backfilling required to bring the work to line and grade shown, including excavation of rock and all other materials which may be encountered.
- B. Excavate trenches wide enough for proper installation of work. Grade trench bottoms evenly.
 Provide bell holes as necessary to insure uniform bearing for pipes. Excavate minimum 6"
 below pipe. Refill cuts below required pipe grade with sand or compacted gravel. Support pipe continuously along its entire length. (Do not use piers to support piping.)
- C. Backfill after inspection by Architect and authorities having jurisdiction. Backfill compacted areas (engineered fill) with sand or fine gravel (89/10) in accordance with requirements of "Sitework" no less than 95% compactancy. Backfill paved areas with sand or fine gravel (89/10) compacted to meet requirements of Paving Section. Backfill shall be free of rock, wood, steel, brick, etc. Do not disturb pipe. Restore or repair pavements and the like after backfilling, matching adjacent work.
- D. Resod grassed areas and replace bushes, etc.

1.17 CONNECTIONS TO EXISTING SYSTEMS:

- A. Make connections to existing systems only at time authorized, in writing, by Owner.
- B. Take existing systems and/or equipment out of service <u>only</u> at times authorized in writing by Owner.
- C. Drain existing systems and fill, vent, and put existing systems into operation after connections have been made.

D. Repair existing insulation at points of connection to existing work.

1.18 MOTORS, STARTERS & ELECTRICAL EQUIPMENT:

- A. Provide electrical equipment compatible with the current shown on electrical drawings. Verify current characteristics before ordering equipment.
- B. Should the Contractor with the Architect's approval make changes in electrical equipment from that shown on the Electrical Drawings, the Contractor shall be responsible for the cost of required changes.
- C. Provide factory installed fuses in all equipment requiring fusing for branch circuit protection.

1.19 SLEEVES:

- A. For pipe through floors inside fire rated chases or through non-fire-rated walls: 20 gauge galvanized steel, 1" larger than pipe or pipe covering.
- B. For pipe through concrete beams: schedule 40 black steel pipe, 1" larger than pipe or pipe covering.
- C. For pipe passing through floors outside fire rated chases and fire rated wall and partitions, provide 20 gauge steel sleeve leaving the annular space between pipe or pipe covering as required by UL systems. Where pipe is insulated, insulation shall be continuous thru sleeve. Refer to Section Through-Penetrations Firestop Systems where included in the contract documents, Otherwise, seal between sleeve and pipe or pipe covering with 3M Brand Fire Barrier CP 25WB caulk, Flamestop V, Specified Technologies, Inc. "Spec Seal Sealant", Rectorseal Corp. Metacaulk 950 or Hilti FSONE bearing UL listing for actual conditions of installation, thickness and application in strict accord with UL reference for each type installation. Any equivalents must meet the 10 day prior approval provision and must show UL approval for all conditions, bare pipe, insulated pipe, etc. For plastic piping material submittal must show UL approval for each application and if caulk comes in direct contact with pipe, it must be compatible and not injurious to the pipe.
- D. Set sleeves before concrete is poured or masonry is erected. In existing construction, grout sleeves firmly in place.
- E. Extend floor sleeves 1-1/2" above finish floor in areas where floor is subject to being wet during normal usage (Plumbing rooms, toilets, etc.).
- F. Where exposed pipes pass through walls and partitions in finished spaces, provide chrome plated F & C plates or escutcheons.

1.20 PAINTING:

A. Refinish equipment damaged during construction to new condition.

- B. Paint all non-potable water pipe and insulation yellow in accordance with Plumbing Code using paint of type specified in Painting Section.
- C. Prime and paint all bare, exposed, exterior piping using type specified in Painting Section. Gas piping shall be painted yellow unless otherwise noted.
- D. Prime and paint all grillage, supports, etc. located indoors, except where noted to be galvanized.
- E. Other painting is specified in Painting Section, Finishes Division.

1.21 PIPE IDENTIFICATION:

- A. Identify all piping exposed to view or accessible through removable ceilings or access panels with plastic snap-on pipe line markers. Color code markers in accordance with ANSI A13.1.
 Show pipe contents and direction of flow. (Markers on lines 8" OD and smaller shall be taped in place.) Markers shall be equal to Craftmark, Brady, Seton or Brimar.
- B. Protect all factory identification tags, nameplates, model and serial numbers, stenciling, etc., during construction and replace if damaged.
- C. Label Spacing and Extent:
 - 1. On straight run of pipes: Above suspended ceilings space labels approximately 10 feet on center; elsewhere, 20 feet on center.
 - 2. Wherever a pipe enters or leaves a room or building.
 - 3. At change of direction.
 - 4. At main valves and control valves (not equipment valves).
 - 5. At manifolds.
 - 6. On risers, just above and below floors.
 - 7. All natural gas piping in the 2 psig system: label at the beginning, at all gas cocks, at ends and at 6'-0" intervals with labels reading "2 psig".

1.22 VALVE TAGS:

A. 2" X 3" laminated plastic with 1/2" numbers engraved at top, leaving space for further engraving by others. Secure tags with chains to valve yoke or stem, not handles.

- B. Valve tag colors:
 - 1. Plumbing: Black tags with white numbers.
- C. Valve tag locations: At all valves on mains, risers and branches (not equipment service valves).
- D. Valve tag numbers: Starting with Number 1, number tags in sequence from the lowest point to the highest point in the building. In existing buildings extend existing sequences.

1.23 VALVE CHARTS:

- A. In all mechanical rooms, provide charts showing number and locations of all labeled valves, type of service, etc. Laminate in heavy plastic and provide brass grommets for attaching to wall. Attach to wall with anchors and brass screws.
- B. In existing buildings include existing valves in the charts of new valves.

1.24 ACCESS DOORS:

- A. Furnish and install access doors for valves, air vents, trap cleanouts, and other items located above non-liftout ceilings or behind partitions or walls. Doors in non-fire rated walls and ceilings: 16-gauge steel with hinges and screwdriver latches. Doors in fire rated walls and ceilings: UL labeled with fire rating equal to fire rating of wall or ceiling. Provide door styles compatible with adjoining surfaces as selected by Architect. Size doors to permit removal of equipment and/or maintenance. Doors: Bar-Co, Nystrom, Williams Bros., or equal.
- B. Mark lay-in ceilings with colored vinyl self adhering disc stuck on grid adjacent to maintenance access points.

1.25 TESTS, CLEANING & ADJUSTMENTS:

- A. All tests shall be witnessed by the Architect in addition to authorities having jurisdiction. A minimum of 72 hour notice is required prior to performance of test.
- B. After systems have been installed complete, adjust and test systems for proper operation and correct all noise or vibration conditions. Perform all tests as required by local codes. Contractor shall furnish testing equipment. *All piping pressure tests shall be hydrostatic tests.*
- C. If local codes are more stringent than the following, local codes shall govern.
- D. Sanitary Systems:
 - 1. Test piping by stopping lower outlets and filling with water to 10' hydrostatic head. Stop leaks and repeat test until watertight. All joints shall be exposed throughout test.

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- 2. Provide "Ball Test" on all piping 3" and larger with ball 1/2" smaller than pipe diameter.
- Ε. Domestic water piping: Test by applying pressure (by temporary pump or compressed air connection) to total hydrostatic pressure 1-1/2 times street pressure but not less than 150 psig for not less than 4 hours. Immediately and completely stop all leaks. On completion of roughing-in, cap all outlets, make connections with house supply line, and put under full water pressure. After testing, leave general pressure on until ready to install fixture (except when necessary to drain to avoid freezing during construction). After completion of all tests, repairs and installation of fixtures, flush all domestic hot and cold water piping with water to remove sediment and scale and then disinfect. Disinfect piping with hypochlorite solution of chlorine or compressed chlorine gas applied through an approved chlorinator. Operate valves and faucets several times to insure the chlorine reaches all parts of the system. Feed water and chlorination agent into the system at rates that will provide a residual chlorine content of not less than 50 ppm after a retention period of 6 hours. Upon completion of treatment, flush treated water from each system until the water supply is satisfactory to the public health authority having jurisdiction. Provide Architect a certificate of compliance from the local Health Department as required.
- F. Natural Gas Piping Tests: After all piping is roughed in but before connection to main or to appliances or equipment, test piping for tightness as required by local gas company; or in the absence of such requirements, apply in Architect's presence an air pressure test equal to 25 psig, which piping shall maintain without pressure drop for at least four hours. Stop all leaks shown up by such test and repeat test until piping is airtight. Black steel piping below grade shall be Holiday tested prior to backfilling.
- G. Start-Up and Service:
 - 1. The Contractor and factory authorized service representative for the water heaters shall place each item of such equipment into satisfactory operation with all automatic and safety devices. Further, all adjustment service required shall be performed during the warranty period.
 - 2. In addition, submit equipment manufacturers' start-up reports for items listed above. See Paragraph "Project Close-Out", below.
 - 3. The Contractor shall balance all hot water pumps and circuit setters to flow shown on drawings. Balancing shall not be started until 1) Systems have been completed, including leak testing and cleaning and until systems have been refilled, pumps are rotating correctly, and strainers have been cleaned and baskets used for the ultimate installation have been installed, and 2) Expansion tanks have been installed and correct system pressure is being maintained, and system has been vented and is free from air.
 - a. Adjust circuit setters to meet design GPM requirements. Measure and record GPM.
 - b. Produce a report documenting the measured flows and submit three (3) copies of the report to the Architect.

1.26 WARRANTY & INSTRUCTIONS:

- A. See General Conditions One-Year Warranty.
- B. Contractor shall and hereby does warrant all materials, workmanship and equipment furnished and installed by him to be free from defects for a period of one year after date of substantial completion of the Contract. Should any defects in material, workmanship, or equipment be made known to Contractor within the one-year warranty period, Contractor shall replace such materials, workmanship, or equipment without charge.
- C. Provide PDF of manufacturer's operating and maintenance manuals and parts lists for all equipment and materials furnished. Provide a maintenance schedule listing routine maintenance operations and suggested frequency thereof. Include all warranty dates on equipment and guarantees.
- D. During the period of tests, adjust all controls, regulators, etc., to comply with these Specifications.
- E. Make available to the Owner, without additional cost, service and adjustment of the equipment for the guarantee period.

1.27 PROJECT CLOSE-OUT:

- A. Prior to the issuance of a certificate for final payment, submit to Architect and obtain his approval of the following:
 - 1. Record drawings plumbing: PDF files and CAD files.
 - 2. Equipment Submittal Data PDF files.
 - 3. Equipment operating and maintenance manuals PDF files.
 - 4. Equipment warranty dates and guarantees.
 - 5. Circulating hot water balance report.
 - 6. Certificate of disinfection of domestic water lines as required by local authority.
 - 7. Install valve charts in Mechanical Rooms.
 - 8. Submit factory start-up reports for:
 - a. Water heaters

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9. Include with insulation material submittal letters from the insulation material manufacturer certifying that the insulation material does not contain asbestos in any shape, form or quantity.

END OF SECTION

SECTION 22 1000

MATERIALS AND METHODS – PLUMBING

PART 1 - GENERAL

1.1 SCOPE:

A. Section 22 0500 - "General Provisions - Plumbing" shall apply to and become part of this Section.

PART 2 - MATERIALS: (Unless otherwise noted, all pipe, fittings and valves shall be manufactured in the United States of America)

NOTE: All materials used in systems that may be used for potable water shall meet the Reduction of Lead in Drinking Water Act.

2.1 SANITARY, WASTE AND VENT PIPING:

- A. Inside building to foundation wall: Vent piping smaller than 3": Cast iron or PVC-DWV. Waste piping above floor: Cast iron, DWV copper or PVC-DWV. Piping below slab on grade: PVC-DWV plastic. Pipe exposed in mechanical rooms or housekeeping rooms shall be cast iron. Piping in return air plenums shall not be PVC.
- B. Outside building (from foundation wall to sewer provided under the Civil Section) 2'-0" or more below grade in non-traffic areas: PVC-DWV, or cast iron. Less than 2'-0" cover and in traffic areas: Cast iron or Ductile iron.
- C. Cast iron hub-and-spigot soil pipe: tar coated with cast iron fittings of corresponding weight. Service weight, ASTM Specification A 74.
- D. Cast iron soil pipe: cast iron no-hub pipe and fittings, CISPI Standard 301, ASTM A888 shall be used only above slab on grade.
- E. Ductile iron pipe: Class 52, ASTM A746, ANSI/AWWA C151/A21.51 cement lined, fittings of corresponding weight, but not cement lined.
- F. DWV copper pipe: copper drainage tube DWV meeting ASTM B 306 with cast bronze solder joint drainage fittings, ANSI B-16-23.

- G. PVC-DWV plastic pipe: PVC-DWV, ASTM D-2665 shall not be used in ceiling plenum return. Solid core only permitted. Cell core not allowed. Provide PVC to cast iron adaptors below slab on grade for caulking or compression joint. No hub bands are not allowed. As an alternative provide coupling equal to Mission Heavyweight at the finish floor.
- H. Joints for cast iron piping: compression gasket especially made for cast iron soil pipe, ASTM FC-564-85.
- I. Joints for no-hub cast iron piping: no-hub neoprene gasket and stainless steel coupling CISPI Standard 310 & ASTM C1277. Joints for 4" and larger shall be 4-band heavy-weight equal to Husky. No hub bands are not allowed below slab on grade.
- J. Joints in ductile iron pipe: push on joints applied as directed by manufacturer meeting ANSI/AWWA C111/A21.11 requirements.
- K. Joints for PVC-DWV plastic pipe: solvent welded cement, ASTM D-2564, made in accord with ASTM D-2855. Provide cast iron to PVC adaptors, for caulking or compression joint when connecting to a cast iron drain or when converting from cast iron to PVC.
- L. Install vent stacks through roof. Terminate 6" above finish roof or according to local code. Flashing is specified under Roofing Section.

2.2 DOMESTIC WATER PIPING:

- A. Domestic Water piping within building: copper tube. Water piping outside building: copper tube.
- B. Copper tube, ASTM B-88, copper water tube, type "L" hard temper inside building, type "K" outside building. Fittings: wrought copper water tube fittings, ANSI B 16.18 or B 16.22.
- C. Joints on copper tube: soldered as recommended by manufacturer, using 95-5 solder. Lead free solder, flux, etc. is required. Mechanically formed tee fitting, as created by T-Drill, is an acceptable method of installation. All joints created in this manner shall be brazed in compliance with code and in accordance with manufacturer's recommendation. Soft solder joints are prohibited. Installation shall be performed by certified T-Drill crafts people.
- D. Provide temporary construction water at site as required.

2.3 NATURAL GAS PIPING:

A. All gas piping below grade: black steel or plastic pipe or tubing. All black steel gas piping below grade, mill- wrapped with fittings field-wrapped with PVC tape, same thickness as mill wrapping. Mill wrapping shall be X-TRU COAT. Ferrous piping shall be holiday tested prior to backfilling. All gas piping above grade: Black steel.

- B. Black steel pipe, schedule 40, ASTM A-53 or A-106. Fittings on pipe 2" and smaller, black malleable iron screwed fittings, ASTM A-197. Fittings on pipe 2-1/2" and larger, welded, using butt welding fittings.
- C. Plastic pipe or tubing: Polyethylene pressure pipe and fittings conforming with ASTM D 2513. Note: May be used only below grade and cannot be used in or below any building. Transition to steel piping shall be by anode less transition fittings conforming to Category I of ASTM D 2513 and U.S. DOT 49CFR 192.281(e). (Use must be verified with Local Authority).
- D. Joints on black steel screwed pipe made up with Teflon tape applied to male threads only.
- E. Joints on plastic pipe made up with compression couplings or heat fusion joints as recommended by the manufacturer in complete accord with the local authority.
- F. Unions 2" and smaller, black malleable iron screwed, unions 2-1/2" and larger flanged.
- G. Arrange for tapping of utilities main, service from main to meter and installation as required by local utility. Pay all charges, fees, temporary deposits, etc. (Contractor is responsible to verify pressures, main and service extensions with the local utility prior to installing any new pipe).
- H. Connect to existing gas piping where shown.
- I. All gas piping in the 2 psig system, labeled at the beginning, at all gas cocks, at ends and at 6' intervals with labels reading "2 psig". See piping identification for materials.
- J. Appliance type regulators as shown on drawings. Regulators shall have vent limiting device as required by local code and local utility, or shall be vented to the exterior as approved by Architect.

2.4 PLUMBING VALVES:

- A. Supply water piping valves as specified. All valves shall meet the Reduction of Lead in Drinking Water Act.
 - Ball valves: (2" and smaller) all bronze, 600 psig WOG, 150 psig WSP, stainless ball and stem, full port, Teflon seats, stem packing seal and thrust washer. Nibco T585-66-LF or S-585-66-LF, Watts, Apollo, Milwaukee or Josam. Provide extension stem capable of clearing 2" insulation, with memory stop, when operated will not disturb vapor seal of insulation.
 - 2. Check valves 2" and smaller: All bronze, 125 psig WSP, swing check, Nibco S-413-Y-LF, Milwaukee or Watts.
 - 3. Water pressure reducing valves: For low flow Watts LFU5B; higher capacity Watts Series LF115, or Wilkins, Conbraco or Cash Acme, complete with inlet strainer, unions and inlet and outlet pressure gauges.

- 4. Calibrated balancing valves ("Circuit Setter"): 125 psig WP, 2" and smaller bronze, screwed; 2-1/2" and larger IBBM, flanged plug valves. All with indicator for angular position of valve, meter connections with positive shut-off valves and internal seals to prevent leakage around stem. Valves should have a locking device to prevent opening past preset position. For each valve provide a flow vs. differential pressure vs. angular position calibration chart and pre-formed foam insulation suitable for temperatures from 35 to 250F. Nibco 1810LF (small) or 737 (large), Armstrong, B&G, Taco or equal.
- B. Natural gas valves: 2" and smaller, Milwaukee BB2-100, Nibco FP-600, Conbraco GB-10/11, GB-50 series, or Resun R-1430 with CSA seal of approval, 175 psi.

2.5 PIPE HANGERS:

- A. General: Pipe hangers, Anvil, PHD, Michigan Hanger, B-Line or Elcen. Anvil figure numbers are given for reference. Provide copper clad or plastic coated hangers on bare copper lines.
- B. Equip pipe hangers with vibration isolators as specified under Vibration Isolators.
- C. Pipe hangers for lines 3" and smaller: adjustable wrought ring hangers, Anvil Fig. 97 or 69 or wrought clevis hangers.
- D. Pipe hangers for piping 4" and larger: adjustable wrought clevis hangers.
- E. Parallel piping graded in same direction may be grouped on trapezes. Trapezes for line 4" and smaller, Unistrut P2000 channel, or equal, with rods sized as specified below for largest pipe on trapeze. Guide lines on (but not anchor to) trapezes using Unistrut Series P1100 clamps. Trapezes shall not exceed 3' in length. Space lines to allow at least 3" clear between adjacent pipe or pipe covering and between pipes or pipe covering and rods. Space trapezes as specified for pipe hangers based upon smallest size of pipe on trapeze.
- F. Provide riser clamps on pipe risers on each floor. Clamps in contact with copper or plastic pipe, plastic coated.
- G. Beam Clamps: Anvil Fig. 228.
- H. Inserts for hangers in concrete structures: Underwriter's listed cast iron inserts. Anvil Fig. 282.
- I. For fasteners in existing concrete structures use drilled in expansion anchors with load rating at least 150% of pipe hanger rating (powder driven anchors are not acceptable).
- J. Size rods for pipe hangers not smaller than the following: 3/8" rods for pipe up to 2", 1/2" for 2-1/2" and 3" pipe, 5/8" rods for 4" and 5" pipe, 3/4" rods for 6" pipe, and 7/8" rods for 8", 10" and 12" pipe, 1" rods for 14" and 16" pipe and 1-1/8" rods for 18" pipe.

- K. Support plumbing water, medical gas and vacuum piping within stud partitions with brackets as manufactured by P&M Bracket Company, Sumner Products, B-Line Ruff-in or Holdrite. Wire is expressly prohibited. Support horizontal plumbing soil and waste piping within stud partitions with Unistrut anchored to floor. Provide fire treated wood backing where required to anchor fixtures and brass securely.
- L. Space pipe hangers at maximum: 5' intervals for cast iron pipe. Pipe hanger spacing for screwed, solder joint and welded piping: 1/2" and 3/4", 6 ft.; 1" to 1-1/4", 8 ft.; 1-1/2" to 2-1/2", 10 ft.; 3" and over, 12 ft. Install additional hangers at change of direction and valve clusters.
- M. Install pipe hangers on insulated pipe over pipe covering. Provide factory fabricated insulated pipe shields equal to Pipe Shields, Inc. "Thermal Hanger Shields" or Tru-Balance insulated saddles at hangers. Provide shield insulation of rigid calcium silicate indoors or rigid Perlite Silicate outdoors, the same thickness as adjacent pipe covering. (At Contractor's option, pipe shields may be field fabricated using rigid calcium silicate or foamglass insulation with ASJ and 20 gauge galvanized steel protector. Shield length: 1.5 times nominal pipe size but not less than 4".)

2.6 THERMOMETERS AND GAUGES:

- A. Non-mercury in glass blue reading separable socket industrial thermometers with die cast aluminum or high impact plastic casings of appropriate pattern for each installation, 9" scale lengths and ranges shown, Palmer, Trerice or Weksler. Install thermometers in brass or stainless steel wells. Equip thermometers installed in insulated lines with 1" extension stems or stems long enough to permit unions to clear insulation whichever is greater.
- B. Where shown install brass thermometer wells with screwed caps. Install wells at an angle to retain oil. Size well to fit thermometers specified.
- C. Enlarge pipe 2" and smaller to 2-1/2" at thermometers and thermometer wells.
- D. Install 4-1/2" dial pressure gauges where shown. Gauges shall have bronze or stainless steel bourdon tubes, 316 stainless steel movement, aluminum or polypropylene solid front cases, adjustable micrometer pointer and accuracy Grade 2A not less than 1/2% of full scale over the entire range, without mounting flange. Gauges shall be Ashcroft 1279, Marsh Series P01, Trerice 450-B, Weksler AA44-2 or U.S. Gauge 1980L with minimum bourdon tube diameter of 3". Provide ball valves for all pressure gauges. Provide siphons for steam gauges.
- E. Where shown, provide temperature and pressure measurement plugs and caps equal to Peterson Equipment Co., Inc. "Pete's plug with Nordel seats and seals". Provide one Pressure and Temperature Kit consisting of a 0-100 psi pressure gauge with adaptors, and two thermometers (25-125°F and 0-220°F), all in carrying cases. Provide nipples for Pete's plugs as required to extend through pipe insulation.

PART 3 - EXECUTION

3.1 PIPE INSTALLATION:

- A. Cut pipe square and ream full size after cutting. Clean pipe. Make threaded joints with Teflon tape. Do not spring pipe into place.
- B. Slope Sanitary Drain Lines:
 - 1. 3" and larger: minimum 1/8" per 1'.
 - 2. Less than 3": minimum 1/4" per 1'.
- C. Install piping to allow for expansion. Make connections to plumbing fixtures and all equipment to eliminate undue strains in piping and equipment. Furnish necessary fittings and bends to avoid springing of pipes during assembly.
- D. Install chrome plated floor and ceiling plates on pipe passing through finished surfaces in finished spaces.
- E. Make horizontal water line size reductions using eccentric reducers (tops flat).
- F. Install 3/4" ball valve drains with hose adaptors at low points of water piping and at bases of all risers (where shown provide larger drains). Provide screwed caps with chains on hose adaptors.
- G. Make connections to equipment using screwed unions in sizes 2" and smaller and flanged unions in sizes 2-1/2" and larger. Install unions in all piping connections to each piece of equipment. Provide unions on all sides of control valves.
- H. Wherever ferrous pipes or tanks and copper tubing connect, provide dielectric insulating unions or couplings, equal to Victaulic style 47, "V-line" insulating couplings as manufactured by Lochinvar, thread to thread or CTS fabrication flange adaptors for flange connections.
- I. Near heating and air conditioning equipment requiring water provide valved and capped water outlets of sizes shown for connection to equipment, including reduced pressure principal backflow preventers. Make final connections under HVAC work. *Note that all piping and insulation downstream from backflow preventer must be painted yellow.*
- J. Run piping concealed, except where specifically shown or specified to be exposed. Plumb all vertical lines and run mains parallel to building walls unless specifically shown otherwise.
- K. Lay underground pressure piping so top of pipe is at least 18" below finished grade. Support all underground piping solidly along body of pipe. Strongly suspend other piping from building construction.

- L. Pipe shall be braced at flexible connections to prevent blowouts under operating conditions.
- M. Lay out and grade all gas piping so as to have a minimum of trapped lines. Where trapping of pipe is unavoidable, provide 4" to 6" scale pocket at low point, with removable cap fitting accessible for cleaning out pocket. Install 175 psig WP bronze cock and union at all connections to gas-fired equipment.
- N. Install no gas piping beneath interior slabs on grade. Where gas piping must be installed below slab on grade, pipe must be encased in steel pipe sealed and vented to exterior as shown on detail.
- O. Run no piping or tubing in direct contact with slag fill. Where necessary to pass through slag, protect piping with not less than two wrappings of polyvinyl chloride tape or equivalent protection approved by Architect.
- P. Provide water hammer arrestors equal to Wilkins WH2950XL. Refer to drawings for location and P.D.I. size. Shock arrestors are required on all equipment with solenoid shutoff valves such as washing machines and dishwashers whether shown or not. Select WH2950XL for use with fixtures which may supply drinking water. Equal by Josam, J.R. Smith, Wade, or Sioux Chief is acceptable.

3.2 INSTALLATION OF VALVES:

- A. Provide shut-off valves in supply and return connections to each item of equipment. Locate valves to isolate each item to facilitate maintenance and/or removal.
- B. Provide check valve in discharge line adjacent to each pump.
- C. Locate valves in piping connections to heat exchangers, water heaters, etc., so heads and tube bundles can be removed without disconnecting equipment or piping other than union or flange connections immediately adjacent to the equipment.
- D. Provide sweat to screw adaptors where required.
- E. Install with valve stems upright or horizontal.

END OF SECTION

SECTION 22 1500

THERMAL AND ACOUSTICAL INSULATION FOR PLUMBING SYSTEMS

PART 1 - GENERAL

1.0 GENERAL:

A. All insulation shall be installed by an insulation contractor in business a minimum of 3 years as an insulation contractor and has completed projects similar in scope to this project.

1.1 SCOPE:

- A. Section 22 0500 "General Provisions Plumbing" shall apply to and become part of this Section.
- B. Repair existing insulation at points of connection and/or alterations to existing work.
- C. "Exposed" is defined as: Exposed to view when construction is complete. (Items which are not "exposed" are considered "concealed".)
- D. The use of any material containing asbestos is strictly prohibited.
- E. Include with insulation material submittal letters from the insulation material manufacturer certifying that the insulation material does not contain asbestos in any shape, form or quantity.

1.2 INSULATION:

- A. Comply with NFPA 90A.
- B. Pipe hanger shields are specified in Section 22 1000 "Materials and Methods Plumbing."
- C. Use insulation and adhesives with Underwriter's Laboratories and ASTM E-84 flame spread rating not over 25 without evidence of continued progressive combustion, and smoke developed rating not exceeding:
 - 1. 50 for pipe covering located in air ducts, plenum or casings.
 - 2. 150 for all other pipe and equipment insulation.

PART 2 - MATERIALS

2.1 FIBERGLASS PIPE COVERING:

- A. Snap-on glass fiber insulation minimum density 5#/cu. ft. maximum thermal conductivity at 75°F mean temperature 0.25 BTU/(hr)(sq. ft.)(°F/in) with UL rated vinyl coated and embossed vapor barrier laminate of aluminum foil and kraft reinforced with glass fiber yarns (ASJ). For domestic hot water circulating system, thermal conductivity shall be 0.27 BTU/(h)(sq.ft.)(°F/in.) at 75°F mean temperature.
- B. For all lines seal jacket with self sealing lap. Butt adjoining sections of insulation tightly and seal with self-adhering butt joint strips.
- C. Cover fittings to thickness of adjacent covering with factory pre-molded fitting covers. Cover flanged valve bodies and flanged unions. Do not cover screwed unions on hot lines. Finish concealed fittings with a skim-coat of mastic and when mastic is dry, fitting shall be covered with glass fab and vinyl acrylic mastic unless otherwise noted below. Zeston type fitting covers may be substituted for glass fab and final coat of mastic on concealed fittings provided fire and smoke ratings are met. Finish fittings exposed in equipment rooms, boiler room, and in finished spaces with vinyl acrylic mastic over glass fab over mastic.
- D. At contractor's option, concealed tees may be insulated with field fabricated tee covers consisting of straight pipe covering on run of tee with notch at branch together with pipe covering on branch contoured to fit notch. Glass fab over skim coat of mastic shall be applied around main, lapping contoured joint at branch by 2" minimum for the full 360° of joint. Cover entire fitting covering with vinyl-acrylic mastic over glass fab, 1/8" thick (dry) coat. Submit sample of fabricated tee covering to Architect for approval before work is begun.

2.2 FOAMED PLASTIC PIPE COVERING: (DO NOT USE IN PLENUMS UNLESS COMPLIES WITH PARAGRAPH 1.2 ABOVE):

- A. Fire retardant foamed plastic pipe covering, maximum K factor at 75°F mean temperature not exceeding 0.27 BTU/(hr)(sq.ft.)(°F/in).
- B. Pipe covering may be seamless insulation slipped over piping before erection or may be slit longitudinally and installed over erected piping.
- C. Make fitting covers from segments of pipe covering.
- D. Cement all joints and seams in accordance with manufacturer's instruction.
- E. Fit pipe hangers over insulation (see PIPE HANGERS). Use hanger shields as specified under pipe hangers.

- F. Where exposed outside, cover insulation with aluminum jacket.
- G. Armacell, Aeroflex or Normaco.

PART 3 - INSTALLATION

3.1 PLUMBING PIPING:

- A. Bodies of floor drains and floor sinks serving refrigeration equipment, AC units and ice machines and traps and waste piping between such drains and waste stack: "Foamed plastic pipe covering", 1" thick.
- B. Cold water piping, interior, above grade: "Fiberglass pipe covering", 1" thick. Pipe insulation in partitions and chases may be 1/2" thick.
- C. Hot water piping, interior, above grade: "Fiberglass pipe covering", 1" thick. Pipe insulation in partitions and chases may be 1/2" thick. All piping in recirculating system shall have 1" thick insulation for up to 1-1/4" pipe, and 1-1/2" thick insulation for 1-1/2" and larger pipe.

END OF SECTION

SECTION 22 2000

PLUMBING FIXTURES AND EQUIPMENT

PART 1 - GENERAL

1.1 SCOPE:

A. Section 22 0500 - "General Provisions - Plumbing" and Section 22 1000 - "Materials and Methods - Plumbing" shall apply to and become part of this Section.

PART 2 - PRODUCTS

2.1 DRAINS:

- A. Mechanical Room Floor Drains (MFD): J.R. Smith 2330 with sediment bucket, deep seal trap, and trap primer connection where shown or required.
- B. Floor drain FD: J.R. Smith 2005A with 6" nickel bronze grate. Select square top for tile floors. Provide primer connection where shown. Provide deep seal trap on all floor drains.

2.2 TRAP PRIMER:

A. Trap Primer: Precision Plumbing Products Model P-2 with distribution unit(s) as required.

2.3 WALL HYDRANT:

A. J.R. Smith 5509-QT or Prier C-634, with integral backflow preventer, latching cover, freeze-proof and of proper length for wall in which installed, verify with Architect finish of stainless steel, polished bronze, nickel bronze or rough bronze box face. Valve must be on building side of exterior wall insulation. Install with center line 24" above finish grade. Provide Owner with one loose key for each wall hydrant. For pre-cast exterior walls use J.R. Smith 5609-QT.

2.4 HOSE BIBB:

A. T&S B-0736-POL, chrome-plated with removable tee handle in finished areas, and Model No. B-0736-RGH rough bronze in unfinished areas complete with vacuum breaker. Provide to Owner one loose key for each loose key hose bibb.

2.5 ROOF HYDRANT:

A. J.R. Smith 5906 non-freeze roof hydrant, with flashing clamp and underdeck clamp. Pipe drain to janitor's sink or mechanical room floor drain.

2.6 CLEANOUTS:

- A. Furnish and install cleanouts where indicated on drawings and at all 90-degree bends, angles, upper terminals and not over 50' apart on straight runs. All cleanouts on cast iron piping to have bronze countersunk rectangular tapered slotted plugs. PVC piping cleanouts shall be standard of piping system used. Flush-with-floor cleanout access covers shall have non-skid covers. All wall cleanout access covers shall have polished satin finish. All cleanouts shall be full size of pipe, 8" and less.
- B. Exposed Cleanouts: Cast brass plug type, J.R. Smith 4470T.
- C. Wall type cleanout plug and access covers, J.R. Smith 4472T. Cleanout plug must be within 1" of finish wall and must be tapped for access cover. On PVC plastic waste pipe in wall: Cleanout access cover J.R. Smith <u>4710</u>.
- D. Floor type cleanout access covers in unfinished areas: J.R. Smith 4239L/LXH-NB. Finished areas: J.R. Smith 4111L/LXH-NB. Plug must be within 3" of finished floor. Provide 4193L/LXH-NB covers where installed in terrazzo floors. Grout cleanout below access cover to seal watertight. Provide option 14 cleanout carpet markers where installed in carpeted floors.
- E. Coordinate the exact location of all cleanouts with the Architect.

2.7 PLUMBING FIXTURES:

- A. Unless otherwise specified, all fixtures complete as catalogued, white color, exposed metal trim chromium plated. Fixtures shall be without discoloration, chips or flaws and shall be free from cracks. Warped or otherwise imperfect fixtures will not be acceptable.
- B. Clean all fixtures to a clean and sanitary condition.
- C. Fixtures and brass shall be securely anchored. Carriers shall be securely anchored to floor with lag bolts, as recommended by the manufacturer. Do not conceal until Architect has observed anchors.
- D. Flush valve supports equal to Sloan "YJ" shall be installed 1" below vacuum breaker, on all flush valves. Flush valves on A.D.A. water closets must be set so that handle is to the wide side of the stall and handle is no more than 44" above finish floor.
- E. Seal wall hung fixtures at wall with white caulk. Seal countertop fixtures with clear silicone sealant. Seal floor mounted fixtures at floor with grout.

- F. All fixtures noted to be A.D.A. approved must be set with great care to assure proper mounting height and proper distance from wall. Elevation of flush valves shall be coordinated with grab bars (see Architect).
- G. All supplies, stops, faucets, etc. on fixtures that could be used for drinking water shall meet the Reduction of Lead in Drinking Water Act.
- H. Contractor shall coordinate all sinks and faucets with casework/millwork shop drawings prior to purchase of sink/faucet. In particular, coordinate A.D.A. vs. non-A.D.A. fixtures with casework/millwork. Failure to do so will make contractor liable for incorrect fixtures.
- I. All items complete as catalogued as follows:

WC1 Water Closet (Floor mount, flush valve, ADA): Kohler K-96057, 16-1/2" floor to rim, to meet A.D.A., Sloan Regal 111 flush valve complete with "YJ" pipe support and Church 295 NSSC white open front seat. Install flush valve with handle on wide side of stall or room. Must meet A.D.A.

LV1 Lavatory (Wall hung, 0.5 gpm, ADA): Kohler K-2006, wall hung, McGuire LF165 supplies with stops, 8872 P-trap, 155A strainer and tailpiece. Zurn Z-81101-G-3M-XL centerset faucet, pop-up waste, 0.5 gpm aerator, 2-1/2" lever handles. Provide J.R. Smith 700 or 700D carrier and set with rim 31" A.F.F. Include ASSE 1070 point of use mixing valve equal to Wilkins ZW3870T for public lavatories. Provide trap wrap for exposed p-trap, supplies and stops.

EWC1 Electric Water Cooler (Wall hung, bi-level, bottle filler, filter): Elkay LZSTL8WSSK bilevel water cooler with bottle filler and filter. All stainless steel, J.R. Smith Carrier, McGuire LF165 supply with stop and 8872 P-trap.

JR1 Janitors Receptor (Floor mount, terrazzo): Stern Williams MTB-2424, 24" x 24" x 10" deep pre-cast terrazzo with aluminum guards on exposed sides and silicone sealant at walls. Provide splash catcher panels on adjacent walls. Provide T&S B-667-RGH faucet with spring checks. Set 42" above finish floor complete with 48" long heavy-duty hose.

2.8 PLUMBING EQUIPMENT:

- A. **EWH-1 Electric Water Heater:** A.O. Smith DEL, tank type. Install per detail.
- B. **CP-1 Circulating Pump:** B&G PL all bronze.

2.9 EQUIVALENT MANUFACTURERS:

- A. Where Kohler fixtures are listed above, Zurn, American Standard, or Toto may be utilized.
- B. Where Sloan flush valves are listed above, Zurn or Delaney may be utilized.
- C. Where Smith is listed above, Josam, Watts, Zurn or Wade may be utilized.

- D. Where Elkay water coolers are mentioned above, Halsey Taylor, Sunroc, or Oasis may be utilized.
- E. Where B&G is listed above, the equal of Armstrong, Taco, or Thrush may be utilized.
- F. Where Church water closet seats are listed above, Zurn, Beneke, Bemis, Centoco or Olsonite may be utilized.
- G. Where Lawler combination pressure balanced and thermostatic mixing valves are listed above, Powers, Symmons, or Leonard may be utilized.
- H. Where A.O. Smith water heaters are listed above, Lochinvar, Rheem, State or Bradford White may be utilized.
- I. Where Stern Williams is listed above, Fiat, or Zurn may be utilized.
- J. Where McGuire is listed above, the equal of Zurn, Watts, Dearborn or Brasscraft may be utilized.

PART 3 - EXECUTION:

3.1 MANUFACTURER'S INSTRUCTIONS:

A. Install all plumbing equipment and fixtures as recommended by the manufacturer's recommendations.

END OF SECTION

DIVISION 23 – HVAC

23 0500 - GENERAL PROVISIONS – HVAC 23 1000 - MATERIALS AND METHODS – HVAC 23 1500 - THERMAL AND ACOUSTICAL INSULATION FOR HVAC SYSTEMS 23 5000 - HEATING AND AIR CONDITIONING EQUIPMENT AND SPECIALTIES 23 6000 - AIR DISTRIBUTION 23 7000 - HVAC TESTING AND BALANCING 23 8000 - CONVENTIONAL AUTOMATIC CONTROLS

END OF SECTIONS



GOODWYN, MILLS & CAWOOD, LLC GMC PROJECT NO.: AHUN210012 MWDDA 222035 Division 23 – HVAC Seal Page
GENERAL PROVISIONS – HVAC

PART 1 – GENERAL

1.1 SCOPE:

- A. Provisions of this Section apply to all Heating, Ventilating, and Air Conditioning (HVAC), Controls, and Test and Balance work.
- B. Include the provisions of General Conditions as part of this Section.
- C. Provide all labor, materials, equipment, and services necessary for the completion of all HVAC work shown or specified, complete and ready for operation, consisting in general of the following:
 - 1. Two (2) Rooftop units with natural gas heat.
 - 2. One (1) Exhaust fan.
 - 3. Two (2) Mini-Split system.
- D. Give required notices, file drawings, obtain and pay for permits, deposits and fees necessary for the installation of the HVAC work. Obtain and pay for inspections required by laws, ordinances, rules, regulations or public authority having jurisdiction. Obtain and pay for certificates of such inspections, and file such certificates with Owner.
- E. "Provide" means to furnish and install, complete and ready for operation.

1.2 DRAWINGS:

- A. HVAC Drawings are diagrammatic and subject to requirements of Architectural Drawings and conditions existing in the field. HVAC Drawings indicate generally the location of components and are not intended to show all fittings or all details of the work.
- B. Follow the drawings closely, coordinate dimensions with Architectural Drawings and field conditions. DO NOT scale HVAC drawings for location of system components.
- C. Make no changes without Architect's written permission. In case of doubt, obtain Architect's decision before proceeding with work. Failure to follow this instruction shall make the Contractor liable for damage to other work and responsible for removing and repairing defective or miss-located work in proper manner.

- D. DO NOT scale drawings to locate ceiling diffusers. COORDINATE with lighting and ceiling grids. Contractor for HVAC work is responsible for coordinating with all trades.
- E. Drawings and specifications are complementary. Work shown or specified in one is binding as if shown or specified in both. Any discrepancies between the drawings and specifications shall be brought to the attention of the Consultant for clarification during the bidding period. No allowance shall be subsequently made to the Contractor by reason of his failure to have brought said discrepancies to the attention of the Consultant during the bidding period or by reason of any error on the Contractor's part.
- F. No attempt has been made to establish the required sections or splits of equipment relative to the size of access into the space, building, etc. Contractor shall establish all said splits, sections, etc. necessary to install equipment complete without undue disassembly of equipment or demolition of building parts at site of work.

1.3 APPLICABLE CODES AND STANDARDS:

- A. Comply with the current editions of the following Codes and Standards:
 - 1. ANSI/B31.9 Code for Building Services Piping
 - 2. ANSI/ASHRAE 15 Safety Code for Mechanical Refrigeration
 - 3. ASHRAE 62.1 Ventilation for Acceptable Indoor Air Quality
 - 4. ASHRAE 90.1 Energy Compliance
 - 5. NFPA 30 Flammable and Combustible Liquids Code
 - 6. NFPA 54 National Fuel Gas Code
 - 7. NFPA 70 National Electrical Code
 - 8. NFPA 90A Installation of Air Conditioning and Ventilating Systems
 - 9. NFPA 101 Safety to Life from Fire in Buildings and Structures
 - 10. Other standards as referenced in other sections of Division 23
 - 11. 2015 International Building Code
 - 12. 2015 International Plumbing Code
 - 13. 2015 International Fuel Gas Code
 - 14. 2015 International Mechanical Code

15. 2015 International Energy Conservation Code

1.4 QUALIFICATIONS OF SUBCONTRACTOR:

- A. The HVAC Subcontractor shall meet the following qualifications:
 - 1. He shall have been in business as a HVAC contractor for at least 3 years prior to the date of opening bids, and shall have held a license from the **Alabama** State Licensing Board for General Contractors for at least 3 years.
 - 2. He shall have a satisfactory experience record with HVAC installations of character and scope comparable with this project, and for at least 3 years prior to the date of opening bids shall have had an established service department capable of providing service inspection or full maintenance contracts.
 - 3. If the HVAC subcontractor, with the Engineer's approval, uses a sub-subcontractor to provide another discipline that the subcontractor does not normally furnish, that sub-subcontractor shall meet the same qualifications as the subcontractor.

1.5 CONFLICTS AND INTERFERENCES:

A. If systems interfere or conflict, the Architect shall decide which equipment to relocate regardless of which was first installed.

1.6 WORKMANSHIP:

A. Do all work in a neat and first-class manner. Remove and replace work not done in such manner as directed by the Architect.

1.7 COOPERATION:

A. Cooperate with all other crafts. Perform work in a timely manner. Do not delay the execution of other work.

1.8 VISITING SITE:

A. Visit site and become familiar with location and various conditions affecting work prior to bid. No additional allowance will be granted because of lack of knowledge of such conditions. No consideration shall be given to future claims due to existing conditions. Any discrepancies or interferences shall be reported immediately to the Architect/Consultant.

1.9 MATERIALS:

- A. Unless otherwise noted, provide new, standard, first-grade materials throughout. **Unless** otherwise noted, all pipe, fittings and valves shall be made in the United States of America.
- B. Where materials or products are specified by manufacturer's name, brand, trade name, or catalog reference, such named materials or products shall be the basis of the estimate, without substitution, and shall be furnished under the contract unless requests for equivalents are approved as noted below. Where two or more brands are named the choice of these shall be optional with the Contractor.
- C. Equivalents will be considered only if written request for approval has been received by the Architect (from a general contract bidder) 10 days prior to the date established for receipt of Proposals. Each request shall include the name of the material or equipment for which an equivalent is proposed and a complete description of the proposed equivalent including drawings, cuts, performance and test data, and deviation from the specification and any other information necessary for evaluation. A statement setting forth any changes in other materials, equipment or other Work that incorporation of the equivalent may require shall be included. The burden of proof of the merit of the proposed equivalent is upon the proposer. The Architect's decision of approval or disapproval of a proposed equivalent is final.
- D. If the Architect approves any proposed equivalent prior to receipt of Proposals, approval will be set forth in an Addendum. **DO NOT RELY UPON APPROVALS MADE IN ANY OTHER MANNER.**
- E. No proposed equivalent will be considered after the Contract has been executed, except as described in the General Conditions.
- F. Within 45 days of execution of contract and before ordering materials or equipment, submit to Architect and obtain his approval of a detailed list showing each item which is to be furnished by make, trade name, catalog number, or the like; together with manufacturer's specifications, certified prints, and other data sufficient for making comparisons with items specified. When approved, such schedule shall be of equal force with these specifications in that no variation there from shall be allowed except with Architect's written approval. Submit PDF format files for approval. Provide PDF files of approved data for project close-out.

1.10 SHOP DRAWINGS:

- A. Before starting work, submit and obtain approval of detailed drawings of the following, fully dimensioned (including elevations of ductwork and piping) and drawn to 1/4" to 1'-0" scale.
 - 1. Ductwork (do not scale for diffuser locations, but coordinate with ceiling grids and lighting layout). See Section "Air Distribution". Shop drawings shall include material type galvanized, finish (paint grip, etc.), actual sizes increased to allow for internal insulation and gauges along with fabrication section notes for individual sections. In addition, include elevations of bottom of duct above finished floor level. Show building sections

through congested areas for coordination with structure and other disciplines. Provide joint details, duct seal methods, insulation type, etc.

- B. Submit complete control and power wiring diagrams for approval before installing controls. See Controls Section.
- C. Engineers' CAD/electronic drawings files will be available upon request for the convenience of the contractor and for use in preparation of shop drawings. A service fee of \$100.00 per drawing sheet file shall be remitted to the Engineer prior to delivery of CAD/electronic drawing files along with a signed agreement between the Engineer and Contractor.

1.11 RECORD DRAWINGS:

- A. When work starts the Architect will furnish two complete sets of white prints of the HVAC Drawings. All corrections, variations, and deviations, including those required by change orders, if any, must be recorded in colored ink or colored pencil at the end of each working day on these drawings. The marked prints shall be available at all times for the Architect's inspection.
- B. Prior to examining the request for final payment or making any response thereto, the Architect shall receive from the Contractor one complete set of the white prints, marked as stated above, indicating the actual completed installation of the work included under this contract.
 - 1. Accurately show location, size and elevation of new exterior utility work and its relationship to any existing utilities, obstructions, etc., contiguous to the area of work.
 - 2. Block out areas modified by change-order & identify them by change-order number.
 - 3. The Architect will forward the marked white prints to the Consulting Engineers for review. They will then be returned by the Architect to the Contractor for use in preparing record drawings.
- C. When work is completed, the Engineers' CAD/electronic drawing files will be made available upon request for the convenience to the contractor for a service fee of \$100.00 per CAD/electronic drawing sheet file and for use in preparing record drawings. Contractor shall transfer the information from the marked white prints to the CAD files, removing all superseded data in order to show the actual completed conditions.
- D. Ductwork and Control Drawings (may be CAD files or a set of mylar reproducible shop drawings), up-dated to show actual conditions at completion of work. Include the contract drawings equipment schedules and details edited to show actual completed conditions.

1.12 PROTECTION OF ROTATING PARTS:

A. For this paragraph only, "exposed" shall mean located in a casing or room or plenum with door large enough to admit a man.

B. Equip exposed belt drives with belt guards with holes for measuring speeds of driven shafts.

1.13 PROTECTION OF EQUIPMENT:

- A. During construction, protect mechanical equipment from damage or deterioration.
- B. When installation is complete, clean equipment and make ready for painting.

1.14 INSTALLATION OF EQUIPMENT:

- A. Install equipment to provide normal service access to all components.
- B. Where drawings show sufficient space for removing components, install equipment to provide such clearance. Provide space at all equipment power and control panels as required by local codes.
- C. Install equipment in accordance with manufacturer's instructions. If manufacturer's instructions conflict with contract documents, obtain Architect's decision before proceeding.
- D. All equipment shall be firmly fastened in place:
 - 1. Roof curbs shall be secured to deck and structure and curb mounted items shall be secured to curbs.
 - 2. Air devices connected by flexible duct shall be secured independently of all other building systems to prevent falling if grid shifts.

1.15 EQUIPMENT SUPPORTS:

- A. Provide supports for ductwork, piping and equipment. Hot dip galvanize after fabrication all grillage, supports, etc., located outdoors. Prime coat and paint all grillage, supports, etc. located indoors. Where noted provide 304 stainless steel supports. At the Contractor's option, all grillage, supports, etc. located outdoors may be 304 stainless steel instead of hot dip galvanized.
- B. Provide factory fabricated equipment roof supports with tops 16" above roof line for roof mounted items as shown. Supports shall have integral cants, pressure treated wood nailers, and counter flashing. Supports shall be galvanized steel, gauge as required for loads, 18 gauge minimum.

1.16 CUTTING AND PATCHING AND INCIDENTAL WORK:

A. Set sleeves and inserts and lay out and form openings in walls, beams, girders and structural floors in this Section.

- B. Cut, patch and repair as required to accomplish HVAC Work and finish to match adjacent work. Architect's approval required before cutting any part where strength or appearance of finished work is involved.
- C. Provide all motors incidental to the HVAC systems. Wiring of motors, switches and starters is included in "Electrical Sections".
- D. Do all control wiring required for HVAC work and all power wiring required by Control Panels, Control System, and Control Devices.
- E. Furnish motor starters as specified below.
- F. Permanent drain connections from AC units, etc., to nearest floor drain are included in this Section.
- G. Door louvers are not included in this Section.

1.17 FLASHING:

- A. General: Furnish all fan curbs, pitch cups, metal base flashing and counter flashing required for HVAC Work. Installation of above items is specified in Roofing Section.
- B. Fan curbs for power roof ventilators are specified with the fans.
- C. Pitch Cups: 20 gauge galvanized steel, at least 8" deep, bases mitered and soldered and extending at least 4" horizontally.
- D. Metal Base Flashing: Galvanized steel for ferrous items, and stainless steel for stainless steel duct items. Minimum thickness 22 gauge (0.034") galvanized steel, 20 gauge (0.038") stainless steel, 0.032" aluminum. Bases mitered and soldered extending out at least 4" horizontally and 8" vertically.
- E. Metal Counter Flashing: Of material and gauges specified for base flashing, lapping base flashing at least 3".

1.18 MOTORS, STARTERS & ELECTRICAL EQUIPMENT:

- A. Provide electrical equipment compatible with the current shown on electrical drawings. Verify current characteristics before ordering equipment.
- B. Should the Contractor with the Architect's approval make changes in electrical equipment from that shown on the Electrical Drawings, the Contractor shall be responsible for the cost of required changes.
- C. Provide factory installed fuses in all equipment requiring fusing for branch circuit protection.

- D. Motors: 1750 RPM open drip-proof construction unless otherwise shown or specified. Integral horsepower motors shall meet NEMA premium efficiency levels as stated in the latest version of NEMA MG-1. Allis-Chalmers, General Electric, Goulds, Louis Allis, Westinghouse.
- E. Where motors are shown or scheduled to be connected to a variable frequency drive, this motor shall be an inverter duty rated by the motor manufacturer and shall comply with NEMA MG1, Article 31.
- F. Do not run motors until correct overload elements are installed in starters. Trading overload elements for elements of correct size for motors actually furnished shall be included in this Section.
- G. Furnishing all starters is included in this Section. Starter installation is specified under "Electrical Section". Starters shall be equipped with melting alloy thermal overload and phase loss protection, in all 3 phases.
- H. Starters for the following items are specified with the equipment:
 - 1. RTU-1.
 - 2. RTU-2.
 - 3. CU-1.
 - 4. CU-2.
- I. Unless otherwise shown or specified for single phase motors provide manual starters equal to Square D Class 2510. When installed in equipment rooms provide surface mounted enclosure, and when installed in finished walls outside equipment rooms provide flush mounted enclosure, key operated.
- J. Provide H-O-A switches, fused control circuit transformers, auxiliary contacts, etc., as shown on control diagrams or required by control sequences.
- K. All starters shall be the product of the same manufacturer.
- L. All control panels, electrical assemblies, etc. must bear a label from a recognized testing laboratory as an assembly, not as individual components.

1.19 SLEEVES:

- A. Where exposed ducts pass through walls and partitions, provide 4" wide 20 gauge galvanized steel closure plates except at grilles and registers. Fit closure plates snugly to duct and secure to wall. Grout around ducts and sound absorbers at equipment room walls.
- B. Where exposed pipes pass through walls and partitions in finished spaces, provide chrome plated F & C plates or escutcheons.

1.20 PAINTING:

- A. Refinish equipment damaged during construction to new condition.
- B. Paint un-insulated duct surfaces visible through grilles and registers flat black.
- C. Prime and paint all bare, exposed, exterior piping using type specified in Painting Section.
- D. Prime and paint all grillage, supports, etc. located indoors except where noted to be galvanized.
- E. Other painting is specified in Painting Section, Finishes Division.

1.21 PIPE IDENTIFICATION:

- A. Identify all piping exposed to view or accessible through removable ceilings or access panels with plastic snap-on pipe line markers. Color code markers in accordance with ANSI A13.1. Show pipe contents and direction of flow. (Markers on lines 8" OD and smaller shall be taped in place; on lines over 8" OD secure with spring clips.) Markers shall be equal to Craftmark, Brady, Seton or Brimar.
- B. Protect all factory identification tags, nameplates, model and serial numbers, stenciling, etc., during construction and replace if damaged.
- C. Label Spacing and Extent:
 - 1. On straight run of pipes: Above suspended ceilings space labels approximately 10 feet on center; elsewhere, 20 feet on center.
 - 2. Wherever a pipe enters or leaves a room or building.
 - 3. At change of direction.
 - 4. At main valves and control valves (not equipment valves).
 - 5. At manifolds.
 - 6. On risers, just above and below floors.

1.22 EQUIPMENT IDENTIFICATION:

A. Provide 2" x 3" or larger laminated plastic nameplates with 1/2" numbers and letters in colors specified below. Screw tags to equipment in obvious locations. Engrave equipment designation and numbers as shown on plans and drawings on upper half of tag, leaving lower half of tag for future engraving by Owner.

- B. Provide similar nameplates for motor starters furnished under Division 23.
- C. Secure nameplates with acorn head screws.
- D. Colors:
 - 1. Equipment connected to utility power only black letters on white nameplates.
 - 2. Equipment connected to emergency power red letters on white nameplates.

1.23 EXHAUST FAN IDENTIFICATION:

A. 2" X 3" or larger laminated plastic nameplates with red letters and numbers on white background, identifying type of fan, number according to plans, and rooms served. Engrave on upper half of tag, leaving lower half for engraving by Owner. Fasten with acorn head screws.

1.24 ACCESS DOORS:

- A. Furnish and install access doors for valves, fire dampers, dampers, controls, air vents, and other items located above non-liftout ceilings or behind partitions or walls. Doors in non-fire rated walls and ceilings: 16-gauge steel with hinges and screwdriver latches. Doors in fire rated walls and ceilings: UL labeled with fire rating equal to fire rating of wall or ceiling. Provide door styles compatible with adjoining surfaces as selected by Architect. Size doors to permit removal of equipment and/or maintenance. Doors: Bar-Co, Nystrom, Williams Bros., or equal.
- B. Mark lay-in ceilings with colored vinyl self adhering disc stuck on grid adjacent to maintenance access points.

1.25 TESTS, CLEANING & ADJUSTMENTS:

- A. General:
 - 1. All tests shall be witnessed by the Architect in addition to the authorities having jurisdiction. A minimum of 72 hours notice is required prior to performance of tests.
 - 2. All air duct pressure tests are specified in Section Air Distribution.
 - 3. All HVAC air balance work and HVAC equipment tests are specified in section 23 7000, "HVAC Testing & Balancing". Notify the Testing and Balancing Agency when systems are ready for balancing - see Section 23 7000, "HVAC Testing & Balancing".
 - 4. Testing and Balancing other than that noted above is specified in Section "HVAC Testing & Balancing".
 - 5. All instruments used for testing and balancing work shall have been calibrated within 6 months and checked for accuracy prior to start of work.

- 6. Cooperate in the execution of work specified in Section 23 7000 HVAC Testing and Balancing and provide assistance as noted in Section 23 7000.
- 7. Perform all tests as required by local codes. Contractor shall furnish testing equipment.
- 8. If local codes are more stringent than the following, local codes shall govern.
- B. Refrigeration System: When system is complete, but before the pipe covering has been installed, test components with dry nitrogen and make tight at equipment manufacturer's recommended test pressures. Then evacuate the system to 26" Hg. vacuum which the system shall hold for 24 hours. After passing the above tests, charge and leak test under operating conditions using electronic leak detector.
- C. Air System:
 - 1. Duct Cleaning:
 - a. Clean new duct system(s) before testing, adjusting, and balancing.
 - b. Use service openings for entry and inspection.
 - Create new openings and install access panels appropriate for duct staticpressure class if required for cleaning access. Provide insulated panels for insulated or lined duct. Patch insulation as recommended by insulation manufacturer. Comply with Section 23 6000 "Air Distribution" for access panels and doors.
 - 2) Disconnect and reconnect flexible ducts as needed for cleaning and inspection.
 - 3) Remove and reinstall ceiling to gain access during the cleaning process.
 - c. Particulate Collection and Odor Control:
 - When venting vacuuming system inside the building, use HEPA filtration with 99.97 percent collection efficiency for 0.3-micron-size (or larger) particles.
 - 2) When venting vacuuming system to outdoors, use filter to collect debris removed from HVAC system, and locate exhaust downwind and away from air intakes and other points of entry into building.
 - d. Clean the following components by removing surface contaminants and deposits:
 - 1) Air outlets and inlets (registers, grilles, and diffusers).

- 2) Supply, return, and exhaust fans including fan housings, plenums (except ceiling supply and return plenums), scrolls, blades or vanes, shafts, baffles, dampers, and drive assemblies.
- Air-handling unit internal surfaces and components including mixing box, coil section, air wash systems, spray eliminators, condensate drain pans, humidifiers and dehumidifiers, filters and filter sections, and condensate collectors and drains.
- 4) Coils and related components.
- 5) Return-air ducts, dampers, actuators, and turning vanes except in ceiling plenums and mechanical equipment rooms.
- 6) Supply-air ducts, dampers, actuators, and turning vanes.
- 7) Dedicated exhaust and ventilation components and makeup air systems.
- e. Mechanical Cleaning Methodology:
 - 1) Clean metal duct systems using mechanical cleaning methods that extract contaminants from within duct systems and remove contaminants from building.
 - 2) Use vacuum-collection devices that are operated continuously during cleaning. Connect vacuum device to downstream end of duct sections so areas being cleaned are under negative pressure.
 - 3) Use mechanical agitation to dislodge debris adhered to interior duct surfaces without damaging integrity of metal ducts, duct liner, or duct accessories.
 - 4) Clean fibrous-glass duct liner with HEPA vacuuming equipment; do not permit duct liner to get wet. Replace fibrous-glass duct liner that is damaged, deteriorated, or delaminated or that has friable material, mold, or fungus growth.
 - 5) Clean coils and coil drain pans according to NADCA 1992. Keep drain pan operational. Rinse coils with clean water to remove latent residues and cleaning materials; comb and straighten fins.
 - 6) Provide drainage and cleanup for wash-down procedures.
 - 7) Antimicrobial Agents and Coatings: Apply EPA-registered antimicrobial agents if fungus is present. Apply antimicrobial agents according to manufacturer's written instructions after removal of surface deposits and debris.

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- 2. When system has been completed, remove all trash and dirt, leave all balancing dampers open and install specified filters in all equipment. Check all fan motors for rotation. Provide all items as required for work specified in Section 23 7000 "HVAC Testing & Balancing".
- D. At the beginning of the first heating season, adjust and balance operating phases and repeat at the beginning of the first cooling season or vice-versa, as the case may be, all without charge.

1.26 WARRANTY & INSTRUCTIONS:

- A. See General Conditions One-Year Warranty.
- B. Contractor shall and hereby does warrant all materials, workmanship and equipment furnished and installed by him to be free from defects for a period of one year after date of substantial completion of the Contract. Should any defects in material, workmanship, or equipment be made known to Contractor within the one-year warranty period, Contractor shall replace such materials, workmanship, or equipment without charge.
- C. All reciprocating and scroll refrigeration compressors shall bear 5-year non-pro-rated parts warranty.
- D. All gas fired air furnaces shall bear 10 year prorated heat exchanger warranties.
- E. After completion of the work, Contractor shall operate the equipment which he installs for a period of (10) working days, as a test of satisfactory operating conditions. During this time, Contractor shall instruct the Owner's operating personnel in the correct operation of the equipment.
- F. Provide PDF of manufacturer's operating and maintenance manuals and parts lists for all equipment and materials furnished. Provide a maintenance schedule listing routine maintenance operations and suggested frequency thereof. Include all warranty dates on equipment and guarantees.
- G. Any work performed on new or existing air conditioning/refrigeration equipment, whether inside or out, that requires removing the refrigerant from the system will require the use of a recovery/recycling unit. Intentional release of the refrigerant, regardless of type, will not be allowed.
- H. Any refrigerant removed from a system that has been properly recycled and has not been exposed to "burn out" <u>can and should</u> be reused in the system. Refrigerant that has been contaminated and cannot be reused after being properly recycled shall be reclaimed by the contractor and returned to the proper company representative.
- I. During the period of tests, adjust all controls, regulators, etc., to comply with these Specifications.

- J. Supply initial charges of refrigerant, refrigeration lubricating oil and anti-freeze necessary for the correct operation of the equipment. Maintain these charges during the guarantee period, with no additional cost to the Owner, unless loss of charge is the fault of the Owner.
- K. Make available to the Owner, without additional cost, warranty service and adjustment of the equipment for the guarantee period. Due to critical temperature guidelines Contractor shall respond to Owner's call for service within a 6 hour time period.

1.27 PROJECT CLOSE-OUT:

- A. Prior to the issuance of a certificate for final payment, submit to Architect and obtain his approval of the following:
 - 1. A letter signed by the subcontractors for HVAC, electrical, temperature control work stating that they have jointly checked each power circuit and control circuit and mutually agree that each item is properly wired and that controls and power circuits will function properly.
 - 2. Record drawings sheet metal work: PDF files and CAD files.
 - 3. Record drawings control systems: PDF files and CAD files.
 - 4. Air balance report PDF files. (See Section 23 7000 "HVAC Testing & Balancing").
 - 5. Equipment Submittal Data PDF files.
 - 6. Equipment operating and maintenance manuals PDF files.
 - 7. Maintenance schedule.
 - 8. Equipment warranty dates and guarantees.
 - 9. List of Owner's Personnel who have received maintenance instructions.
 - 10. Include with insulation material submittal letters from the insulation material manufacturer certifying that the insulation material does not contain asbestos in any shape, form or quantity.

MATERIALS AND METHODS – HVAC

PART 1 - GENERAL

1.1 SCOPE:

A. Section 23 0500 - "General Provisions - HVAC" shall apply to and become part of this Section.

PART 2 - MATERIALS: (All pipe, fittings and valves shall be manufactured in the United States of America)

2.1 HVAC DRAIN PIPING:

- A. Standard weight galvanized steel pipe ASTM A106 with galvanized malleable iron fittings, or type L hard copper with wrought copper sweat fittings, at Contractor's option.
- B. Provide drain traps for AC unit drain pans. Size traps as required to drain under operating conditions. See trap detail on drawings.

2.2 **REFRIGERATION PIPING:**

- A. Type L hard drawn copper tubing with wrought copper sweat fitting joints: Stay Brite-8 silver bearing solder with continuous flow of dry nitrogen through lines.
- B. Size all lines per manufacturer's recommendations and requirements based on actual line lengths, distances, and elevations, so as to ensure oil return at minimum loading.
- C. Small lines 5/8" OD and smaller may be soft copper with flare fittings, provided that all joints are exposed for visual inspection.

2.3 PIPE HANGERS:

- A. General: Pipe hangers, Anvil, PHD, Michigan Hanger, B-Line or Elcen. Anvil figure numbers are given for reference. Provide copper clad or plastic coated hangers on bare copper lines.
- B. Equip pipe hangers with vibration isolators as specified under Vibration Isolators.
- C. Pipe hangers for lines 3" and smaller: adjustable wrought ring hangers, Anvil Fig. 97 or 69 or wrought clevis hangers.
- D. Beam Clamps: Anvil Fig. 228.

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- E. Size rods for pipe hangers not smaller than the following: 3/8" rods for pipe up to 2", 1/2" for 2-1/2" and 3" pipe, 5/8" rods for 4" and 5" pipe.
- F. Space pipe hangers at maximum: Pipe hanger spacing for screwed, solder joint and welded piping: 1/2" and 3/4", 6 ft.; 1" to 1-1/4", 8 ft.; 1-1/2" to 2-1/2", 10 ft.; 3" and over, 12 ft. Install additional hangers at change of direction, valve clusters, and at all duct and unit mounted coils.
- G. Install pipe hangers on insulated pipe over pipe covering. Provide factory fabricated insulated pipe shields equal to Pipe Shields, Inc. "Thermal Hanger Shields" or Tru-Balance insulated saddles at hangers. Provide shield insulation of rigid calcium silicate indoors or rigid Perlite Silicate outdoors, the same thickness as adjacent pipe covering. (At Contractor's option, pipe shields may be field fabricated using rigid calcium silicate or foamglass insulation with ASJ and 20 gauge galvanized steel protector. Shield length: 1.5 times nominal pipe size but not less than 4".)
- H. Wrap bare copper refrigerant lines with sheet lead or molded plastic sleeve at hangers.

PART 3 - EXECUTION

3.1 PIPE INSTALLATION:

- A. Cut pipe square and ream full size after cutting. Clean pipe. Make threaded joints with Teflon tape. Do not spring pipe into place.
- B. Provide welding material and labor in accordance with the welding procedures of the Heating, Piping, and Air Conditioning Contractors' National Association or other approved procedure conforming to the requirements of ANSI B31.9 "Building Service Piping". Employ only welders fully qualified in the above specified procedure and currently certified by recognized testing authority. Use either electric arc or oxyacetylene welding. Provide full perimeter welds at both face end and collar end of each slip-on flange.
- C. Install piping to allow for expansion. Make connections to all equipment to eliminate undue strains in piping and equipment. Furnish necessary fittings and bends to avoid springing of pipes during assembly.
- D. Pitch air conditioning unit drain lines down in direction of flow 1" in 20'. Grade chilled and hot and condenser water supply and return lines down to drains and up to air vents.
- E. Install chrome plated floor and ceiling plates on pipe passing through finished surfaces in finished spaces.
- F. Run piping concealed, except where specifically shown or specified to be exposed. Plumb all vertical lines and run mains parallel to building walls unless specifically shown otherwise.

G. Pipe shall be braced at flexible connections to prevent blowouts under operating conditions.

THERMAL AND ACOUSTICAL INSULATION FOR HVAC SYSTEMS

PART 1 - GENERAL

1.0 GENERAL:

A. All external duct insulation and flexible duct shall be legibly printed or identified at intervals not greater than 36 inches with the name of the manufacturer, the thermal resistance R-value at the specified installed thickness and the flame spread and smoke-developed indexes of the composite materials.

1.1 SCOPE:

- A. Section 23 0500 "General Provisions HVAC" shall apply to and become part of this Section.
- B. Repair existing insulation at points of connection and/or alterations to existing work.
- C. "Exposed" is defined as: Exposed to view when construction is complete. (Items which are not "exposed" are considered "concealed".)
- D. The use of any material containing asbestos is strictly prohibited.
- E. Include with insulation material submittal letters from the insulation material manufacturer certifying that the insulation material does not contain asbestos in any shape, form or quantity.

1.2 INSULATION:

- A. Comply with NFPA 90A.
- B. Pipe hanger shields are specified in Section 23 1000 "Materials and Methods HVAC."

PART 2 - MATERIALS

2.1 FOAMED PLASTIC PIPE COVERING: (DO NOT USE IN PLENUMS UNLESS COMPLIES WITH PARAGRAPH 1.2 ABOVE):

- A. Fire retardant foamed plastic pipe covering, maximum K factor at 75°F mean temperature not exceeding 0.27 BTU/(hr)(sq.ft.)(°F/in).
- B. Pipe covering may be seamless insulation slipped over piping before erection or may be slit longitudinally and installed over erected piping.

- C. Make fitting covers from segments of pipe covering.
- D. Cement all joints and seams in accordance with manufacturer's instruction.
- E. Fit pipe hangers over insulation (see PIPE HANGERS). Use hanger shields as specified under pipe hangers.
- F. Where exposed outside, cover insulation with aluminum jacket (see below).
- G. Armacell, Aeroflex or Normaco.

1.2 DUCT INSULATION, INTERNAL:

A. Glass fiber acoustical/thermal insulation complying with NFPA 90A and UL 181 and having an erosion resistant heavy coating on the air side treated with an anti-microbial agent which does not support mold, bacteria nor fungus growth when tested in accordance with ASTM C1071, ASTM G21 and G22. NRC not less than 0.80 at 1-1/2" thickness, minimum density 1-1/2 lb/cu. ft., and maximum friction correction factor at 2000 fpm average velocity 1.15 (per TIMA test method AHS-1S2-76U). Minimum thermal conductance at R6 = 0.17 (ASTM C177). Knauf "Duct Liner E-M", Certainteed "Tough Guard" or approved equal. Submit sample to obtain approval for other manufacturers.

2.2 DUCT INSULATION, EXTERNAL, FOR CONCEALED DUCTS:

- A. Flexible glass fiber insulation with foil-scrim-kraft (FSK) facing. Flame spread classification, 25 or less, smoke developed rating not exceeding 50. Minimum density, 1 lb./cu. ft., maximum thermal conductivity at 75°F mean temperature 0.26 BTU/(hr)(sq. ft.)(°F/in).
- B. Fire-retardant foamed plastic insulating board having a thermal conductivity at 75° mean temperature not exceeding 0.27 BTU/(hr)(sq.ft.)(°F/in.). Fasten in place and seal joints with adhesive in accordance with insulation manufacturer's instructions.
 - 1. Finish: Vimaso 749 vapor-block mastic color grey.
 - 2. Armacell, Aeroflex or Normaco.

PART 3 - INSTALLATION

3.1 HVAC PIPING:

- A. Refrigerant suction lines and hot gas bypass lines: "Foamed plastic pipe covering", 3/4" thick.
- B. AC Unit drain lines: "Foamed Plastic Pipe Covering", 1/2" thick.

3.2 DUCT INSULATION, INTERNAL:

- A. Apply in accordance with SMACNA "Duct liner application standard" over full coverage adhesive. Coat all edges with adhesive and seal all punctures or tears with mastic before installing ducts. Cut liner to assure overlapped and compressed longitudinal corner joints. Provide mechanical fasteners and metal nosings as noted below:
 - 1. For all velocities, provide metal nosings on upstream edge of liner at connections to equipment: Fans, coils, dampers, AC Units, sound absorbers, etc.
 - 2. For velocities up to 2,000 feet per minute: start fasteners within 3" of the upstream transverse edges of the liner and 3" from the longitudinal joints and space them a maximum of 12" o.c. around the perimeter of the duct, except that they may be a maximum of 12" from a corner break. Elsewhere locate fasteners a maximum of 18" o.c., except that they shall be placed not more than 6" from a longitudinal joint of the liner nor more than 12" from a corner break.
 - 3. For velocities from 2,001 to 4,000 feet per minute: start fasteners within 3" of the upstream transverse edges of the liner and 3" from the longitudinal joints and space them a maximum of 6" o.c. around the perimeter of the duct, except that they may be a maximum of 6" from a corner break. Elsewhere locate fasteners a maximum of 16" o.c., except that they shall be placed not more than 6" from a longitudinal joint of the liner nor more than 12" from a corner break. In addition to the adhesive edge coating of transverse joints, coat any longitudinal joints with adhesive.
 - 4. For velocities from 4,001 to 6,000 feet per minute: same as 2 above except that metal nosing shall be installed to secure liner at all upstream transverse edges.
- B. Thickness and extent: 1-1/2" thick on all return duct. For all return ducts, provide nosing on duct liner at all connections to equipment and at all leading edges (no adjacent upstream liner). Nosing shall fit outside the equipment flange.

3.3 DUCT INSULATION, EXTERNAL, FOR CONCEALED DUCTS:

- A. For flexible glass fiber insulation:
 - 1. Lap jacket and vapor seal all joints and seams with suitable mastic.
 - 2. On rectangular and flat oval ducts 30" wide and wider, support insulation with weld pins and speed clips 18" on centers. Seal weld pins with mastic and FSK tape.
 - Thickness and Extent: All sheet metal supply ducts not specified to be lined: Minimum
 2" thick except as noted below. Note: Conical and straight spin-ins on both lined and unlined ducts shall be insulated as noted below. (See Foamed Plastic Insulation below.)

- B. All metal surfaces of ceiling diffuser (CD) located above the ceiling: 2" thick (seal air tight to diffusers).
- C. Foamed Plastic Insulation:
 - Insulate portions of fire damper sleeves in insulated ducts, which are not concealed in walls, partitions and floors as specified with 3/4" thick foamed plastic insulation. Do not extend the insulation through the wall, floor or partition. Seal to wall and glass fiber insulation (or if lined duct seal foamed plastic insulation to duct with 3" lap over liner). On externally insulated duct, lap glass fiber insulation over foamed plastic and seal to foamed plastic.
 - 2. Insulate all flexible connectors in sheet metal ducts with 1" thick foamed plastic sheet with joints sealed. Extend insulation minimum 3" upstream and downstream of flex connector joints and seal to sheet metal duct.
 - 3. Insulate portions of lined ducts at manual dampers with 3/4" thick foamed plastic insulation overlapping the liner a minimum 3" upstream and downstream of the damper. Seal foamed plastic insulation to duct.
 - 4. Insulate all unlined ducts with dampers, all conical branch duct fittings and straight branch duct spin-ins with 3/4" thick foamed plastic insulation. Glass fiber insulation on the branch ducts shall overlap foamed plastic insulation on the conical fittings and spin-ins. Seal fiberglass to foamed plastic. For connections of flexible duct to spin-ins or conical branch duct fittings, connect flexible duct inner liner to sheet metal with specified clamps and lap outer liner and insulation over foamed plastic and clamp with Panduit strap. Seal flex duct outer cover to spin-in or conical fitting insulation. Insulation contractor shall submit sample of spin-in and conical fitting insulation and flexible duct connection for approval.

HEATING AND AIR CONDITIONING EQUIPMENT AND SPECIALTIES

PART 1 - GENERAL

1.1 **SCOPE:**

A. Section 23 0500 – "General Provisions – HVAC" shall apply to and become part of this Section.

PART 2 - EQUIPMENT AND SPECIALTIES

2.1 **PACKAGED ROOF TOP AC UNITS (GAS HEAT):**

- A. Factory assembled packaged heating and cooling unit with all operating components assembled together in a weather-proof casing designed for outdoor installation.
- B. Casing: Galvanized steel not lighter than 18 gauge with epoxy primer and baked enamel finish. All supply and return ducts shall pierce the bottom of the unit within the curb.
- C. Mount each unit on a spring vibration isolation rail on a pre-fabricated galvanized steel curb contoured to fit unit with pressure treated wood nailer for flashing attachment. Curb shall be insulated. Isolation curb shall provide a minimum of 90% isolation efficiency with 2" deflection.
- D. Refrigeration components shall include hermetic compressors with crankcase heaters, safety cutouts for oil pressure and high and low pressure and motor temperature, direct expansion cooling coil, air cooled condenser with direct driven propeller condenser fan and weather protected fan motor and insulated refrigeration piping and specialties, hot gas reheat (where scheduled). Equip condenser fan with discharge guard. Equip condenser coils with hail guards.
- E. Condenser coil coating: Equip condenser coils with factory applied epoxy coating for seacoast environments.
- F. Refrigerant: R-410A.
- G. Heating components: Heater section with alloy heat exchanger stainless steel ribbon burners, manual gas valves, automatic gas valve, pilot safety, electrically ignited pilot, high limit thermostat and bonnet thermostat. Combustion air and flue gas openings shall be rain tight, arranged to permit operation under all normal wind conditions. Gas regulators shall be installed to prevent freezing and shall be installed in strict accordance with the manufacturer's installation instructions and recommendations. No vent limiting gas regulators are to be used except where required by code.

- H. Provide 1 year non-prorated parts warranty on complete unit. Provide 5 year non-prorated parts warranty on compressors and 10 year gas fired heat exchanger parts warranty.
- I. Outside Air Economizer: Provide factory installed outside air enthalpy economizer with barometric or powered relief damper (as scheduled). Provide automatic damper to prevent outside air entry during "off" cycle.
- J. Filters: Provide filter section with 2" thick pleated MERV 13 filters.
- K. Demand Control Ventilation: Provide factory installed demand control ventilation where scheduled.
- L. Provide unit with single point power connection for all components, phase monitoring and protection from phase loss, phase imbalance, and phase reversal.
- M. Provide unit with 304 stainless steel double sloped condensate drain pan.
- N. Provide unit with motorized outside air damper.
- O. See "Motors and Starters."
- P. Unit shall be by Trane, Carrier or York.

2.2 SPLIT SYSTEM HEAT PUMP - VRF:

- A. Split system air conditioners shall consist of a wall or ceiling mounted indoor section, outdoor heat pump unit, connecting refrigerant piping, and electronic controls. System shall be UL rated.
- B. Indoor unit shall consist of centrifugal evaporator fan(s), evaporator coil, drain pan with condensate pump and safety switch, all enclosed in a plastic casing equipped with adjustable supply grille and return air grille. Provide 3 pole disconnect switch.
- C. Outdoor unit shall consist of compressor, condenser coil, condenser fan, and controls, all enclosed in a metal grilled cabinet suitable for roof or pad mounting. Provide refrigerant piping kit, pre-insulated, properly sized for capacity shown. (See drawings to determine length.)
- D. Controls shall consist of a wall mounted remote controller utilizing a microprocessor. Functions shall include:
 - 1. Computerized dehumidification.
 - 2. Operation mode setting.
 - 3. Self-diagnostic display.
 - 4. Room temperature display.

- 5. Twenty-four hour on-off timer.
- 6. Fan speed indicator.
- 7. Memory.
- E. Split system heat pump VRF shall be Trane-Mitsubishi, Carrier, Daikin, Gree, or approved equal.

2.3 **CENTRIFUGAL ROOF EXHAUSTERS:**

Centrifugal power roof ventilators with AMCA certified air and sound ratings, belt or direct driven as shown. Provide permanently oiled bearings, statically and dynamically balanced backward curved blade wheels and spun aluminum housing with curb cap, disconnect switches, back-draft damper and outlet bird screen. For belt driven fans provide V-belt drive sized for 50% overload, adjustable pitch motor pulley and adjustable motor base. For each fan furnish an 18 gauge galvanized steel insulated prefabricated curb with integral cant. Furnish baffled sound absorbing curbs where required to obtain noise levels specified. Static pressures scheduled are external to sound curbs.

A. Fans shall be Greenheck, Acme, Carnes, Penn or Loren Cook.

AIR DISTRIBUTION

PART 1 - GENERAL

1.1 SCOPE:

A. Section 23 0500 – "General Provisions – HVAC" shall apply to and become part of this Section.

PART 2 - PRODUCTS

2.1 GENERAL:

A. Air terminal submittal data shall include, for each terminal, both radiated and discharge sound power in DB re 10 to the minus 12 watts in octave bands 2 through 7. All air terminal controls shall be installed in a unit mounted control panel and shall be UL listed as an assembly.

2.2 GRILLES, REGISTERS AND DIFFUSERS:

- A. General: Air devices may be Price, Titus, Krueger, Nailor, or approved equal. Titus part numbers are given for reference. Coordinate border and frame types for air devices with ceiling types as shown on Architectural Reflected Ceiling Plan.
- B. Rectangular Louver Face Diffusers One-, Two-, Three-, Four-Way or Corner Throw (LD or CD): Fixed pattern louver face diffusers, all aluminum with white enamel finish, removable cores latched in place, opposed blade dampers, adjustable multiblade scoops, #TDC,-AA.
- C. Supply Registers (SR): Adjustable vertical face bars, adjustable horizontal rear bars, opposed blade dampers, plaster frames, adjustable multiblade scoops, all aluminum with prime coat finish: #272.
- Wall Return Registers (WRR): All aluminum, aluminum lacquer finish, horizontal bars fixed at about 35° angle, plaster frames, opposed blade damper #350. (Wall Return Grilles {WRG}
 Delete opposed blade damper).
- E. Ceiling Return Registers (R): All aluminum, 1/2" x 1/2" x 1/2" cube core, plaster frame, opposed blade dampers, white enamel finish #50F. Omit dampers for registers not attached to return ductwork.
- F. Ceiling Exhaust Registers (E) and Ceiling Transfer Registers (T): Same as Ceiling Return Registers.

2.3 FLEXIBLE DUCT CONNECTIONS:

- A. Install Neoprene coated glass cloth flexible connections at all duct connections to all fans, all AC Units and all powered induction units.
- B. Install flexible connections in all ducts at building expansion joints.

2.4 DUCTWORK - GENERAL:

- A. Unless otherwise shown or specified construct ducts of galvanized steel sheet metal using gauges and recommended details as contained in the current edition of the SMACNA HVAC Duct Construction Standards. Ductwork shall include supply air, exhaust air, return air, and outdoor air ducts, together with all necessary fittings, splitters, dampers, quadrants, flexible connections, sleeves, hangers, support, braces, etc. Hang and install ducts in a neat and workmanship manner with adequate bracing and cross breaking to prevent breathing, rattling, and vibration. DO NOT USE SNAP-LOCK SEAMS.
- B. Install Duro-Dyne locking quadrants and Duro-Dyne end bearings on all splitters and manual volume dampers located above accessible ceiling and Young #315 regulator, and Duro-Dyne end bearings elsewhere. Provide stand-offs for quadrants on externally insulated ducts. (Refer also to "Sheet Metal Specialties.")
- C. Duct dimensions are **net dimensions inside insulation**. Determine gauges by actual duct size.
- D. All duct turns (except as noted below for 90 degree turns) shall be radiused with a centerline radius of 1.5 times the duct width in the plane of the turn. At the contractor's option, 90 degree turns may be square throat elbows vaned to provide a dynamic loss coefficient ("C") not greater than 0.2 or shall be radiused. Do not use "push on" vane runners. Duct turns less than 20 degrees may be mitered. Do not use off-sets that reduce the cross-sectional area of the duct.
- E. Duct Sealing: Seal duct seams and joints after assembly as noted below. Seal entire circumference of all branch duct connections, tapping collars and spin-ins. Seal ducts using mastic sealant equal to solvent based United Duct Sealer.
 - 1. Class A Seal: Seal all joints and seams and leak test at pressure specified. Leakage cfm per 100 sq. ft. duct surface area shall not exceed 8 times the square root of the test pressure in inches of water and no leaks shall be audible.
 - 2. Class B Seal: Seal entire circumference of all transverse joints, seal all longitudinal joints.
 - 3. Class C Seal: Seal entire circumference of all transverse joints.
 - 4. Class D Seal: Seal corners of transverse joints.

2.5 DUCTWORK - LOW PRESSURE:

- A. Ductwork, Low Pressure, shall include: All supply, return and exhaust duct not specified to be double wall duct.
- B. Construct ducts in accordance with SMACNA Duct Construction Standards for pressure and seal classes noted below. Do not use snap-lock seam.
- C. Pressure and Seal Classes: 1" Pressure Class, Seal Class "C".
- D. Hang ducts using 1"x12-guage galvanized straps at transverse joints but not greater than 8 ft. apart.
- E. Reinforce ductwork in accordance with SMACNA Duct Construction Standards.

2.6 DUCTWORK LOW PRESSURE ROUND:

- A. Low pressure round ductwork includes all round supply, return, outside air, and exhaust ductwork except as specified medium pressure round ductwork.
- B. Ductwork: Factory fabricated single-wall galvanized steel round spiral lock seam ducts of 28 gauge for ducts up to 14" in diameter, 26 gauge for ducts from 15" to 26" in diameter, 24 gauge for ducts 27" to 36" in diameter, and 22 gauge for ducts over 36" in diameter.
- C. Fabricate fittings by continuous brazing or electric welding. Thickness of metal for round fittings: 26 gauge for fittings up to 14" in diameter, 24 gauge for fittings 15" to 26" in diameter, 22 gauge for all fittings over 26" in diameter. Elbows shall have a center-line radius of 1.5 diameters, 5 piece construction. Take-offs shall be 45 degree laterals. Splitters (tees) shall be reducing Y-Branch with dampers.
- D. Make transverse joints using beaded slip couplings, sealing compound equal to solvent based United Duct Seal and sheet metal screws.
- E. Provide hanger straps per SMACNA table no more than 8 ft. apart. Straps shall encircle duct. Do not penetrate ductwork at hangers.
- F. No adhesive labels shall be placed on the exposed surface of exposed ductwork.
- G. Ductwork and fittings shall be United McGill Airflow, Semco, Spiral Systems, Spiral Pipe of Texas or Eastern Sheet Metal round duct and fittings, 2" WG standard.

2.7 FLEXIBLE DUCTS:

- Flexible duct connectors: 2 element spiral construction composed of galvanized steel supporting spiral and coated woven textile fabric with metal or mineral base, UL listed as Class I Air Duct and Connector (UL 181).
- B. Flexible connectors shall not exceed 5 feet in length and turns shall not exceed 20 degrees with maximum of two turns.
- C. Make connections between flexible ducts and other equipment using galvanized steel draw bands with plated screws and buckles and United Duct seal for nylon draw bands for low pressure ducts.
- D. Factory insulate cold flexible ducts using insulation equivalent to that specified for cold ducts minimum R5 rating and provide continuous vapor barrier at connections to other ducts and equipment.
- E. Hang ducts in accordance with manufacturer's instructions.
- F. Flexible ducts: Thermaflex M-KC, EverClean, or Flexmaster Type 4M.

2.8 ACCESS DOORS:

- A. Access doors in low pressure ducts: galvanized steel frame flange mounted permanently secured to duct with a hinged gasketed access port held in place with thumb operated latches. Doors in insulated ducts: double thickness with insulation. Doors in non-insulated ducts: a single thickness. Size doors to permit removal of equipment or maintenance. Minimum 18" x 18" in ducts 20" or greater. Minimum 12" x 12" in ducts 14" to 18" and minimum 8" x 12" in ducts 10" to 12". If duct is less than 10", enlarge duct at access door (and fire damper, if applicable) to allow minimum 8" x 12" access door. Kees "FH" series standard pressure flanged mount. Install for flush interior on double wall doors.
- B. Mark access points in lift-out ceilings with colored vinyl stick-on discs. Locate discs on grid adjacent to point of access and coordinate location of access doors in non-accessible ceiling with General Contractor.

HVAC TESTING AND BALANCING

PART 1 - GENERAL

- A. Provisions of Section 23 0500 "General Provisions HVAC" shall apply to and become a part of this section.
- B. The HVAC testing and balancing work specified in this section shall be done by an Associated Air Balance Council (AABC) member or by a National Environmental Balancing Bureau (NEBB) member (and an AABC "National Project Performance Guarantee" shall be provided for the project). The Testing and Balancing Agency's (TABA) project manager shall be an AABC certified or NEBB certified testing and balancing engineer and be responsible for supervision of and certification of the work herein specified.
- C. The Testing and Balancing agency will be employed by the Engineer.
- D. The balancing agency shall submit records of experience in the field of air and hydronic system balancing or any other data as requested by the Owner and Engineer. The supervisory personnel for the firm shall have at least five (5) years' experience, and all the employees used in this project shall be qualified technicians in this specific field.
- E. The balancing agency shall furnish all necessary calibrated instrumentation to adequately perform the specified services. An inventory of all instruments and devices in possession of the balancing agency may be required by the Owner and Engineer to determine the balancing agency's performance capability.

1.2 SCOPE:

- All air balance work shall be done in accordance with the AABC National Standards for Testing and Balancing Heating & Air Conditioning Systems (AABC National Standards), or NEBB National Standards edition in force at time of bidding. If these specifications set forth more stringent requirements than the AABC National Standards, these specifications shall prevail.
- B. The systems to be balanced and/or tested shall include:
 - 1. RTU-1.
 - 2. RTU-2.
 - 3. EF-1.
 - 4. CU-1/AC-1.

1.3 DOCUMENTS:

- A. The architect will provide the balancing agency one copy of each of the following documents:
 - 1. Project drawings and specifications.
 - 2. Approved construction revisions pertaining to the HVAC systems.
 - 3. Approved submittal data on HVAC equipment and systems to be installed under Division 23.
 - 4. Approved HVAC shop drawings.
 - 5. Approved HVAC wiring diagrams, control diagrams and equipment brochures, as appropriate.

1.4 COORDINATION:

- A. The TABA shall perform its services in close coordination with the work specified in Division 23.
- B. The plans and specifications indicate meters, valves, dampers, etc. for the purpose of adjusting the HVAC systems to obtain optimum operating conditions. In the event that any of meters, valves, dampers, etc. have been installed in a manner which will not permit their being used for their intended purpose, TABA shall so notify the Owner, Engineer, Building Contractor or Mechanical Contractor so that the above items may be correctly installed as specified in the other sections of Division 23.
- C. Work included in this section shall not be started until the systems involved meet the following conditions:
 - 1. Air Distribution Systems
 - a. Systems have been completed (including sealing and/or leak testing where specified) with all components properly installed and ready for operation, fans are rotating correctly, motor starters have correct overload elements, variable speed drives have been put into operation and clean filters (of the type required for finished system) have been installed.
 - b. All dampers, including automatic dampers, are operating smoothly and without binding and that the automatic dampers close tightly and open wide without binding.

- 2. Automatic Control System:
 - a. Systems have been completed and are operating as designed.
 - 1) Installation is complete, all instruments (including room thermostats) have been field calibrated and operate correctly, and are set for design operating conditions.
 - 2) TABA personnel have been instructed in the proper use of and in changing set points of the various controllers including via computer or keypad if required.

1.5 NOTIFICATION FOR TESTING & BALANCING WORK TO BEGIN:

- A. When the above conditions have been met, the General Contractor and Mechanical Contractor shall notify the TABA in writing that the system(s) are ready for Testing and Balancing.
- B. When the TABA has been notified that the systems are ready for testing and balancing, the TABA shall inspect the various systems involved and notify General Contractor and Mechanical Contractor of any condition which may impede the TAB work (missing dampers, valves, incomplete control or electrical work, etc.).
- C. When the deficiencies noted above have been corrected, General Contractor and Mechanical Contractor shall again notify TABA that the system(s) are ready for testing and balancing.

1.6 INSPECTIONS:

- A. During construction the TABA shall inspect the installation of the piping systems, sheet metal work, control system and mechanical equipment.
- B. The inspections should be made when 60% of the ductwork has been installed and when 90% of the equipment has been installed.
- C. The TABA shall submit a brief written report of each inspection to the Owner, Engineer, General Contractor, and Mechanical Contractor.

1.7 TESTING AND BALANCING PROCEDURES:

- A. All testing and balancing work shall be done in accordance with the AABC National Standards.
- B. Air Systems:
 - 1. Fan Speed: Test and adjust fan RPM to achieve design CFM requirements.
 - 2. Current and Voltage: Measure and record motor current and voltage of each fan.

- 3. Pitot-tube Traverse: Perform a Pitot-tube traverse of main supply and return ducts to obtain total CFM. If a Pitot-tube traverse is not practical, the summation of the outlets or inlets may be used. An explanation why a traverse was not made must appear on the appropriate data sheet.
- 4. Outside Air: Test and adjust system minimum outside air by Pitot-tube traverse. If a Pitot-tube traverse is not practical, the percentage of outside air may be determined by calculations from the return air, outside air, and discharge air temperatures with heating and cooling coil valves shut. Make allowances for heat of compression and motor heat where applicable.
- 5. Static Pressure: Test and record system static pressures, including suction and discharge static pressure of each fan.
- 6. Air Temperature: Take wet-bulb and dry-bulb air temperatures on the entering and leaving side of each cooling coil. Dry-bulb temperature shall be taken on the entering and leaving side of each heating coil.
- 7. Zone Ducts: Adjust zone ducts to within design CFM requirements. At least one zone balancing damper shall be completely open.
- 8. Main Ducts: Adjust main ducts to within design CFM requirements and traverse for total CFM quantities.
- 9. Branch Ducts: Adjust branch ducts to within design CFM requirements. Multi-diffuser branch ducts shall have at least one outlet or inlet volume damper completely open.
- 10. Tolerances: Test and balance each diffuser, grille and register to within -5% and +10% of design requirements.
- 11. Identification: Identify the location and area of each grille, diffuser, and register. This information shall be recorded on air outlet data sheets.
- 12. Description: Record the size, type and manufacturer of each diffuser, grille and register on air outlet data sheets.
- 13. Minimizing Drafts: Set grille bars for throws, diffusers for patterns and adjust all diffusers, grilles, and registers to minimize drafts in all areas.
- C. Verification of Temperature Control:
 - 1. Verify that all control components are installed in accordance with project requirements and are functional, including all electrical interlocks, damper sequences, air and water reset, and fire and freeze stats.
 - 2. Verify that all controlling instruments are calibrated and set for design operating conditions.

3. Verify the accuracy of the final settings by taking temperature readings. The readings shall be in a typical conditioned space for each separately controlled zone.

1.8 TEST AND BALANCE REPORT:

- A. The test and balance report shall be complete with logs, data, and records as required herein. All logs, data, and records shall be typed on white bond paper and bound. The report shall be certified accurate and complete by the balancing agency's certified test and balance engineer. Any drawings submitted must be to a scale of 1/8" per foot or larger.
- B. Six (6) copies or PDF electronic file of the test and balance report are required and shall be submitted to the Architect and Engineer.
- C. The report shall contain the following general data in a format selected by the balancing agency:
 - 1. Project Number
 - 2. Contract number
 - 3. Project title
 - 4. Project location
 - 5. Project architect
 - 6. Project mechanical engineer
 - 7. Test and balance agency
 - 8. Test and balance engineer
 - 9. General contractor
 - 10. Mechanical subcontractor
 - 11. Dates tests were performed
 - 12. Certification
- D. The test and balance report shall be recorded on report forms conforming to the recommended forms in the AABC or NEBB National Standards. At a minimum, the report shall include:
 - 1. Preface: A general discussion of the system, any abnormalities and problems encountered.

- 2. Instrumentation List: The list of instruments including type, model, manufacturer, serial number and calibration dates.
- 3. System Identification: In each report, the VAV boxes, zones, supply, return, and exhaust openings, and traverse points shall be numbered and/or lettered to correspond to the numbers and letters used on the report data sheets.
- 4. Air handling equipment test report forms: Record the following on each air-handling equipment test form:
 - a. Manufacturer, model number and serial number
 - b. All design and manufacturer-rated data
 - c. Total actual CFM by traverse if practical. If not practical, the sum of the outlets may be used, or a combination of these procedures. For specific systems, such as ones with diversity, see the AABC *National Standards*.
 - d. Suction and discharge static pressure of each fan, as applicable.
 - e. Outside air, return air and total CFM.
 - f. Actual operating current, voltage and brake horsepower of each fan motor.
 - g. Final RPM of each fan.
 - h. Fan and motor sheave manufacturer, model, size, number of grooves and center distance.
 - i. Belt size and quantity.
 - j. Static pressure controls' final operating set points.
- 5. Test and balance drawings: Include the following:
 - a. All air devices: Indicate terminal unit as air handler served from design airflow, actual airflow, neck size and air device type.
 - b. Air Handlers: Indicate mark, design supply airflow, actual supply airflow, design return airflow, actual return airflow, outside air design airflow and outside air actual airflow.
 - c. Fans: Indicate mark, design airflow and actual airflow.

1.9 FINAL ACCEPTANCE:

- A. Before Certificate of Final Payment is issued the TABA shall recheck, in the presence of the Owner's representative, and Engineer, specific and random selections of data recorded in the certified test and balance report.
- B. Points and areas for recheck shall be selected by the Owner's representative, and Engineer.
- C. Measurements and test procedures shall be the same as the original test and balance.
- D. Selections for recheck, specific plus random, shall not normally exceed 15 percent of the total number tabulated in the report, except where special air systems require a complete recheck for safety reasons.
- E. If random tests demonstrate a measured flow deviation of 10 percent or more from that recorded in the certified test and balance report, the report shall automatically be rejected. In the event the report is rejected, all systems shall be readjusted and tested, new data recorded, a new certified test and balance report submitted, and a new inspection test made, all at no additional cost to the Owner.

CONVENTIONAL AUTOMATIC CONTROLS

PART 1 - GENERAL

- 1.1 SCOPE:
 - A. Section 23 0500 "General Provisions HVAC" shall apply to and become part of this Section.

1.2 CONTROL SYSTEMS:

- A. Furnish and install complete and ready for operation with control sequences specified below.
- B. Products of a manufacturer maintaining complete service and parts facilities in Alabama continuously for the last three years: Honeywell, Johnson, Trane, Carrier or Siemens.
- C. Control equipment, except for items comprising an integral part of the water or refrigeration piping, shall be installed by trained mechanics employed by the control manufacturer.
- D. Include the services of a full time control technician for calibrating and adjusting controls for the first 10 working days after Owner has occupied building.
- E. Before installation, submit for approval 5 copies of complete power and control wiring and piping diagrams and list of control panel locations by room name and number. Hang a photostatic copy of the "as built" diagram, framed behind glass, in each equipment room. Provide one set of reproducible sepias of "as built" control diagrams at completion of project for the Owner's use.
- F. Provide permanent nameplates for control switches and motor starters. Nameplates: engraved laminated plastic with letters legible under normal operating conditions. (Black on white).
- G. Permanently identify control devices and room thermostats, so they may be identified on control diagrams. Provide engraved plastic nameplates for items mounted outside of or on faces of panels. Mark other instruments with indelible ink.
ELECTRICAL SPECIFICATION – INDEX

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SECTION 26 0519

LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

- 1. Building wires and cables rated 600 V and less.
- 2. Connectors, splices, and terminations rated 600 V and less.

PART 2 - PRODUCTS

2.1 CONDUCTORS AND CABLES

- A. Copper Conductors: Comply with NEMA WC 70/ICEA S-95-658.
- B. Conductor Insulation: Comply with NEMA WC 70/ICEA S-95-658 for Type THW-2 Type THHN-2-THWN-2 Type XHHW-2.
- C. Multiconductor Cable: Comply with NEMA WC 70/ICEA S-95-658 for metal-clad cable, Type MC with ground wire.

2.2 CONNECTORS AND SPLICES

A. Description: Factory-fabricated connectors and splices of size, ampacity rating, material, type, and class for application and service indicated.

2.3 SYSTEM DESCRIPTION

- 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. Comply with NFPA 70.

PART 3 - EXECUTION

3.1 CONDUCTOR MATERIAL APPLICATIONS

- A. Feeders: Copper. Solid for No. 10 AWG and smaller; stranded for No. 8 AWG and larger.
- B. Branch Circuits: Copper. Solid for No. 10 AWG and smaller; stranded for No. 8 AWG and larger, except VFC cable, which shall be extra flexible stranded.

3.2 CONDUCTOR INSULATION AND MULTICONDUCTOR CABLE APPLICATIONS AND WIRING METHODS

- A. Service Entrance: Type XHHW-2, single conductors in raceway.
- B. Exposed Feeders: Type THHN-2-THWN-2, single conductors in raceway.
- C. Feeders Concealed in Ceilings, Walls, Partitions, and Crawlspaces: Type THHN-2-THWN-2, single conductors in raceway.

- D. Feeders Concealed in Concrete, below Slabs-on-Grade, and Underground: Type XHHW-2, single conductors in raceway.
- E. Feeders in Cable Tray: Metal-clad cable, Type MC.
- F. Exposed Branch Circuits, Including in Crawlspaces: Type THHN-2-THWN-2, single conductors in raceway.
- G. Branch Circuits Concealed in Ceilings, Walls, and Partitions: Type THHN-2-THWN-2, single conductors in raceway.
- H. Branch Circuits Concealed in Concrete, below Slabs-on-Grade, and Underground: Type XHHW-2, single conductors in raceway.
- I. Branch Circuits in Cable Tray: Metal-clad cable, Type MC.
- J. Cord Drops and Portable Appliance Connections: Type SO, hard service cord with stainlesssteel, wire-mesh, strain relief device at terminations to suit application.

3.3 INSTALLATION OF CONDUCTORS AND CABLES

- A. Conceal cables in finished walls, ceilings, and floors unless otherwise indicated.
- B. Complete raceway installation between conductor and cable termination points according to Section 26 0533 "Raceways and Boxes for Electrical Systems" prior to pulling conductors and cables.
- C. Use manufacturer-approved pulling compound or lubricant where necessary; compound used must not deteriorate conductor or insulation. Do not exceed manufacturer's recommended maximum pulling tensions and sidewall pressure values.
- D. Use pulling means, including fish tape, cable, rope, and basket-weave wire/cable grips, that will not damage cables or raceway.
- E. Install exposed cables parallel and perpendicular to surfaces of exposed structural members, and follow surface contours where possible.
- F. Support cables according to Section 26 0529 "Hangers and Supports for Electrical Systems."
- G. Complete cable tray systems installation according to Section 26 0536 "Cable Trays for Electrical Systems" prior to installing conductors and cables.

3.4 CONNECTIONS

- A. Tighten electrical connectors and terminals according to manufacturer's published torquetightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A-486B.
- B. Make splices, terminations, and taps that are compatible with conductor material and that possess equivalent or better mechanical strength and insulation ratings than unspliced conductors.
- C. Wiring at Outlets: Install conductor at each outlet, with at least 6 inches (150 mm) of slack.

3.5 **IDENTIFICATION**

- A. Identify and color-code conductors and cables according to Section 26 0553 "Identification for Electrical Systems."
- B. Identify each spare conductor at each end with identity number and location of other end of conductor and identify as spare conductor.

3.6 SLEEVE AND SLEEVE-SEAL INSTALLATION FOR ELECTRICAL PENETRATIONS

A. Install sleeves and sleeve seals at penetrations of exterior floor and wall assemblies. Comply with requirements in Section 26 0544 "Sleeves and Sleeve Seals for Electrical Raceways and Cabling."

3.7 FIRESTOPPING

A. Apply firestopping to electrical penetrations of fire-rated floor and wall assemblies to restore original fire-resistance rating of assembly.

3.8 FIELD QUALITY CONTROL

- A. Perform the following tests and inspections with the assistance of a factory-authorized service representative:
 - 1. After installing conductors and cables and before electrical circuitry has been energized, test service entrance and feeder conductors for compliance with requirements.
 - 2. Perform each visual and mechanical inspection and electrical test stated in NETA Acceptance Testing Specification. Certify compliance with test parameters.
- B. Cables will be considered defective if they do not pass tests and inspections.

SECTION 26 0526

GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes grounding and bonding systems and equipment.

1.2 QUALITY ASSURANCE

A. Comply with UL 467 for grounding and bonding materials and equipment.

PART 2 - PRODUCTS

2.1 SYSTEM DESCRIPTION

- 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. Comply with UL 467 for grounding and bonding materials and equipment.

2.2 CONDUCTORS

- A. Insulated Conductors: Copper wire or cable insulated for 600 V unless otherwise required by applicable Code or authorities having jurisdiction.
- B. Bare Copper Conductors:
 - 1. Solid Conductors: ASTM B 3.
 - 2. Stranded Conductors: ASTM B 8.
 - 3. Tinned Conductors: ASTM B 33.
 - 4. Bonding Cable: 28 kcmil, 14 strands of No. 17 AWG conductor, 1/4 inch (6 mm) in diameter.
 - 5. Bonding Conductor: No. 4 or No. 6 AWG, stranded conductor.
 - 6. Bonding Jumper: Copper tape, braided conductors terminated with copper ferrules; 1-5/8 inches (41 mm) wide and 1/16 inch (1.6 mm) thick.
 - 7. Tinned Bonding Jumper: Tinned-copper tape, braided conductors terminated with copper ferrules; 1-5/8 inches (41 mm) wide and 1/16 inch (1.6 mm) thick.

2.3 CONNECTORS

- A. Listed and labeled by an NRTL acceptable to authorities having jurisdiction for applications in which used and for specific types, sizes, and combinations of conductors and other items connected.
- B. Bolted Connectors for Conductors and Pipes: Copper or copper alloy.
- C. Welded Connectors: Exothermic-welding kits of types recommended by kit manufacturer for materials being joined and installation conditions.
- D. Bus-Bar Connectors: Mechanical type, cast silicon bronze, solderless compression-type wire terminals, and long-barrel, two-bolt connection to ground bus bar.

2.4 GROUNDING ELECTRODES

A. Ground Rods: Copper-clad steel; 3/4 inch by 10 feet (19 mm by 3 m).

PART 3 - EXECUTION

3.1 APPLICATIONS

- A. Conductors: Install solid conductor for No. 8 AWG and smaller, and stranded conductors for No. 6 AWG and larger unless otherwise indicated.
- B. Underground Grounding Conductors: Install barecopper conductor, sized per drawings.
 - 1. Bury at least 24 inches (600 mm) below grade.
 - 2. Duct-Bank Grounding Conductor: Bury 12 inches (300 mm) above duct bank when indicated as part of duct-bank installation.
- C. Isolated Grounding Conductors: Green-colored insulation with continuous yellow stripe. On feeders with isolated ground, identify grounding conductor where visible to normal inspection, with alternating bands of green and yellow tape, with at least three bands of green and two bands of yellow.
- D. Grounding Bus: Install in electrical equipment rooms, in rooms housing service equipment, and elsewhere as indicated.
 - 1. Install bus horizontally, on insulated spacers 2 inches (50 mm) minimum from wall, 6 inches (150 mm) above finished floor unless otherwise indicated.
 - 2. Where indicated on both sides of doorways, route bus up to top of door frame, across top of doorway, and down; connect to horizontal bus.
- E. Conductor Terminations and Connections:
 - 1. Pipe and Equipment Grounding Conductor Terminations: Bolted connectors.
 - 2. Underground Connections: Welded connectors except at test wells and as otherwise indicated.
 - 3. Connections to Ground Rods at Test Wells: Bolted connectors.
 - 4. Connections to Structural Steel: Welded connectors.

3.2 GROUNDING AT THE SERVICE

A. Equipment grounding conductors and grounding electrode conductors shall be connected to the ground bus. Install a main bonding jumper between the neutral and ground buses.

3.3 EQUIPMENT GROUNDING

- A. Install insulated equipment grounding conductors with all feeders and branch circuits.
- B. Air-Duct Equipment Circuits: Install insulated equipment grounding conductor to duct-mounted electrical devices operating at 120 V and more, including air cleaners, heaters, dampers, humidifiers, and other duct electrical equipment. Bond conductor to each unit and to air duct and connected metallic piping.
- C. Water Heater, Heat-Tracing, and Antifrost Heating Cables: Install a separate insulated equipment grounding conductor to each electric water heater and heat-tracing cable. Bond conductor to heater units, piping, connected equipment, and components.

- D. Isolated Grounding Receptacle Circuits: Install an insulated equipment grounding conductor connected to the receptacle grounding terminal. Isolate conductor from raceway and from panelboard grounding terminals. Terminate at equipment grounding conductor terminal of the applicable derived system or service unless otherwise indicated.
- E. Isolated Equipment Enclosure Circuits: For designated equipment supplied by a branch circuit or feeder, isolate equipment enclosure from supply circuit raceway with a nonmetallic raceway fitting listed for the purpose. Install fitting where raceway enters enclosure and install a separate insulated equipment grounding conductor. Isolate conductor from raceway and from panelboard grounding terminals. Terminate at equipment grounding conductor terminal of the applicable derived system or service unless otherwise indicated.
- F. Poles Supporting Outdoor Lighting Fixtures: Install grounding electrode and a separate insulated equipment grounding conductor in addition to grounding conductor installed with branch-circuit conductors.
- G. Metallic Fences: Comply with requirements of IEEE C2.
 - 1. Grounding Conductor: Bare copper, not less than No. 8 AWG.
 - 2. Gates: Shall be bonded to the grounding conductor with a flexible bonding jumper.
 - 3. Barbed Wire: Strands shall be bonded to the grounding conductor.

3.4 INSTALLATION

- A. Grounding Conductors: Route along shortest and straightest paths possible unless otherwise indicated or required by Code. Avoid obstructing access or placing conductors where they may be subjected to strain, impact, or damage.
- B. Ground Bonding Common with Lightning Protection System: Comply with NFPA 780 and UL 96 when interconnecting with lightning protection system. Bond electrical power system ground directly to lightning protection system grounding conductor at closest point to electrical service grounding electrode. Use bonding conductor sized same as system grounding electrode conductor, and install in conduit.
- C. Ground Rods: Drive rods until tops are 2 inches (50 mm) below finished floor or final grade unless otherwise indicated.
 - 1. Interconnect ground rods with grounding electrode conductor below grade and as otherwise indicated. Make connections without exposing steel or damaging coating if any.
- D. Bonding Straps and Jumpers: Install in locations accessible for inspection and maintenance except where routed through short lengths of conduit.
 - 1. Bonding to Structure: Bond straps directly to basic structure, taking care not to penetrate any adjacent parts.
 - 2. Bonding to Equipment Mounted on Vibration Isolation Hangers and Supports: Install bonding so vibration is not transmitted to rigidly mounted equipment.
 - 3. Use exothermic-welded connectors for outdoor locations; if a disconnect-type connection is required, use a bolted clamp.
- E. Grounding and Bonding for Piping:
 - 1. Metal Water Service Pipe: Install insulated copper grounding conductors, in conduit, from building's main service equipment, or grounding bus, to main metal water service

entrances to building. Connect grounding conductors to main metal water service pipes; use a bolted clamp connector or bolt a lug-type connector to a pipe flange by using one of the lug bolts of the flange. Where a dielectric main water fitting is installed, connect grounding conductor on street side of fitting. Bond metal grounding conductor conduit or sleeve to conductor at each end.

- 2. Water Meter Piping: Use braided-type bonding jumpers to electrically bypass water meters. Connect to pipe with a bolted connector.
- 3. Bond each aboveground portion of gas piping system downstream from equipment shutoff valve.
- F. Bonding Interior Metal Ducts: Bond metal air ducts to equipment grounding conductors of associated fans, blowers, electric heaters, and air cleaners. Install tinned bonding jumper to bond across flexible duct connections to achieve continuity.

3.5 FIELD QUALITY CONTROL

- A. Perform tests and inspections.
 - 1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.
- B. Tests and Inspections:
 - 1. After installing grounding system but before permanent electrical circuits have been energized, test for compliance with requirements.
 - 2. Inspect physical and mechanical condition. Verify tightness of accessible, bolted, electrical connections with a calibrated torque wrench according to manufacturer's written instructions.
 - 3. Test completed grounding system at each location where a maximum ground-resistance level is specified, at service disconnect enclosure grounding terminal, and at individual ground rods. Make tests at ground rods before any conductors are connected.
 - a. Measure ground resistance no fewer than two full days after last trace of precipitation and without soil being moistened by any means other than natural drainage or seepage and without chemical treatment or other artificial means of reducing natural ground resistance.
 - b. Perform tests by fall-of-potential method according to IEEE 81.
- C. Grounding system will be considered defective if it does not pass tests and inspections.
- D. Prepare test and inspection reports.
- E. Report measured ground resistances that exceed the following values:
 - 1. Power and Lighting Equipment or System with Capacity of 500 kVA and Less: 10 ohms.
 - 2. Power and Lighting Equipment or System with Capacity of 500 to 1000 kVA: 5 ohms.
 - 3. Power and Lighting Equipment or System with Capacity More Than 1000 kVA: 3 ohms.
 - 4. Power Distribution Units or Panelboards Serving Electronic Equipment: 1 ohm(s).
 - 5. Substations and Pad-Mounted Equipment: 5 ohms.
- F. Excessive Ground Resistance: If resistance to ground exceeds specified values, notify Architect promptly and include recommendations to reduce ground resistance.

SECTION 26 0529

HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

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. Hangers and supports for electrical equipment and systems.
 - 2. Construction requirements for concrete bases.

1.3 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Design supports for multiple raceways, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.
- B. Design supports for multiple raceways capable of supporting combined weight of supported systems and its contents.
- C. Design equipment supports capable of supporting combined operating weight of supported equipment and connected systems and components.

1.4 QUALITY ASSURANCE

A. Comply with NFPA 70.

1.5 COORDINATION

- A. Coordinate size and location of concrete bases. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork requirements are specified together with concrete Specifications.
- B. Coordinate installation of roof curbs, equipment supports, and roof penetrations.

PART 2 - PRODUCTS

2.1 SUPPORT, ANCHORAGE, AND ATTACHMENT COMPONENTS

- A. Steel Slotted Support Systems: Comply with MFMA-4, factory-fabricated components for field assembly.
 - Metallic Coatings: Hot-dip galvanized after fabrication and applied according to MFMA-4.
 - 2. Nonmetallic Coatings: Manufacturer's standard PVC, polyurethane, or polyester coating applied according to MFMA-4.
 - Painted Coatings: Manufacturer's standard painted coating applied according to MFMA-4.
 - 4. Channel Dimensions: Selected for applicable load criteria.

GOODWYN, MILLS & CAWOOD, LLC GMC PROJECT NO.: AHUN210012 Hangers and Supports for Electrical Systems

- B. Raceway and Cable Supports: As described in NECA 1 and NECA 101.
- C. Conduit and Cable Support Devices: Steel hangers, clamps, and associated fittings, designed for types and sizes of raceway or cable to be supported.
- D. Support for Conductors in Vertical Conduit: Factory-fabricated assembly consisting of threaded body and insulating wedging plug or plugs for non-armored electrical conductors or cables in riser conduits. Plugs shall have number, size, and shape of conductor gripping pieces as required to suit individual conductors or cables supported. Body shall be malleable iron.
- E. Structural Steel for Fabricated Supports and Restraints: ASTM A 36/A 36M, steel plates, shapes, and bars; black and galvanized.
- F. Mounting, Anchoring, and Attachment Components: Items for fastening electrical items or their supports to building surfaces include the following:
 - 1. Powder-Actuated Fasteners: Threaded-steel stud, for use in hardened portland cement concrete, steel, or wood, with tension, shear, and pullout capacities appropriate for supported loads and building materials where used.
 - 2. Mechanical-Expansion Anchors: Insert-wedge-type, zinc-coated steel, for use in hardened portland cement concrete with tension, shear, and pullout capacities appropriate for supported loads and building materials in which used.
 - 3. Concrete Inserts: Steel or malleable-iron, slotted support system units similar to MSS Type 18; complying with MFMA-4 or MSS SP-58.
 - 4. Clamps for Attachment to Steel Structural Elements: MSS SP-58, type suitable for attached structural element.
 - 5. Through Bolts: Structural type, hex head, and high strength. Comply with ASTM A 325.
 - 6. Toggle Bolts: All-steel springhead type.
 - 7. Hanger Rods: Threaded steel.

PART 3 - EXECUTION

3.1 APPLICATION

- A. Comply with NECA 1 and NECA 101 for application of hangers and supports for electrical equipment and systems except if requirements in this Section are stricter.
- B. Maximum Support Spacing and Minimum Hanger Rod Size for Raceway: Space supports for EMT, IMC, and RMC as required by NFPA 70. Minimum rod size shall be 1/4 inch (6 mm) in diameter.
- C. Multiple Raceways or Cables: Install trapeze-type supports fabricated with steel slotted support system, sized so capacity can be increased by at least 25 percent in future without exceeding specified design load limits.
 - 1. Secure raceways and cables to these supports with two-bolt conduit clamps.

3.2 SUPPORT INSTALLATION

- A. Comply with NECA 1 and NECA 101 for installation requirements except as specified in this Article.
- B. Raceway Support Methods: In addition to methods described in NECA 1, EMT, IMC, and RMC may be supported by openings through structure members, as permitted in NFPA 70.

- C. Strength of Support Assemblies: Where not indicated, select sizes of components so strength will be adequate to carry present and future static loads within specified loading limits. Minimum static design load used for strength determination shall be weight of supported components plus 200 lb (90 kg).
- D. Mounting and Anchorage of Surface-Mounted Equipment and Components: Anchor and fasten electrical items and their supports to building structural elements by the following methods unless otherwise indicated by code:
 - 1. To Wood: Fasten with lag screws or through bolts.
 - 2. To New Concrete: Bolt to concrete inserts.
 - 3. To Masonry: Approved toggle-type bolts on hollow masonry units and expansion anchor fasteners on solid masonry units.
 - 4. To Existing Concrete: Expansion anchor fasteners.
 - 5. To Steel: Beam clamps (MSS Type 19, 21, 23, 25, or 27) complying with MSS SP-69.
 - 6. To Light Steel: Sheet metal screws.
 - 7. Items Mounted on Hollow Walls and Nonstructural Building Surfaces: Mount cabinets, panelboards, disconnect switches, control enclosures, pull and junction boxes, transformers, and other devices on slotted-channel racks attached to substrate.
- E. Drill holes for expansion anchors in concrete at locations and to depths that avoid reinforcing bars.

3.3 CONCRETE BASES

- A. Construct concrete bases of dimensions indicated but not less than 4 inches (100 mm) larger in both directions than supported unit, and so anchors will be a minimum of 10 bolt diameters from edge of the base.
- B. Use 3000-psi (20.7-MPa), 28-day compressive-strength concrete.
- C. Anchor equipment to concrete base.
 - 1. Place and secure anchorage devices. Use supported equipment manufacturer's setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
 - 2. Install anchor bolts to elevations required for proper attachment to supported equipment.
 - 3. Install anchor bolts according to anchor-bolt manufacturer's written instructions.

SECTION 26 0533

RACEWAYS AND BOXES FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Metal conduits, tubing, and fittings.
 - 2. Nonmetal conduits, tubing, and fittings.
 - 3. Metal wireways and auxiliary gutters.
 - 4. Nonmetal wireways and auxiliary gutters.
 - 5. Surface raceways.
 - 6. Boxes, enclosures, and cabinets.
 - 7. Handholes and boxes for exterior underground cabling.

PART 2 - PRODUCTS

2.1 METAL CONDUITS, TUBING, AND FITTINGS

- A. Listing and Labeling: Metal conduits, tubing, and fittings shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. GRC: Comply with ANSI C80.1 and UL 6.
- C. IMC: Comply with ANSI C80.6 and UL 1242.
- D. PVC-Coated Steel Conduit: PVC-coated rigid steel conduit.
 - 1. Comply with NEMA RN 1.
 - 2. Coating Thickness: 0.040 inch (1 mm), minimum.
- E. EMT: Comply with ANSI C80.3 and UL 797.
- F. FMC: Comply with UL 1; zinc-coated steel.
- G. LFMC: Flexible steel conduit with PVC jacket and complying with UL 360.
- H. Fittings for Metal Conduit: Comply with NEMA FB 1 and UL 514B.
 - 1. Fittings for EMT:
 - a. Material: Steel.
 - b. Type: compression.
 - 2. Expansion Fittings: PVC or steel to match conduit type, complying with UL 651, rated for environmental conditions where installed, and including flexible external bonding jumper.
 - 3. Coating for Fittings for PVC-Coated Conduit: Minimum thickness of 0.040 inch (1 mm), with overlapping sleeves protecting threaded joints.

I. Joint Compound for IMC, GRC, or ARC: Approved, as defined in NFPA 70, by authorities having jurisdiction for use in conduit assemblies, and compounded for use to lubricate and protect threaded conduit joints from corrosion and to enhance their conductivity.

2.2 NONMETALLIC CONDUITS, TUBING, AND FITTINGS

- A. Listing and Labeling: Nonmetallic conduits, tubing, and fittings shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. ENT: Comply with NEMA TC 13 and UL 1653.
- C. RNC: Type EPC-40-PVC, complying with NEMA TC 2 and UL 651 unless otherwise indicated.
- D. LFNC: Comply with UL 1660.
- E. Rigid HDPE: Comply with UL 651A.
- F. RTRC: Comply with UL 1684A and NEMA TC 14.
- G. Fittings for ENT and RNC: Comply with NEMA TC 3; match to conduit or tubing type and material.
- H. Fittings for LFNC: Comply with UL 514B.

2.3 METAL WIREWAYS AND AUXILIARY GUTTERS

- A. Description: Sheet metal, complying with UL 870 and NEMA 250, Type 1 unless otherwise indicated, and sized according to NFPA 70.
 - 1. Metal wireways installed outdoors shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. Fittings and Accessories: Include covers, couplings, offsets, elbows, expansion joints, adapters, hold-down straps, end caps, and other fittings to match and mate with wireways as required for complete system.
- C. Wireway Covers: Hinged type unless otherwise indicated.
- D. Finish: Manufacturer's standard enamel finish.

2.4 BOXES, ENCLOSURES, AND CABINETS

- A. General Requirements for Boxes, Enclosures, and Cabinets: Boxes, enclosures, and cabinets installed in wet locations shall be listed for use in wet locations.
- B. Sheet Metal Outlet and Device Boxes: Comply with NEMA OS 1 and UL 514A.

- C. Cast-Metal Outlet and Device Boxes: Comply with NEMA FB 1, ferrous alloy, Type FD, with gasketed cover.
- D. Nonmetallic Outlet and Device Boxes: Comply with NEMA OS 2 and UL 514C.
- E. Metal Floor Boxes:
 - 1. Material: Cast metal.
 - 2. Type: Fully adjustable.
 - 3. Shape: Rectangular.
 - 4. Listing and Labeling: Metal floor boxes shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- F. Luminaire Outlet Boxes: Nonadjustable, designed for attachment of luminaire weighing 50 lb (23 kg). Outlet boxes designed for attachment of luminaires weighing more than 50 lb (23 kg) shall be listed and marked for the maximum allowable weight.
- G. Small Sheet Metal Pull and Junction Boxes: NEMA OS 1.
- H. Cast-Metal Access, Pull, and Junction Boxes: Comply with NEMA FB 1 and UL 1773, galvanized, cast iron with gasketed cover.
- I. Box extensions used to accommodate new building finishes shall be of same material as recessed box.
- J. Device Box Dimensions: 4 inches square by 2-1/8 inches deep (100 mm square by 60 mm deep).
- K. Gangable boxes are prohibited.

2.5 HANDHOLES AND BOXES FOR EXTERIOR UNDERGROUND WIRING

- A. General Requirements for Handholes and Boxes:
 - 1. Boxes and handholes for use in underground systems shall be designed and identified as defined in NFPA 70, for intended location and application.
 - 2. Boxes installed in wet areas shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. Polymer-Concrete Handholes and Boxes with Polymer-Concrete Cover: Molded of sand and aggregate, bound together with polymer resin, and reinforced with steel, fiberglass, or a combination of the two.
 - Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:

 Quazite: Hubbell Power System, Inc.
 - a. Quazite: Hubbell Power System2. Standard: Comply with SCTE 77.
 - 3. Configuration: Designed for flush burial with open bottom unless otherwise indicated.
 - 4. Cover: Weatherproof, secured by tamper-resistant locking devices and having structural load rating consistent with enclosure and handhole location.

- 5. Cover Finish: Nonskid finish shall have a minimum coefficient of friction of 0.50.
- 6. Conduit Entrance Provisions: Conduit-terminating fittings shall mate with entering ducts for secure, fixed installation in enclosure wall.

2.6 SOURCE QUALITY CONTROL FOR UNDERGROUND ENCLOSURES

PART 3 - EXECUTION

3.1 RACEWAY APPLICATION

- A. Outdoors: Apply raceway products as specified below unless otherwise indicated:
 - 1. Exposed Conduit: GRC.
 - 2. Concealed Conduit, Aboveground: IMC.
 - 3. Underground Conduit: RNC, Type EPC-80-PVC, concrete encased.
 - 4. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): LFMC.
 - 5. Boxes and Enclosures, Aboveground: NEMA 250, Type 3R.
- B. Indoors: Apply raceway products as specified below unless otherwise indicated:
 - 1. Exposed, Not Subject to Physical Damage: EMT.
 - 2. Exposed, Not Subject to Severe Physical Damage: EMT.
 - 3. Exposed and Subject to Severe Physical Damage: GRC. Raceway locations include the following:
 - a. Loading dock.
 - b. Corridors used for traffic of mechanized carts, forklifts, and pallet-handling units.
 - c. Mechanical rooms.
 - 4. Concealed in Ceilings and Interior Walls and Partitions: EMT.
 - 5. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): FMC, except use LFMC in damp or wet locations.
 - 6. Damp or Wet Locations: IMC.
 - 7. Boxes and Enclosures: NEMA 250, Type 1, except use NEMA 250, Type 4 stainless steel in institutional and commercial kitchens and damp or wet locations.
- C. Minimum Raceway Size: 3/4-inch (21-mm) trade size.
- D. Raceway Fittings: Compatible with raceways and suitable for use and location.
 - 1. Rigid and Intermediate Steel Conduit: Use threaded rigid steel conduit fittings unless otherwise indicated. Comply with NEMA FB 2.10.
 - 2. PVC Externally Coated, Rigid Steel Conduits: Use only fittings listed for use with this type of conduit. Patch and seal all joints, nicks, and scrapes in PVC coating after installing conduits and fittings. Use sealant recommended by fitting manufacturer and apply in thickness and number of coats recommended by manufacturer.
 - 3. EMT: Use compression, steel fittings. Comply with NEMA FB 2.10.
 - 4. Flexible Conduit: Use only fittings listed for use with flexible conduit. Comply with NEMA FB 2.20.
- E. Do not install aluminum conduits, boxes, or fittings in contact with concrete or earth.

- F. Install surface raceways only where indicated on Drawings.
- G. Do not install nonmetallic conduit where ambient temperature exceeds 120 deg F (49 deg C).

3.2 INSTALLATION

- A. Comply with NECA 1 and NECA 101 for installation requirements except where requirements on Drawings or in this article are stricter. Comply with NECA 102 for aluminum conduits. Comply with NFPA 70 limitations for types of raceways allowed in specific occupancies and number of floors.
- B. Keep raceways at least 6 inches (150 mm) away from parallel runs of flues and steam or hotwater pipes. Install horizontal raceway runs above water and steam piping.
- C. Complete raceway installation before starting conductor installation.
- D. Comply with requirements in Section 26 0529 "Hangers and Supports for Electrical Systems" for hangers and supports.
- E. Arrange stub-ups so curved portions of bends are not visible above finished slab.
- F. Install no more than the equivalent of three 90-degree bends in any conduit run except for control wiring conduits, for which fewer bends are allowed. Support within 12 inches (300 mm) of changes in direction.
- G. Conceal conduit and EMT within finished walls, ceilings, and floors unless otherwise indicated. Install conduits parallel or perpendicular to building lines.
- H. Support conduit within 12 inches (300 mm) of enclosures to which attached.
- I. Raceways Embedded in Slabs:
 - 1. Run conduit larger than 1-inch (27-mm) trade size, parallel or at right angles to main reinforcement. Where at right angles to reinforcement, place conduit close to slab support. Secure raceways to reinforcement at maximum 10-foot (3-m) intervals.
 - 2. Arrange raceways to cross building expansion joints at right angles with expansion fittings.
 - 3. Arrange raceways to keep a minimum of 2 inches (50 mm) of concrete cover in all directions.
 - 4. Do not embed threadless fittings in concrete unless specifically approved by Architect for each specific location.
 - 5. Change from ENT to IMC before rising above floor.
- J. Raceways Below Slabs:
 - 1. Change from ENT to IMC before rising above floor.
- K. Stub-ups to Above Recessed Ceilings:
 - 1. Use EMT, IMC, or RMC for raceways.

- 2. Use a conduit bushing or insulated fitting to terminate stub-ups not terminated in hubs or in an enclosure.
- L. Threaded Conduit Joints, Exposed to Wet, Damp, Corrosive, or Outdoor Conditions: Apply listed compound to threads of raceway and fittings before making up joints. Follow compound manufacturer's written instructions.
- M. Coat field-cut threads on PVC-coated raceway with a corrosion-preventing conductive compound prior to assembly.
- N. Terminate threaded conduits into threaded hubs or with locknuts on inside and outside of boxes or cabinets. Install bushings on conduits up to 1-1/4-inch (35mm) trade size and insulated throat metal bushings on 1-1/2-inch (41-mm) trade size and larger conduits terminated with locknuts. Install insulated throat metal grounding bushings on service conduits.
- O. Install raceways square to the enclosure and terminate at enclosures with locknuts. Install locknuts hand tight plus 1/4 turn more.
- P. Do not rely on locknuts to penetrate nonconductive coatings on enclosures. Remove coatings in the locknut area prior to assembling conduit to enclosure to assure a continuous ground path.
- Q. Cut conduit perpendicular to the length. For conduits 2-inch (53-mm) trade size and larger, use roll cutter or a guide to make cut straight and perpendicular to the length.
- R. Install pull wires in empty raceways. Use polypropylene or monofilament plastic line with not less than 200-lb (90-kg) tensile strength. Leave at least 12 inches (300 mm) of slack at each end of pull wire. Cap underground raceways designated as spare above grade alongside raceways in use.
- S. Install raceway sealing fittings at accessible locations according to NFPA 70 and fill them with listed sealing compound. For concealed raceways, install each fitting in a flush steel box with a blank cover plate having a finish similar to that of adjacent plates or surfaces. Install raceway sealing fittings according to NFPA 70.
- T. Install devices to seal raceway interiors at accessible locations. Locate seals so no fittings or boxes are between the seal and the following changes of environments. Seal the interior of all raceways at the following points:
 - 1. Where conduits pass from warm to cold locations, such as boundaries of refrigerated spaces.
 - 2. Where an underground service raceway enters a building or structure.
 - 3. Where otherwise required by NFPA 70.
- U. Comply with manufacturer's written instructions for solvent welding RNC and fittings.
- V. Expansion-Joint Fittings:
 - 1. Install in each run of aboveground RNC that is located where environmental temperature change may exceed 30 deg F (17 deg C) and that has straight-run length that exceeds 25 feet (7.6 m). Install in each run of aboveground RMC conduit that is located where

environmental temperature change may exceed 100 deg F (55 deg C) and that has straight-run length that exceeds 100 feet (30 m).

- 2. Install type and quantity of fittings that accommodate temperature change listed for each of the following locations:
 - a. Outdoor Locations Not Exposed to Direct Sunlight: 125 deg F (70 deg C) temperature change.
 - b. Outdoor Locations Exposed to Direct Sunlight: 155 deg F (86 deg C) temperature change.
 - c. Indoor Spaces Connected with Outdoors without Physical Separation: 125 deg F (70 deg C) temperature change.
- 3. Install fitting(s) that provide expansion and contraction for at least 0.00041 inch per foot of length of straight run per deg F (0.06 mm per meter of length of straight run per deg C) of temperature change for PVC conduits. Install fitting(s) that provide expansion and contraction for at least 0.000078 inch per foot of length of straight run per deg F (0.0115 mm per meter of length of straight run per deg C) of temperature change for metal conduits.
- 4. Install expansion fittings at all locations where conduits cross building or structure expansion joints.
- 5. Install each expansion-joint fitting with position, mounting, and piston setting selected according to manufacturer's written instructions for conditions at specific location at time of installation. Install conduit supports to allow for expansion movement.
- W. Flexible Conduit Connections: Comply with NEMA RV 3. Use a maximum of 72 inches (1830 mm) of flexible conduit for recessed and semi recessed luminaires, equipment subject to vibration, noise transmission, or movement; and for transformers and motors.
 - 1. Use LFMC in damp or wet locations subject to severe physical damage.
 - 2. Use LFMC or LFNC in damp or wet locations not subject to severe physical damage.
- X. Mount boxes at heights indicated on Drawings. If mounting heights of boxes are not individually indicated, give priority to ADA requirements. Install boxes with height measured to top of box unless otherwise indicated.
- Y. Recessed Boxes in Masonry Walls: Saw-cut opening for box in center of cell of masonry block and install box flush with surface of wall. Prepare block surfaces to provide a flat surface for a raintight connection between box and cover plate or supported equipment and box.
- Z. Horizontally separate boxes mounted on opposite sides of walls so they are not in the same vertical channel.
- AA. Locate boxes so that cover or plate will not span different building finishes.
- BB. Support boxes of three gangs or more from more than one side by spanning two framing members or mounting on brackets specifically designed for the purpose.
- CC. Fasten junction and pull boxes to or support from building structure. Do not support boxes by conduits.
- DD. Set metal floor boxes level and flush with finished floor surface.

EE. Set nonmetallic floor boxes level. Trim after installation to fit flush with finished floor surface.

3.3 INSTALLATION OF UNDERGROUND CONDUIT

- A. Direct-Buried Conduit:
 - 1. Excavate trench bottom to provide firm and uniform support for conduit. Prepare trench bottom for pipe less than 6 inches (150 mm) in nominal diameter.
 - 2. Install backfill.
 - 3. After installing conduit, backfill and compact. Start at tie-in point, and work toward end of conduit run, leaving conduit at end of run free to move with expansion and contraction as temperature changes during this process. Firmly hand tamp backfill around conduit to provide maximum supporting strength. After placing controlled backfill to within 12 inches (300 mm) of finished grade, make final conduit connection at end of run and complete backfilling with normal compaction.
 - 4. Install manufactured rigid steel conduit elbows for stub-ups at poles and equipment and at building entrances through floor.
 - a. Couple steel conduits to ducts with adapters designed for this purpose, and encase coupling with 3 inches (75 mm) of concrete for a minimum of 12 inches (300 mm) on each side of the coupling.
 - b. For stub-ups at equipment mounted on outdoor concrete bases and where conduits penetrate building foundations, extend steel conduit horizontally a minimum of 60 inches (1500 mm) from edge of foundation or equipment base. Install insulated grounding bushings on terminations at equipment.
 - 5. Underground Warning Tape: Comply with requirements in Section 26 0553 "Identification for Electrical Systems."

3.4 INSTALLATION OF UNDERGROUND HANDHOLES AND BOXES

- A. Install handholes and boxes level and plumb and with orientation and depth coordinated with connecting conduits to minimize bends and deflections required for proper entrances.
- B. Unless otherwise indicated, support units on a level bed of crushed stone or gravel, graded from 1/2-inch (12.5-mm) sieve to No. 4 (4.75-mm) sieve and compacted to same density as adjacent undisturbed earth.
- C. Elevation: In paved areas, set so cover surface will be flush with finished grade. Set covers of other enclosures 1 inch (25 mm) above finished grade.
- D. Install removable hardware, including pulling eyes, cable stanchions, cable arms, and insulators, as required for installation and support of cables and conductors and as indicated. Select arm lengths to be long enough to provide spare space for future cables but short enough to preserve adequate working clearances in enclosure.
- E. Field-cut openings for conduits according to enclosure manufacturer's written instructions. Cut wall of enclosure with a tool designed for material to be cut. Size holes for terminating fittings to be used, and seal around penetrations after fittings are installed.

3.5 SLEEVE AND SLEEVE-SEAL INSTALLATION FOR ELECTRICAL PENETRATIONS

A. Install sleeves and sleeve seals at penetrations of exterior floor and wall assemblies. Comply with requirements in Section 26 0544 "Sleeves and Sleeve Seals for Electrical Raceways and Cabling."

3.6 FIRESTOPPING

A. Install firestopping at penetrations of fire-rated floor and wall assemblies.

3.7 PROTECTION

- A. Protect coatings, finishes, and cabinets from damage and deterioration.
 - 1. Repair damage to galvanized finishes with zinc-rich paint recommended by manufacturer.
 - 2. Repair damage to PVC coatings or paint finishes with matching touchup coating recommended by manufacturer.

SECTION 26 0544

SLEEVES AND SLEEVE SEALS FOR ELECTRICAL RACEWAYS AND CABLING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Sleeves for raceway and cable penetration of non-fire-rated construction walls and floors.
 - 2. Sleeve-seal systems.
 - 3. Sleeve-seal fittings.
 - 4. Grout.
 - 5. Silicone sealants.

PART 2 - PRODUCTS

2.1 SLEEVES

- A. Wall Sleeves:
 - 1. Steel Pipe Sleeves: ASTM A 53/A 53M, Type E, Grade B, Schedule 40, zinc coated, plain ends.
- B. Sleeves for Conduits Penetrating Non-Fire-Rated Gypsum Board Assemblies: Galvanized-steel sheet; 0.0239-inch (0.6-mm) minimum thickness; round tube closed with welded longitudinal joint, with tabs for screw-fastening the sleeve to the board.
- C. Sleeves for Rectangular Openings:
 - 1. Material: Galvanized sheet steel.
 - 2. Minimum Metal Thickness:
 - a. For sleeve cross-section rectangle perimeter less than 50 inches (1270 mm) and with no side larger than 16 inches (400 mm), thickness shall be 0.052 inch (1.3 mm).
 - b. For sleeve cross-section rectangle perimeter 50 inches (1270 mm) or more and one or more sides larger than 16 inches (400 mm), thickness shall be 0.138 inch (3.5 mm).

2.2 SLEEVE-SEAL SYSTEMS

- A. Description: Modular sealing device, designed for field assembly, to fill annular space between sleeve and raceway or cable.
 - 1. Sealing Elements: EPDM rubber interlocking links shaped to fit surface of pipe. Include type and number required for pipe material and size of pipe.
 - 2. Pressure Plates: Carbon steel.
 - 3. Connecting Bolts and Nuts: Carbon steel, with corrosion-resistant coating, of length required to secure pressure plates to sealing elements.

2.3 SLEEVE-SEAL FITTINGS

A. Description: Manufactured plastic, sleeve-type, waterstop assembly made for embedding in concrete slab or wall. Unit shall have plastic or rubber waterstop collar with center opening to match piping OD.

2.4 GROUT

- A. Description: Nonshrink; recommended for interior and exterior sealing openings in non-firerated walls or floors.
- B. Standard: ASTM C 1107/C 1107M, Grade B, post-hardening and volume-adjusting, dry, hydraulic-cement grout.
- C. Design Mix: 5000-psi (34.5-MPa), 28-day compressive strength.
- D. Packaging: Premixed and factory packaged.

PART 3 - EXECUTION

3.1 SLEEVE INSTALLATION FOR NON-FIRE-RATED ELECTRICAL PENETRATIONS

- A. Comply with NECA 1.
- B. Comply with NEMA VE 2 for cable tray and cable penetrations.
- C. Sleeves for Conduits Penetrating Above-Grade Non-Fire-Rated Concrete and Masonry-Unit Floors and Walls:
 - 1. Interior Penetrations of Non-Fire-Rated Walls and Floors:
 - a. Seal annular space between sleeve and raceway or cable, using joint sealant appropriate for size, depth, and location of joint.
 - b. Seal space outside of sleeves with mortar or grout. Pack sealing material solidly between sleeve and wall so no voids remain. Tool exposed surfaces smooth; protect material while curing.
 - 2. Use pipe sleeves unless penetration arrangement requires rectangular sleeved opening.
 - 3. Size pipe sleeves to provide 1/4-inch (6.4-mm) annular clear space between sleeve and raceway or cable unless sleeve seal is to be installed.
 - 4. Install sleeves for wall penetrations unless core-drilled holes or formed openings are used. Install sleeves during erection of walls. Cut sleeves to length for mounting flush with both surfaces of walls. Deburr after cutting.
- D. Sleeves for Conduits Penetrating Non-Fire-Rated Gypsum Board Assemblies:
 - 1. Use circular metal sleeves unless penetration arrangement requires rectangular sleeved opening.
 - 2. Seal space outside of sleeves with approved joint compound for gypsum board assemblies.

- E. Roof-Penetration Sleeves: Seal penetration of individual raceways and cables with flexible boot-type flashing units applied in coordination with roofing work.
- F. Aboveground, Exterior-Wall Penetrations: Seal penetrations using [steel] [cast-iron] pipe sleeves and mechanical sleeve seals. Select sleeve size to allow for 1-inch (25-mm) annular clear space between pipe and sleeve for installing mechanical sleeve seals.
- G. Underground, Exterior-Wall and Floor Penetrations: Install cast-iron pipe sleeves. Size sleeves to allow for 1-inch (25-mm) annular clear space between raceway or cable and sleeve for installing sleeve-seal system.

3.2 SLEEVE-SEAL-SYSTEM INSTALLATION

- A. Install sleeve-seal systems in sleeves in exterior concrete walls and slabs-on-grade at raceway entries into building.
- B. Install type and number of sealing elements recommended by manufacturer for raceway or cable material and size. Position raceway or cable in center of sleeve. Assemble mechanical sleeve seals and install in annular space between raceway or cable and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.

SECTION 26 0553

IDENTIFICATION FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Identification for raceways.
 - 2. Identification of power and control cables.
 - 3. Identification for conductors.
 - 4. Underground-line warning tape.
 - 5. Warning labels and signs.
 - 6. Instruction signs.
 - 7. Equipment identification labels.
 - 8. Miscellaneous identification products.

1.2 QUALITY ASSURANCE

- A. Comply with ANSI A13.1.
- B. Comply with NFPA 70.
- C. Comply with 29 CFR 1910.144 and 29 CFR 1910.145.
- D. Comply with ANSI Z535.4 for safety signs and labels.
- E. Adhesive-attached labeling materials, including label stocks, laminating adhesives, and inks used by label printers, shall comply with UL 969.

1.3 COORDINATION

- A. Coordinate identification names, abbreviations, colors, and other features with requirements in other Sections requiring identification applications, Drawings, Shop Drawings, manufacturer's wiring diagrams, and the Operation and Maintenance Manual; and with those required by codes, standards, and 29 CFR 1910.145. Use consistent designations throughout Project.
- B. Coordinate installation of identifying devices with completion of covering and painting of surfaces where devices are to be applied.
- C. Coordinate installation of identifying devices with location of access panels and doors.
- D. Install identifying devices before installing acoustical ceilings and similar concealment.

PART 2 - PRODUCTS

2.1 POWER AND CONTROL RACEWAY IDENTIFICATION MATERIALS

- A. Comply with ANSI A13.1 for minimum size of letters for legend and for minimum length of color field for each raceway size.
- B. Colors for Raceways Carrying Circuits at 600 V or Less:
 - 1. Black letters on white background.
 - 2. Legend: Indicate voltage and system or service type.
- C. Vinyl Labels for Raceways Carrying Circuits at 600 V or Less: Preprinted, flexible label laminated with a clear, weather- and chemical-resistant coating and matching wraparound clear adhesive tape for securing ends of legend label.
- D. Write-On Tags: Polyester tag, 0.015 inch (0.38 mm) thick, with corrosion-resistant grommet and cable tie for attachment to conductor or cable.
 - 1. Marker for Tags: Machine-printed, permanent, waterproof, black ink marker recommended by printer manufacturer.

2.2 POWER AND CONTROL CABLE IDENTIFICATION MATERIALS

- A. Comply with ANSI A13.1 for minimum size of letters for legend and for minimum length of color field for each cable size.
- B. Vinyl Labels: Preprinted, flexible label laminated with a clear, weather- and chemical-resistant coating and matching wraparound clear adhesive tape for securing ends of legend label.

2.3 CONDUCTOR IDENTIFICATION MATERIALS

A. Color-Coding Conductor Tape: Colored, self-adhesive vinyl tape not less than 3 mils (0.08 mm) thick by 1 to 2 inches (25 to 50 mm) wide.

2.4 FLOOR MARKING TAPE

A. 2-inch- (50-mm-) wide, 5-mil (0.125-mm) pressure-sensitive vinyl tape, with yellow and black stripes and clear vinyl overlay.

2.5 UNDERGROUND-LINE WARNING TAPE

- A. Tape:
 - 1. Recommended by manufacturer for the method of installation and suitable to identify and locate underground electrical and communications utility lines.
 - 2. Printing on tape shall be permanent and shall not be damaged by burial operations.
 - 3. Tape material and ink shall be chemically inert, and not subject to degrading when exposed to acids, alkalis, and other destructive substances commonly found in soils.
- B. Color and Printing:
 - 1. Comply with ANSI Z535.1 through ANSI Z535.5.

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- 2. Inscriptions for Red-Colored Tapes: ELECTRIC LINE, HIGH VOLTAGE.
- 3. Inscriptions for Orange-Colored Tapes: TELEPHONE CABLE, CATV CABLE, COMMUNICATIONS CABLE, OPTICAL FIBER CABLE.

2.6 WARNING LABELS AND SIGNS

- A. Comply with NFPA 70 and 29 CFR 1910.145.
- B. Baked-Enamel Warning Signs:
 - 1. Preprinted aluminum signs punched or drilled for fasteners, with colors, legend, and size required for application.
 - 2. 1/4-inch (6.4-mm) grommets in corners for mounting.
 - 3. Nominal size, 7 by 10 inches (180 by 250 mm).
- C. Warning label and sign shall include, but are not limited to, the following legends:
 - 1. Multiple Power Source Warning: "DANGER ELECTRICAL SHOCK HAZARD EQUIPMENT HAS MULTIPLE POWER SOURCES."
 - 2. Workspace Clearance Warning: "WARNING OSHA REGULATION AREA IN FRONT OF ELECTRICAL EQUIPMENT MUST BE KEPT CLEAR FOR 36 INCHES (915 MM)."

2.7 EQUIPMENT IDENTIFICATION LABELS

A. Engraved, Laminated Acrylic or Melamine Label: Punched or drilled for screw mounting. White letters on a dark-gray background. Minimum letter height shall be 3/8 inch (10 mm).

2.8 CABLE TIES

- A. General-Purpose Cable Ties: Fungus inert, self extinguishing, one piece, self locking, Type 6/6 nylon.
 - 1. Minimum Width: 3/16 inch (5 mm).
 - 2. Tensile Strength at 73 deg F (23 deg C), According to ASTM D 638: 12,000 psi (82.7 MPa).
 - 3. Temperature Range: Minus 40 to plus 185 deg F (Minus 40 to plus 85 deg C).
 - 4. Color: Black except where used for color-coding.
- B. UV-Stabilized Cable Ties: Fungus inert, designed for continuous exposure to exterior sunlight, self extinguishing, one piece, self locking, Type 6/6 nylon.
 - 1. Minimum Width: 3/16 inch (5 mm).
 - 2. Tensile Strength at 73 deg F (23 deg C), According to ASTM D 638: 12,000 psi (82.7 MPa).
 - 3. Temperature Range: Minus 40 to plus 185 deg F (Minus 40 to plus 85 deg C).
 - 4. Color: Black.
- C. Plenum-Rated Cable Ties: Self extinguishing, UV stabilized, one piece, self-locking.
 - 1. Minimum Width: 3/16 inch (5 mm).
 - 2. Tensile Strength at 73 deg F ((23 deg C)), According to ASTM D 638: 7000 psi (48.2 MPa).

- 3. UL 94 Flame Rating: 94V-0.
- 4. Temperature Range: Minus 50 to plus 284 deg F (Minus 46 to plus 140 deg C).
- 5. Color: Black.

2.9 MISCELLANEOUS IDENTIFICATION PRODUCTS

- A. Paint: Comply with requirements in painting Sections for paint materials and application requirements. Select paint system applicable for surface material and location (exterior or interior).
- B. Fasteners for Labels and Signs: Self-tapping, stainless-steel screws or stainless-steel machine screws with nuts and flat and lock washers.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Verify identity of each item before installing identification products.
- B. Location: Install identification materials and devices at locations for most convenient viewing without interference with operation and maintenance of equipment.
- C. Apply identification devices to surfaces that require finish after completing finish work.
- D. Attach signs and plastic labels that are not self-adhesive type with mechanical fasteners appropriate to the location and substrate.
- E. Attach plastic raceway and cable labels that are not self-adhesive type with clear vinyl tape with adhesive appropriate to the location and substrate.
- F. System Identification Color-Coding Bands for Raceways and Cables: Each color-coding band shall completely encircle cable or conduit. Place adjacent bands of two-color markings in contact, side by side. Locate bands at changes in direction, at penetrations of walls and floors, at 50-foot (15-m) maximum intervals in straight runs, and at 25-foot (7.6-m) maximum intervals in congested areas.
- G. Aluminum Wraparound Marker Labels and Metal Tags: Secure tight to surface of conductor or cable at a location with high visibility and accessibility.
- H. Cable Ties: For attaching tags. Use general-purpose type, except as listed below:
 - 1. Outdoors: UV-stabilized nylon.
 - 2. In Spaces Handling Environmental Air: Plenum rated.
- I. Underground-Line Warning Tape: During backfilling of trenches install continuous underground-line warning tape directly above line at 6 to 8 inches (150 to 200 mm) below finished grade. Use multiple tapes where width of multiple lines installed in a common trench exceeds 16 inches (400 mm) overall.
- J. Painted Identification: Comply with requirements in painting Sections for surface preparation and paint application.

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3.2 IDENTIFICATION SCHEDULE

- A. Accessible Raceways and Metal-Clad Cables, 600 V or Less, for Service, Feeder, and Branch Circuits More Than 30 A, and 120 V to ground: Identify with self-adhesive vinyl tape applied in bands. Install labels at 10-foot (3-m) maximum intervals.
- B. Accessible Raceways and Cables within Buildings: Identify the covers of each junction and pull box of the following systems with self-adhesive vinyl labels with the wiring system legend and system voltage. System legends shall be as follows:
 - 1. Emergency Power.
 - 2. Power.
 - 3. UPS.
- C. Power-Circuit Conductor Identification, 600 V or Less: For conductors in vaults, pull and junction boxes, manholes, and handholes, use color-coding conductor tape to identify the phase.
 - 1. Color-Coding for Phase and Voltage Level Identification, 600 V or Less: Use colors listed below for ungrounded service, feeder and branch-circuit conductors.
 - a. Color shall be factory applied or field applied for sizes larger than No. 8 AWG, if authorities having jurisdiction permit.
 - b. Colors for 208/120-V Circuits:
 - 1) Phase A: Black.
 - 2) Phase B: Red.
 - 3) Phase C: Blue.
 - c. Colors for 480/277-V Circuits:
 - 1) Phase A: Brown.
 - 2) Phase B: Orange.
 - 3) Phase C: Yellow.
 - d. Field-Applied, Color-Coding Conductor Tape: Apply in half-lapped turns for a minimum distance of 6 inches (150 mm) from terminal points and in boxes where splices or taps are made. Apply last two turns of tape with no tension to prevent possible unwinding. Locate bands to avoid obscuring factory cable markings.
- D. Install instructional sign including the color-code for grounded and ungrounded conductors using adhesive-film-type labels.
- E. Auxiliary Electrical Systems Conductor Identification: Identify field-installed alarm, control, and signal connections.
 - 1. Identify conductors, cables, and terminals in enclosures and at junctions, terminals, and pull points. Identify by system and circuit designation.
 - 2. Use system of marker tape designations that is uniform and consistent with system used by manufacturer for factory-installed connections.
 - 3. Coordinate identification with Project Drawings, manufacturer's wiring diagrams, and the Operation and Maintenance Manual.
- F. Locations of Underground Lines: Identify with underground-line warning tape for power, lighting, communication, and control wiring and optical fiber cable.
 - 1. Limit use of underground-line warning tape to direct-buried cables.

- 2. Install underground-line warning tape for both direct-buried cables and cables in raceway.
- G. Workspace Indication: Install floor marking tape to show working clearances in the direction of access to live parts. Workspace shall be as required by NFPA 70 and 29 CFR 1926.403 unless otherwise indicated. Do not install at flush-mounted panelboards and similar equipment in finished spaces.
- H. Warning Labels for Indoor Cabinets, Boxes, and Enclosures for Power and Lighting: Bakedenamel warning signs.
 - 1. Comply with 29 CFR 1910.145.
 - 2. Identify system voltage with black letters on an orange background.
 - 3. Apply to exterior of door, cover, or other access.
- I. Operating Instruction Signs: Install instruction signs to facilitate proper operation and maintenance of electrical systems and items to which they connect. Install instruction signs with approved legend where instructions are needed for system or equipment operation.
- J. Equipment Identification Labels: On each unit of equipment, install unique designation label that is consistent with wiring diagrams, schedules, and the Operation and Maintenance Manual. Apply labels to disconnect switches and protection equipment, central or master units, control panels, control stations, terminal cabinets, and racks of each system. Systems include power, lighting, control, communication, signal, monitoring, and alarm systems unless equipment is provided with its own identification.
 - 1. Labeling Instructions:
 - a. Indoor Equipment: Engraved, laminated acrylic or melamine label. Unless otherwise indicated, provide a single line of text with 1/2-inch- (13-mm-) high letters on 1-1/2-inch- (38-mm-) high label; where two lines of text are required, use labels 2 inches (50 mm) high.
 - b. Outdoor Equipment: Engraved, laminated acrylic or melamine label.
 - c. Elevated Components: Increase sizes of labels and letters to those appropriate for viewing from the floor.
 - d. Unless provided with self-adhesive means of attachment, fasten labels with appropriate mechanical fasteners that do not change the NEMA or NRTL rating of the enclosure.
 - 2. Equipment to Be Labeled:
 - a. Panelboards: Typewritten directory of circuits in the location provided by panelboard manufacturer. Panelboard identification shall be engraved, laminated acrylic or melamine label.
 - b. Enclosures and electrical cabinets.
 - c. Access doors and panels for concealed electrical items.
 - d. Switchgear.
 - e. Switchboards.
 - f. Transformers: Label that includes tag designation shown on Drawings for the transformer, feeder, and panelboards or equipment supplied by the secondary.
 - g. Substations.
 - h. Emergency system boxes and enclosures.
 - i. Motor-control centers.
 - j. Enclosed switches.

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- k. Enclosed circuit breakers.
- l. Enclosed controllers.
- m. Contactors.
- n. Battery-inverter units.
- o. Power-generating units.
- p. Monitoring and control equipment.

SECTION 26 0923 LIGHTING CONTROL DEVICES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Time switches.
 - 2. Photoelectric switches.
 - 3. Indoor occupancy sensors.
 - 4. Lighting contactors.
 - 5. Emergency shunt relays.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: Show installation details for occupancy and light-level sensors.
 - 1. Interconnection diagrams showing field-installed wiring.
 - 2. Include diagrams for power, signal, and control wiring.

1.4 INFORMATIONAL SUBMITTALS

A. Field quality-control reports.

1.5 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For each type of lighting control device to include in emergency, operation, and maintenance manuals.

PART 2 - PRODUCTS

2.1 TIME SWITCHES

- A. Manufacturers: Subject to compliance with requirements, provide products by the following:
- B. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:
 - 1. Lutron
 - 2. Intermatic, Inc.
 - 3. Invensys Controls.

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2.2 INDOOR OCCUPANCY SENSORS

- A. Manufacturers: Subject to compliance with requirements, provide products by the following:
- B. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:
 - 1. Bryant Electric; a Hubbell company.
 - 2. Cooper Industries, Inc.
 - 3. Leviton Mfg. Company Inc.
 - 4. Lightolier Controls.
 - 5. Lithonia Lighting; Acuity Lighting Group, Inc.
 - 6. Lutron Electronics Co., Inc.
 - 7. NSi Industries LLC; TORK Products.
 - 8. RAB Lighting.
 - 9. Sensor Switch, Inc.
 - 10. Square D; a brand of Schneider Electric.
 - 11. Watt Stopper.
- C. General Requirements for Sensors: Wall- or ceiling-mounted, solid-state indoor occupancy sensors with a separate power pack.
 - 1. Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
 - 2. Operation: Unless otherwise indicated, turn lights on when coverage area is occupied, and turn them off when unoccupied; with a time delay for turning lights off, adjustable over a minimum range of 1 to 15 minutes.
 - 3. Sensor Output: Contacts rated to operate the connected relay, complying with UL 773A. Sensor is powered from the power pack.
 - 4. Power Pack: Dry contacts rated for 20-A ballast load at 120- and 277-V ac, for 13-A tungsten at 120-V ac, and for 1 hp at 120-V ac. Sensor has 24-V dc, 150-mA, Class 2 power source, as defined by NFPA 70.
 - 5. Mounting:
 - a. Sensor: Suitable for mounting in any position on a standard outlet box.
 - b. Relay: Externally mounted through a 1/2-inch knockout in a standard electrical enclosure.
 - c. Time-Delay and Sensitivity Adjustments: Recessed and concealed behind hinged door.
 - 6. Indicator: Digital display, to show when motion is detected during testing and normal operation of sensor.
 - 7. Bypass Switch: Override the "on" function in case of sensor failure.
 - 8. Automatic Light-Level Sensor: Adjustable from 2 to 200 fc; turn lights off when selected lighting level is present.
- D. Dual-Technology Type: Ceiling mounted; detect occupants in coverage area using PIR and ultrasonic detection methods. The particular technology or combination of technologies that control on-off functions is selectable in the field by operating controls on unit.
 - 1. Sensitivity Adjustment: Separate for each sensing technology.

- 2. Detector Sensitivity: Detect occurrences of 6-inch- minimum movement of any portion of a human body that presents a target of not less than 36 sq. in., and detect a person of average size and weight moving not less than 12 inches in either a horizontal or a vertical manner at an approximate speed of 12 inches/s.
- 3. Detection Coverage (Standard Room): Detect occupancy anywhere within a circular area of 1000 sq. ft. when mounted on a 96-inch- high ceiling.

2.3 LIGHTING CONTACTORS

- A. Manufacturers: Subject to compliance with requirements, provide products by the following:
- B. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:
 - 1. Allen-Bradley/Rockwell Automation.
 - 2. ASCO Power Technologies, LP; a division of Emerson Electric Co.
 - 3. Eaton Corporation.
 - 4. General Electric Company; GE Consumer & Industrial Electrical Distribution; Total Lighting Control.
 - 5. Square D; a brand of Schneider Electric.
- C. Description: Electrically operated and mechanically held, combination-type lighting contactors with fusible switch, complying with NEMA ICS 2 and UL 508.
 - 1. Current Rating for Switching: Listing or rating consistent with type of load served, including tungsten filament, inductive, and high-inrush ballast (ballast with 15 percent or less total harmonic distortion of normal load current).
 - 2. Fault Current Withstand Rating: Equal to or exceeding the available fault current at the point of installation.
 - 3. Enclosure: Comply with NEMA 250.

PART 3 - EXECUTION

3.1 SENSOR INSTALLATION

- A. Coordinate layout and installation of ceiling-mounted devices with other construction that penetrates ceilings or is supported by them, including light fixtures, HVAC equipment, smoke detectors, fire-suppression systems, and partition assemblies.
- B. Install and aim sensors in locations to achieve not less than 90 percent coverage of areas indicated. Do not exceed coverage limits specified in manufacturer's written instructions.

3.2 CONTACTOR INSTALLATION

A. Mount electrically held lighting contactors with elastomeric isolator pads to eliminate structureborne vibration, unless contactors are installed in an enclosure with factory-installed vibration isolators.

3.3 WIRING INSTALLATION

- A. Wiring Method: Comply with Section 260519 "Low-Voltage Electrical Power Conductors and Cables." Minimum conduit size is 1/2 inch.
- B. Wiring within Enclosures: Comply with NECA 1. Separate power-limited and nonpowerlimited conductors according to conductor manufacturer's written instructions.
- C. Size conductors according to lighting control device manufacturer's written instructions unless otherwise indicated.
- D. Splices, Taps, and Terminations: Make connections only on numbered terminal strips in junction, pull, and outlet boxes; terminal cabinets; and equipment enclosures.

3.4 IDENTIFICATION

- A. Identify components and power and control wiring according to Section 260553 "Identification for Electrical Systems."
 - 1. Identify controlled circuits in lighting contactors.
 - 2. Identify circuits or luminaires controlled by photoelectric and occupancy sensors at each sensor.
- B. Label time switches and contactors with a unique designation.

3.5 FIELD QUALITY CONTROL

- A. Testing Agency: Engage a qualified testing agency to evaluate lighting control devices and perform tests and inspections.
- B. Manufacturer's Field Service: Engage a factory-authorized service representative to test and inspect components, assemblies, and equipment installations, including connections.
- C. Perform the following tests and inspections:
 - 1. Operational Test: After installing time switches and sensors, and after electrical circuitry has been energized, start units to confirm proper unit operation.
 - 2. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- D. Lighting control devices will be considered defective if they do not pass tests and inspections.
- E. Prepare test and inspection reports.

3.6 ADJUSTING

A. Occupancy Adjustments: When requested within 12 months from date of Substantial Completion, provide on-site assistance in adjusting sensors to suit actual occupied conditions. Provide up to two visits to Project during other-than-normal occupancy hours for this purpose.

1. For occupancy and motion sensors, verify operation at outer limits of detector range. Set time delay to suit Owner's operations.

SECTION 26 2416 PANELBOARDS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Distribution panelboards.
 - 2. Lighting and appliance branch-circuit panelboards.
- B. SVR: Suppressed voltage rating.
- C. TVSS: Transient voltage surge suppressor.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of panelboard, switching and overcurrent protective device, transient voltage suppression device, accessory, and component indicated. Include dimensions and manufacturers' technical data on features, performance, electrical characteristics, ratings, and finishes.
- B. Shop Drawings: For each panelboard and related equipment.
 - 1. Include dimensioned plans, elevations, sections, and details. Show tabulations of installed devices, equipment features, and ratings.
 - 2. Detail enclosure types and details for types other than NEMA 250, Type 1.
 - 3. Detail bus configuration, current, and voltage ratings.
 - 4. Short-circuit current rating of panelboards and overcurrent protective devices.
 - 5. Detail features, characteristics, ratings, and factory settings of individual overcurrent protective devices and auxiliary components.
 - 6. Include wiring diagrams for power, signal, and control wiring.

1.3 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For panelboards and components to include in emergency, operation, and maintenance manuals. Include the following:
 - 1. Manufacturer's written instructions for testing and adjusting overcurrent protective devices.
 - 2. Time-current curves, including selectable ranges for each type of overcurrent protective device that allows adjustments.

1.4 QUALITY ASSURANCE

A. Source Limitations: Obtain panelboards, overcurrent protective devices, components, and accessories from single source from single manufacturer.
- B. Product Selection for Restricted Space: Drawings indicate maximum dimensions for panelboards including clearances between panelboards and adjacent surfaces and other items. Comply with indicated maximum dimensions.
- C. 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.
- D. Comply with NEMA PB 1.
- E. Comply with NFPA 70.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Handle and prepare panelboards for installation according to NECA 407.

1.6 PROJECT CONDITIONS

- A. Environmental Limitations:
 - 1. Do not deliver or install panelboards until spaces are enclosed and weathertight, wet work in spaces is complete and dry, work above panelboards is complete, and temporary HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period.
 - 2. Rate equipment for continuous operation under the following conditions unless otherwise indicated:
 - a. Ambient Temperature: Not exceeding [23 deg F (minus 5 deg C)] to plus 104 deg F (plus 40 deg C).
 - b. Altitude: Not exceeding 6600 feet (2000 m).

1.7 COORDINATION

A. Coordinate layout and installation of panelboards and components with other construction that penetrates walls or is supported by them, including electrical and other types of equipment, raceways, piping, encumbrances to workspace clearance requirements, and adjacent surfaces. Maintain required workspace clearances and required clearances for equipment access doors and panels.

PART 2 - PRODUCTS

2.1 GENERAL REQUIREMENTS FOR PANELBOARDS

- A. Enclosures: As shown on schedules.
 - 1. Rated for environmental conditions at installed location.
 - a. Indoor Dry and Clean Locations: NEMA 250, Type 1.
 - b. Outdoor Locations: NEMA 250, Type 3R.
 - 2. Front: Secured to box with concealed trim clamps. For surface-mounted fronts, match box dimensions; for flush-mounted fronts, overlap box.
 - 3. Finishes:
 - a. Panels and Trim: Steel, factory finished immediately after cleaning and pretreating with manufacturer's standard two-coat, baked-on finish consisting of prime coat and thermosetting topcoat.

- b. Back Boxes: Same finish as panels and trim.
- c. Fungus Proofing: Permanent fungicidal treatment for overcurrent protective devices and other components.
- 4. Directory Card: Inside panelboard door, mounted in transparent card holder.
- B. Phase, Neutral, and Ground Buses:
 - 1. Material: Hard-drawn copper, 98 percent conductivity.
 - 2. Equipment Ground Bus: Adequate for feeder and branch-circuit equipment grounding conductors; bonded to box.
- C. Conductor Connectors: Suitable for use with conductor material and sizes.
 - 1. Material: Hard-drawn copper, 98 percent conductivity.
 - 2. Main and Neutral Lugs: Compression type.
 - 3. Ground Lugs and Bus-Configured Terminators: Compression type.
 - 4. Feed-Through Lugs: Compression type, suitable for use with conductor material. Locate at opposite end of bus from incoming lugs or main device.
 - 5. Subfeed (Double) Lugs: Compression type suitable for use with conductor material. Locate at same end of bus as incoming lugs or main device.
 - 6. Gutter-Tap Lugs: Compression type suitable for use with conductor material. Locate at same end of bus as incoming lugs or main device.
- D. Service Equipment Label: NRTL labeled for use as service equipment for panelboards or load centers with one or more main service disconnecting and overcurrent protective devices.
- E. Future Devices: Mounting brackets, bus connections, filler plates, and necessary appurtenances required for future installation of devices.
- F. Panelboard Short-Circuit Current Rating: Fully rated to interrupt symmetrical short-circuit current available at terminals.

2.2 **PERFORMANCE REQUIREMENTS**

2.3 DISTRIBUTION PANELBOARDS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Eaton Electrical Inc.; Cutler-Hammer Business Unit.
 - 2. General Electric Company; GE Consumer & Industrial Electrical Distribution.
 - 3. Siemens Energy & Automation, Inc.
 - 4. Square D; a brand of Schneider Electric.
- B. Panelboards: NEMA PB 1, power and feeder distribution type.
- C. Doors: Secured with vault-type latch with tumbler lock; keyed alike.
 - 1. For doors more than 36 inches (914 mm) high, provide two latches, keyed alike.
- D. Branch Overcurrent Protective Devices for Circuit-Breakers: Bolt-on circuit breakers.

2.4 LIGHTING AND APPLIANCE BRANCH-CIRCUIT PANELBOARDS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Eaton Electrical Inc.; Cutler-Hammer Business Unit.
 - 2. General Electric Company; GE Consumer & Industrial Electrical Distribution.
 - 3. Siemens Energy & Automation, Inc.
 - 4. Square D; a brand of Schneider Electric.
- B. Panelboards: NEMA PB 1, lighting and appliance branch-circuit type.
- C. Branch Overcurrent Protective Devices: Bolt-on circuit breakers, replaceable without disturbing adjacent units.
- D. Doors: Concealed hinges; secured with flush latch with tumbler lock; keyed alike.
- E. Column-Type Panelboards: Narrow gutter extension, with cover, to overhead junction box equipped with ground and neutral terminal buses.

2.5 DISCONNECTING AND OVERCURRENT PROTECTIVE DEVICES

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Eaton Electrical Inc.; Cutler-Hammer Business Unit.
 - 2. General Electric Company; GE Consumer & Industrial Electrical Distribution.
 - 3. Siemens Energy & Automation, Inc.
 - 4. Square D; a brand of Schneider Electric.
- B. Molded-Case Circuit Breaker (MCCB): Comply with UL 489, with interrupting capacity to meet available fault currents.
 - 1. Thermal-Magnetic Circuit Breakers: Inverse time-current element for low-level overloads, and instantaneous magnetic trip element for short circuits. Adjustable magnetic trip setting for circuit-breaker frame sizes 250 A and larger.
 - 2. Adjustable Instantaneous-Trip Circuit Breakers: Magnetic trip element with frontmounted, field-adjustable trip setting.
 - 3. Electronic trip circuit breakers with rms sensing; field-replaceable rating plug or field-replicable electronic trip.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Receive, inspect, handle, and store panelboards according to NECA 407.
- B. Examine panelboards before installation. Reject panelboards that are damaged or rusted or have been subjected to water saturation.
- C. Examine elements and surfaces to receive panelboards for compliance with installation tolerances and other conditions affecting performance of the Work.

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

3.2 INSTALLATION

- A. Install panelboards and accessories according to NECA 407.
- B. Mount panelboard cabinet plumb and rigid without distortion of box. Mount recessed panelboards with fronts uniformly flush with wall finish and mating with back box.
- C. Install overcurrent protective devices and controllers not already factory installed.
 - 1. Set field-adjustable, circuit-breaker trip ranges.
- D. Install filler plates in unused spaces.
- E. Comply with NECA 1.

3.3 IDENTIFICATION

- A. Identify field-installed conductors, interconnecting wiring, and components; provide warning signs complying with Section 26 0553 "Identification for Electrical Systems."
- B. Panelboard Nameplates: Label each panelboard with a nameplate complying with requirements for identification specified in Section 26 0553 "Identification for Electrical Systems."

3.4 FIELD QUALITY CONTROL

- A. Perform tests and inspections.
- B. Acceptance Testing Preparation:
 - 1. Test insulation resistance for each panelboard bus, component, connecting supply, feeder, and control circuit.
 - 2. Test continuity of each circuit.
- C. Tests and Inspections:
 - 1. Perform each visual and mechanical inspection and electrical test stated in NETA Acceptance Testing Specification. Certify compliance with test parameters.
 - 2. Correct malfunctioning units on-site, where possible, and retest to demonstrate compliance; otherwise, replace with new units and retest.
- D. Panelboards will be considered defective if they do not pass tests and inspections.
- E. Prepare test and inspection reports, including a certified report that identifies panelboards included and that describes scanning results. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.

3.5 ADJUSTING

A. Adjust moving parts and operable component to function smoothly and lubricate as recommended by manufacturer.

B. Set field-adjustable circuit-breaker trip ranges as specified in Section 26 0570 "Electrical System Study."

3.6 PROTECTION

A. Temporary Heating: Apply temporary heat to maintain temperature according to manufacturer's written instructions.

END OF SECTION

SECTION 26 2726 WIRING DEVICES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Straight-blade convenience, hospital-grade, isolated-ground, and tamper-resistant receptacles.
 - 2. USB charger devices.
 - 3. GFCI receptacles.
 - 4. Toggle switches.
 - 5. Decorator-style convenience.
 - 6. Wall plates.
 - 7. Floor service outlets.
 - 8. Poke-through assemblies.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

1.3 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For wiring devices to include in all manufacturers' packinglabel warnings and instruction manuals that include labeling conditions.

PART 2 - PRODUCTS

2.1 GENERAL WIRING-DEVICE REQUIREMENTS

- A. Wiring Devices, Components, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. Comply with NFPA 70.
- C. Devices for Owner-Furnished Equipment:
 - 1. Receptacles: Match plug configurations.
- D. Source Limitations: Obtain each type of wiring device and associated wall plate from single source from single manufacturer.

2.2 STRAIGHT-BLADE RECEPTACLES

A. Duplex Convenience Receptacles: 125 V, 20 A; comply with NEMA WD 1, NEMA WD 6 Configuration 5-20R, UL 498, and FS W-C-596. B. Controlled Duplex Convenience Receptacles: 125V, 20A: Permanently marked as controlled. Equal to Leviton 5362-S2T (color by architect) comply with NEMA WD 1, NEMA WD 6 configurations 5-20R, UL 498, and FS W-C-596.

2.3 USB CHARGER DEVICES

- A. Tamper-Resistant, USB Charger Receptacles: 125 V, 20 A; comply with NEMA WD 1, NEMA WD 6 Configuration 5-20R, UL 498, UL 1310, and FS W-C-596.
 - 1. Description: Single-piece, rivetless, nickel-plated, all-brass grounding system. Nickelplated, brass mounting strap.
 - 2. USB Receptacles: Single, Type A.
 - 3. Line Voltage Receptacles: Single, two pole, three wire, and self-grounding.

2.4 GFCI RECEPTACLES

- A. General Description:
 - 1. 125 V, 20 A, straight blade, non-feed-through type.
 - 2. Comply with NEMA WD 1, NEMA WD 6 Configuration 5-20R, UL 498, UL 943 Class A, and FS W-C-596.
 - 3. Include indicator light that shows when the GFCI has malfunctioned and no longer provides proper GFCI protection.

2.5 TOGGLE SWITCHES

- A. Comply with NEMA WD 1, UL 20, and FS W-S-896.
- B. Switches, 120/277 V, 20 A:

2.6 WALL PLATES

- A. Single and combination types shall match corresponding wiring devices.
 - 1. Plate-Securing Screws: Metal with head color to match plate finish.
 - 2. Material for Finished Spaces: 0.035-inch- (1-mm-) thick, satin-finished, Type 302 stainless steel.
 - 3. Material for Unfinished Spaces: Galvanized steel.
 - 4. Material for Damp Locations: Cast aluminum with spring-loaded lift cover, and listed and labeled for use in wet and damp locations.
- B. Wet-Location, Weatherproof Cover Plates: NEMA 250, complying with Type 3R, weatherresistant, die-cast aluminum with lockable cover.

2.7 FLOOR SERVICE FITTINGS

- A. Type: Modular, flush-type, dual-service units suitable for wiring method used.
- B. Compartments: Barrier separates power from voice and data communication cabling.
- C. Service Plate: Rectangular, solid brass with satin finish.

D.Power Receptacle: NEMA WD 6 Configuration 5-20R, gray finish, unless otherwise indicated.GOODWYN, MILLS & CAWOOD, LLCWiring DevicesGMC PROJECT NO.: AHUN21001226 2726, 2 OF 5

E. Voice and Data Communication Outlet: Blank cover with bushed cable opening.

2.8 POKE-THROUGH ASSEMBLIES

- A. Description:
 - 1. Factory-fabricated and -wired assembly of below-floor junction box with multichanneled, through-floor raceway/firestop unit and detachable matching floor service-outlet assembly.
 - 2. Comply with UL 514 scrub water exclusion requirements.
 - 3. Fire Rating: Unit is listed and labeled for fire rating of floor-ceiling assembly.
 - 4. Wiring Raceways and Compartments: For a minimum of four No. 12 AWG conductors and a minimum of four, four-pair cables.

2.9 FINISHES

- A. Device Color:
 - 1. Wiring Devices Connected to Normal Power System: As selected by Architect unless otherwise indicated or required by NFPA 70 or device listing.
- B. Wall Plate Color: As selected by Architect.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Comply with NECA 1, including mounting heights listed in that standard, unless otherwise indicated.
- B. Coordination with Other Trades:
 - 1. Protect installed devices and their boxes. Do not place wall finish materials over device boxes and do not cut holes for boxes with routers that are guided by riding against outside of boxes.
 - 2. Keep outlet boxes free of plaster, drywall joint compound, mortar, cement, concrete, dust, paint, and other material that may contaminate the raceway system, conductors, and cables.
 - 3. Install device boxes in brick or block walls so that the cover plate does not cross a joint unless the joint is troweled flush with the face of the wall.
 - 4. Install wiring devices after all wall preparation, including painting, is complete.
- C. Conductors:
 - 1. Do not strip insulation from conductors until right before they are spliced or terminated on devices.
 - 2. Strip insulation evenly around the conductor using tools designed for the purpose. Avoid scoring or nicking of solid wire or cutting strands from stranded wire.
 - 3. The length of free conductors at outlets for devices shall meet provisions of NFPA 70, Article 300, without pigtails.
 - 4. Existing Conductors:
 - a. Cut back and pigtail or replace all damaged conductors.
 - b. Straighten conductors that remain and remove corrosion and foreign matter.

- c. Pigtailing existing conductors is permitted, provided the outlet box is large enough.
- D. Device Installation:
 - 1. Replace devices that have been in temporary use during construction and that were installed before building finishing operations were complete.
 - 2. Keep each wiring device in its package or otherwise protected until it is time to connect conductors.
 - 3. Do not remove surface protection, such as plastic film and smudge covers, until the last possible moment.
 - 4. Connect devices to branch circuits using pigtails that are not less than 6 inches (152 mm) in length.
 - 5. When there is a choice, use side wiring with binding-head screw terminals. Wrap solid conductor tightly clockwise, two-thirds to three-fourths of the way around terminal screw.
 - 6. Use a torque screwdriver when a torque is recommended or required by manufacturer.
 - 7. When conductors larger than No. 12 AWG are installed on 15- or 20-A circuits, splice No. 12 AWG pigtails for device connections.
 - 8. Tighten unused terminal screws on the device.
 - 9. When mounting into metal boxes, remove the fiber or plastic washers used to hold device-mounting screws in yokes, allowing metal-to-metal contact.
- E. Receptacle Orientation:
 - 1. Install ground pin of vertically mounted receptacles up, and on horizontally mounted receptacles to the left.
- F. Device Plates: Do not use oversized or extra-deep plates. Repair wall finishes and remount outlet boxes when standard device plates do not fit flush or do not cover rough wall opening.
- G. Arrangement of Devices: Unless otherwise indicated, mount flush, with long dimension vertical and with grounding terminal of receptacles on top. Group adjacent switches under single, multigang wall plates.
- H. Adjust locations of floor service outlets and service poles to suit arrangement of partitions and furnishings.

3.2 GFCI RECEPTACLES

A. Install non-feed-through-type GFCI receptacles where protection of downstream receptacles is not required.

3.3 IDENTIFICATION

A. Comply with Section 26 0553 "Identification for Electrical Systems."

3.4 FIELD QUALITY CONTROL

- A. Test Instruments: Use instruments that comply with UL 1436.
- B. Test Instrument for Convenience Receptacles: Digital wiring analyzer with digital readout or illuminated digital-display indicators of measurement.

- C. Perform the following tests and inspections:
 - 1. Test Instruments: Use instruments that comply with UL 1436.
- D. Tests for Convenience Receptacles:
 - 1. Line Voltage: Acceptable range is 105 to 132 V.
 - 2. Percent Voltage Drop under 15-A Load: A value of 6 percent or higher is unacceptable.
 - 3. Ground Impedance: Values of up to 2 ohms are acceptable.
 - 4. GFCI Trip: Test for tripping values specified in UL 1436 and UL 943.
 - 5. Using the test plug, verify that the device and its outlet box are securely mounted.
 - 6. Tests shall be diagnostic, indicating damaged conductors, high resistance at the circuit breaker, poor connections, inadequate fault current path, defective devices, or similar problems. Correct circuit conditions, remove malfunctioning units and replace with new ones, and retest as specified above.
- E. Wiring device will be considered defective if it does not pass tests and inspections.

END OF SECTION

SECTION 26 2813

FUSES

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. Cartridge fuses rated 600 V and less for use in switches.

1.3 SUBMITTALS

- A. Product Data: For each fuse type indicated.
- B. Operation and maintenance data.

1.4 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- B. Comply with NEMA FU 1.
- C. Comply with NFPA 70.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Cooper Bussman, Inc.
 - 2. Eagle Electric Mfg. Co., Inc.; Cooper Industries, Inc.
 - 3. Ferraz Shawmut, Inc.
 - 4. Tracor, Inc.; Littelfuse, Inc. Subsidiary.

2.2 CARTRIDGE FUSES

A. Characteristics: NEMA FU 1, nonrenewable cartridge fuse; class and current rating indicated; voltage rating consistent with circuit voltage.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install fuses in fusible devices. Arrange fuses so rating information is readable without removing fuse.

3.2 IDENTIFICATION

A. Install labels indicating fuse replacement information on inside door of each fused switch.

END OF SECTION

SECTION 26 2816

ENCLOSED SWITCHES AND CIRCUIT BREAKERS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Fusible switches.
 - 2. Nonfusible switches.
 - 3. Enclosures.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of enclosed switch, circuit breaker, accessory, and component indicated. Include dimensioned elevations, sections, weights, and manufacturers' technical data on features, performance, electrical characteristics, ratings, accessories, and finishes.
 - 1. Enclosure types and details for types other than NEMA 250, Type 1.
 - 2. Current and voltage ratings.
 - 3. Short-circuit current ratings (interrupting and withstand, as appropriate).
 - 4. Detail features, characteristics, ratings, and factory settings of individual overcurrent protective devices, accessories, and auxiliary components.
- B. Shop Drawings: For enclosed switches and circuit breakers. Include plans, elevations, sections, details, and attachments to other work.
 - 1. Wiring Diagrams: For power, signal, and control wiring.

1.3 QUALITY ASSURANCE

- A. Source Limitations: Obtain enclosed switches and circuit breakers, overcurrent protective devices, components, and accessories, within same product category, from single source from single manufacturer.
- B. Product Selection for Restricted Space: Drawings indicate maximum dimensions for enclosed switches and circuit breakers, including clearances between enclosures, and adjacent surfaces and other items. Comply with indicated maximum dimensions.
- C. 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.
- D. Comply with NFPA 70.

1.4 PROJECT CONDITIONS

A. Environmental Limitations: Rate equipment for continuous operation under the following conditions unless otherwise indicated:

- 1. Ambient Temperature: Not less than minus 22 deg F (minus 30 deg C) and not exceeding 104 deg F (40 deg C).
- 2. Altitude: Not exceeding 6600 feet (2010 m).

1.5 COORDINATION

A. Coordinate layout and installation of switches, circuit breakers, and components with equipment served and adjacent surfaces. Maintain required workspace clearances and required clearances for equipment access doors and panels.

PART 2 - PRODUCTS

2.1 FUSIBLE SWITCHES

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Eaton Electrical Inc.; Cutler-Hammer Business Unit.
 - 2. General Electric Company; GE Consumer & Industrial Electrical Distribution.
 - 3. Siemens Energy & Automation, Inc.
 - 4. Square D; a brand of Schneider Electric.
- B. Type HD, Heavy Duty, 1200 A and Smaller: UL 98 and NEMA KS 1, horsepower rated, with clips or bolt pads to accommodate indicated fuses, lockable handle with capability to accept three padlocks, and interlocked with cover in closed position.

2.2 NONFUSIBLE SWITCHES

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Eaton Electrical Inc.; Cutler-Hammer Business Unit.
 - 2. General Electric Company; GE Consumer & Industrial Electrical Distribution.
 - 3. Siemens Energy & Automation, Inc.
 - 4. Square D; a brand of Schneider Electric.
- B. Type HD, Heavy Duty, 1200 A and Smaller: UL 98 and NEMA KS 1, horsepower rated, lockable handle with capability to accept three padlocks, and interlocked with cover in closed position.

2.3 ENCLOSURES

- A. Enclosed Switches and Circuit Breakers: NEMA AB 1, NEMA KS 1, NEMA 250, and UL 50, to comply with environmental conditions at installed location.
 - 1. Indoor, Dry and Clean Locations: NEMA 250, Type 1.
 - 2. Outdoor Locations: NEMA 250, Type 3R.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine elements and surfaces to receive enclosed switches and circuit breakers for compliance with installation tolerances and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install individual wall-mounted switches and circuit breakers with tops at uniform height unless otherwise indicated.
- B. Temporary Lifting Provisions: Remove temporary lifting eyes, channels, and brackets and temporary blocking of moving parts from enclosures and components.
- C. Install fuses in fusible devices.
- D. Comply with NECA 1.

3.3 IDENTIFICATION

- A. Comply with requirements in Section 26 0553 "Identification for Electrical Systems."
 - 1. Identify field-installed conductors, interconnecting wiring, and components; provide warning signs.
 - 2. Label each enclosure with engraved metal or laminated-plastic nameplate.

3.4 FIELD QUALITY CONTROL

- A. Perform tests and inspections.
- B. Acceptance Testing Preparation:
 - 1. Test insulation resistance for each enclosed switch and circuit breaker, component, connecting supply, feeder, and control circuit.
 - 2. Test continuity of each circuit.
- C. Tests and Inspections:
 - 1. Perform each visual and mechanical inspection and electrical test stated in NETA Acceptance Testing Specification. Certify compliance with test parameters.
 - 2. Correct malfunctioning units on-site, where possible, and retest to demonstrate compliance; otherwise, replace with new units and retest.
 - 3. Test and adjust controls, remote monitoring, and safeties. Replace damaged and malfunctioning controls and equipment.
- D. Enclosed switches and circuit breakers will be considered defective if they do not pass tests and inspections.

E. Prepare test and inspection reports, including a certified report that identifies enclosed switches and circuit breakers and that describes scanning results. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.

3.5 ADJUSTING

- A. Adjust moving parts and operable components to function smoothly and lubricate as recommended by manufacturer.
- B. Set field-adjustable circuit-breaker trip ranges as specified in Section 26 0570 "Electrical System Study."

END OF SECTION

SECTION 26 5100 INTERIOR LIGHTING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

- 1. Interior lighting fixtures, lamps, and ballasts.
- 2. Emergency lighting units.
- 3. Exit signs.
- 4. Lighting fixture supports.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of lighting fixture, arranged in order of fixture designation. Include data on features, accessories, finishes, and the following:
 - 1. Physical description of lighting fixture including dimensions.
 - 2. Emergency lighting units including battery and charger.
 - 3. Energy-efficiency data.
 - 4. Life, output (lumens, CCT, and CRI), and energy-efficiency data for lamps.
 - 5. Photometric data and adjustment factors based on laboratory tests, complying with IESNA Lighting Measurements Testing & Calculation Guides, of each lighting fixture type. The adjustment factors shall be for lamps, ballasts, and accessories identical to those indicated for the lighting fixture as applied in this Project.
 - a. Manufacturer Certified Data: Photometric data shall be certified by a manufacturer's laboratory with a current accreditation under the National Voluntary Laboratory Accreditation Program for Energy Efficient Lighting Products.
- B. Shop Drawings: For nonstandard or custom lighting fixtures. Include plans, elevations, sections, details, and attachments to other work.
 - 1. Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
- C. Installation instructions.

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. Comply with NFPA 70.
- C. All Fixtures to have A U.L. label.

1.4 COORDINATION

A. Coordinate layout and installation of lighting fixtures and suspension system with other construction that penetrates ceilings or is supported by them, including HVAC equipment, fire-suppression system, and partition assemblies.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Products: Subject to compliance with requirements, provide one of the products indicated on Drawings.

2.2 GENERAL REQUIREMENTS FOR LIGHTING FIXTURES AND COMPONENTS

- A. Recessed Fixtures: Comply with NEMA LE 4 for ceiling compatibility for recessed fixtures.
- B. Metal Parts: Free of burrs and sharp corners and edges.
- C. Sheet Metal Components: Steel unless otherwise indicated. Form and support to prevent warping and sagging.
- D. Doors, Frames, and Other Internal Access: Smooth operating, free of light leakage under operating conditions, and designed to permit relamping without use of tools. Designed to prevent doors, frames, lenses, diffusers, and other components from falling accidentally during relamping and when secured in operating position.
- E. Factory-Applied Labels: Comply with UL 1598. Labels shall be located where they will be readily visible to service personnel, but not seen from normal viewing angles when lamps are in place.

2.3 EXIT SIGNS

- A. General Requirements for Exit Signs: Comply with UL 924; for sign colors, visibility, luminance, and lettering size, comply with authorities having jurisdiction.
- B. Internally Lighted Signs:
 - 1. Lamps for AC Operation: LEDs, 50,000 hours minimum rated lamp life.
 - 2. Self-Powered Exit Signs (Battery Type): Integral automatic charger in a self-contained power pack.
 - a. Battery: Sealed, maintenance-free, nickel-cadmium type.
 - b. Charger: Fully automatic, solid-state type with sealed transfer relay.
 - c. Operation: Relay automatically energizes lamp from battery when circuit voltage drops to 80 percent of nominal voltage or below. When normal voltage is restored, relay disconnects lamps from battery, and battery is automatically recharged and floated on charger.
 - d. Test Push Button: Push-to-test type, in unit housing, simulates loss of normal power and demonstrates unit operability.
 - e. LED Indicator Light: Indicates normal power on. Normal glow indicates trickle charge; bright glow indicates charging at end of discharge cycle.

f. Integral Self-Test: Factory-installed electronic device automatically initiates coderequired test of unit emergency operation at required intervals. Test failure is annunciated by an integral audible alarm and a flashing red LED.

2.4 EMERGENCY LIGHTING UNITS

- A. General Requirements for Emergency Lighting Units: Self-contained units complying with UL 924.
 - 1. Battery: Sealed, maintenance-free, lead-acid type.
 - 2. Charger: Fully automatic, solid-state type with sealed transfer relay.
 - 3. Operation: Relay automatically turns lamp on when power-supply circuit voltage drops to 80 percent of nominal voltage or below. Lamp automatically disconnects from battery when voltage approaches deep-discharge level. When normal voltage is restored, relay disconnects lamps from battery, and battery is automatically recharged and floated on charger.
 - 4. Test Push Button: Push-to-test type, in unit housing, simulates loss of normal power and demonstrates unit operability.
 - 5. LED Indicator Light: Indicates normal power on. Normal glow indicates trickle charge; bright glow indicates charging at end of discharge cycle.
 - 6. Wire Guard: Heavy-chrome-plated wire guard protects lamp heads or fixtures.
 - 7. Integral Self-Test: Factory-installed electronic device automatically initiates coderequired test of unit emergency operation at required intervals. Test failure is annunciated by an integral audible alarm and a flashing red LED.

2.5 LIGHTING FIXTURE SUPPORT COMPONENTS

- A. Comply with Section 26 0529 "Hangers and Supports for Electrical Systems" for channel- and angle-iron supports and nonmetallic channel and angle supports.
- B. Single-Stem Hangers: 1/2-inch (13-mm) steel tubing with swivel ball fittings and ceiling canopy. Finish same as fixture.
- C. Twin-Stem Hangers: Two, 1/2-inch (13-mm) steel tubes with single canopy designed to mount a single fixture. Finish same as fixture.
- D. Wires: ASTM A 641/A 641M, Class 3, soft temper, zinc-coated steel, 12 gage (2.68 mm).
- E. Wires for Humid Spaces: ASTM A 580/A 580M, Composition 302 or 304, annealed stainless steel, 12 gage (2.68 mm).
- F. Rod Hangers: 3/16-inch (5-mm) minimum diameter, cadmium-plated, threaded steel rod.
- G. Hook Hangers: Integrated assembly matched to fixture and line voltage and equipped with threaded attachment, cord, and locking-type plug.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Lighting fixtures:

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- 1. Set level, plumb, and square with ceilings and walls unless otherwise indicated.
- B. Temporary Lighting: If it is necessary, and approved by Architect, to use permanent luminaires for temporary lighting, install and energize the minimum number of luminaires necessary. When construction is sufficiently complete, remove the temporary luminaires, disassemble, clean thoroughly, install new lamps, and reinstall.
- C. Remote Mounting of Drivers: Distance between the driver and fixture shall not exceed that recommended by manufacturer. Verify, with manufacturers, maximum distance between driver and luminaire.
- D. Lay-in Ceiling Lighting Fixtures Supports: Use grid as a support element.
 - 1. Install ceiling support system rods or wires, independent of the ceiling suspension devices, for each fixture. Locate not more than 6 inches (150 mm) from lighting fixture corners.
 - 2. Support Clips: Fasten to lighting fixtures and to ceiling grid members at or near each fixture corner with clips that are UL listed for the application.
 - 3. Fixtures of Sizes Less Than Ceiling Grid: Install as indicated on reflected ceiling plans or center in acoustical panel, and support fixtures independently with at least two 3/4-inch (20-mm) metal channels spanning and secured to ceiling tees.
- E. Suspended Lighting Fixture Support:
 - 1. Pendants and Rods: Where longer than 48 inches (1200 mm), brace to limit swinging.
 - 2. Stem-Mounted, Single-Unit Fixtures: Suspend with twin-stem hangers.
 - 3. Continuous Rows: Use tubing or stem for wiring at one point and tubing or rod for suspension for each unit length of fixture chassis, including one at each end.
 - 4. Do not use grid as support for pendant luminaires. Connect support wires or rods to building structure.
- F. Connect wiring according to Section 26 0519 "Low-Voltage Electrical Power Conductors and Cables."

3.2 IDENTIFICATION

A. Install labels with panel and circuit numbers on concealed junction and outlet boxes. Comply with requirements for identification specified in Section 26 0553 "Identification for Electrical Systems."

3.3 FIELD QUALITY CONTROL

A. Test for Emergency Lighting: Interrupt power supply to demonstrate proper operation. Verify transfer from normal power to battery and retransfer to normal.

3.4 STARTUP SERVICE

A. Burn-in all lamps that require specific aging period to operate properly, prior to occupancy by Owner.

3.5 ADJUSTING

- A. Occupancy Adjustments: When requested within 12 months of date of Substantial Completion, provide on-site assistance in adjusting aimable luminaires to suit actual occupied conditions. Provide up to two visits to Project during other-than-normal occupancy hours for this purpose. Some of this work may be required after dark.
 - 1. Adjust aimable luminaires in the presence of Architect.

END OF SECTION

SECTION 26 5600 EXTERIOR LIGHTING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Exterior luminaires with lamps and ballasts.
 - 2. Poles and accessories.

1.2 ACTION SUBMITTALS

- A. Product Data: For each luminaire, pole, and support component, arranged in order of lighting unit designation. Include data on features, accessories, finishes, and the following:
 - 1. Physical description of luminaire, including materials, dimensions, effective projected area, and verification of indicated parameters.
 - 2. Details of attaching luminaires and accessories.
 - 3. Details of installation and construction.
 - 4. Luminaire materials.
 - 5. Photometric data based on laboratory tests of each luminaire type, complete with indicated lamps, ballasts, and accessories.
 - 6. Ballasts, including energy-efficiency data.
 - 7. Lamps, including life, output, CCT, CRI, lumens, and energy-efficiency data.
 - 8. Materials, dimensions, and finishes of poles.
 - 9. Means of attaching luminaires to supports, and indication that attachment is suitable for components involved.
 - 10. Anchor bolts for poles.

1.3 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For luminaires to include in emergency, operation, and maintenance manuals.

1.4 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. All fixtures to have U.L. labels.
- C. Comply with IEEE C2, "National Electrical Safety Code."
- D. Comply with NFPA 70.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Store poles on decay-resistant-treated skids at least 12 inches (300 mm) above grade and vegetation. Support poles to prevent distortion and arrange to provide free air circulation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Products: Subject to compliance with requirements, provide one of the products indicated on Drawings.

2.2 GENERAL REQUIREMENTS FOR LUMINAIRES

- A. Luminaires shall comply with UL 1598 and be listed and labeled for installation in wet locations by an NRTL acceptable to authorities having jurisdiction.
- B. Lateral Light Distribution Patterns: Comply with IESNA RP-8 for parameters of lateral light distribution patterns indicated for luminaires.
- C. Metal Parts: Free of burrs and sharp corners and edges.
- D. Sheet Metal Components: Corrosion-resistant aluminum unless otherwise indicated. Form and support to prevent warping and sagging.
- E. Housings: Rigidly formed, weather- and light-tight enclosures that will not warp, sag, or deform in use. Provide filter/breather for enclosed luminaires.
- F. Doors, Frames, and Other Internal Access: Smooth operating, free of light leakage under operating conditions, and designed to permit relamping without use of tools. Designed to prevent doors, frames, lenses, diffusers, and other components from falling accidentally during relamping and when secured in operating position. Doors shall be removable for cleaning or replacing lenses. Designed to disconnect ballast when door opens.
- G. Exposed Hardware Material: Stainless steel.
- H. Plastic Parts: High resistance to yellowing and other changes due to aging, exposure to heat, and UV radiation.
- I. Reflecting surfaces shall have minimum reflectance as follows unless otherwise indicated:
 - 1. White Surfaces: 85 percent.
 - 2. Specular Surfaces: 83 percent.
 - 3. Diffusing Specular Surfaces: 75 percent.
- J. Lenses and Refractors Gaskets: Use heat- and aging-resistant resilient gaskets to seal and cushion lenses and refractors in luminaire doors.
- K. Luminaire Finish: Manufacturer's standard paint applied to factory-assembled and -tested luminaire before shipping. Where indicated, match finish process and color of pole or support materials.

- L. Factory-Applied Finish for Steel Luminaires: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
 - 1. Surface Preparation: Clean surfaces to comply with SSPC-SP 1, "Solvent Cleaning," to remove dirt, oil, grease, and other contaminants that could impair paint bond. Grind welds and polish surfaces to a smooth, even finish. Remove mill scale and rust, if present, from uncoated steel, complying with SSPC-SP 5/NACE No. 1, "White Metal Blast Cleaning," or SSPC-SP 8, "Pickling."
 - 2. Exterior Surfaces: Manufacturer's standard finish consisting of one or more coats of primer and two finish coats of high-gloss, high-build polyurethane enamel.
 - a. Color: As selected by Architect from manufacturer's full range.
- M. Factory-Applied Labels: Comply with UL 1598. Include recommended lamps and ballasts. Labels shall be located where they will be readily visible to service personnel, but not seen from normal viewing angles when lamps are in place.
 - 1. Label shall include the following lamp and ballast characteristics:
 - a. "USES ONLY" and include specific lamp type.
 - b. Lamp diameter code (T-4, T-5, T-8, T-12), tube configuration (twin, quad, triple), base type, and nominal wattage for fluorescent and compact fluorescent luminaires.
 - c. Lamp type, wattage, bulb type (ED17, BD56, etc.) and coating (clear or coated) for HID luminaires.
 - d. Start type (preheat, rapid start, instant start) for fluorescent and compact fluorescent luminaires.
 - e. ANSI ballast type (M98, M57, etc.) for HID luminaires.
 - f. CCT and CRI for all luminaires.

2.3 FLUORESCENT BALLASTS AND LAMPS

- A. Ballasts for Low-Temperature Environments:
 - 1. Temperatures 0 Deg F (Minus 17 Deg C) and Higher: Electronic type rated for 0 deg F (minus 17 deg C) starting and operating temperature with indicated lamp types.
 - 2. Temperatures Minus 20 Deg F (Minus 29 Deg C) and Higher: Electromagnetic type designed for use with indicated lamp types.
- B. Ballast Characteristics:
 - 1. Power Factor: 90 percent, minimum.
 - 2. Total Harmonic Distortion Rating: Less than 10 percent.
 - 3. Electromagnetic Ballasts: Comply with ANSI C82.1, energy-saving, high power factor, Class P, automatic-reset thermal protection.
 - 4. Case Temperature for Compact Lamp Ballasts: 65 deg C, maximum.
 - 5. Transient-Voltage Protection: Comply with IEEE C62.41.1 and IEEE C62.41.2, Category A or better.
- C. Low-Temperature Lamp Capability: Rated for reliable starting and operation with ballast provided at temperatures 0 deg F (minus 18 deg C) and higher.

2.4 GENERAL REQUIREMENTS FOR POLES AND SUPPORT COMPONENTS

- A. Structural Characteristics: Comply with AASHTO LTS-4-M.
 - 1. Wind-Load Strength of Poles: Adequate at indicated heights above grade without failure, permanent deflection, or whipping in steady winds of speed indicated in "Structural Analysis Criteria for Pole Selection" Article.
 - 2. Strength Analysis: For each pole, multiply the actual equivalent projected area of luminaires and brackets by a factor of 1.1 to obtain the equivalent projected area to be used in pole selection strength analysis.
- B. Luminaire Attachment Provisions: Comply with luminaire manufacturers' mounting requirements. Use stainless-steel fasteners and mounting bolts unless otherwise indicated.
- C. Mountings, Fasteners, and Appurtenances: Corrosion-resistant items compatible with support components.
 - 1. Materials: Shall not cause galvanic action at contact points.
 - 2. Anchor Bolts, Leveling Nuts, Bolt Caps, and Washers: Hot-dip galvanized after fabrication unless otherwise indicated.
 - 3. Anchor-Bolt Template: Plywood or steel.
- D. Handhole: Oval-shaped, with minimum clear opening of 2-1/2 by 5 inches (65 by 130 mm), with cover secured by stainless-steel captive screws.
- E. Concrete Pole Foundations: Cast in place, with anchor bolts to match pole-base flange.

2.5 STEEL POLES

- A. Poles: Comply with ASTM A 500, Grade B, carbon steel with a minimum yield of 46,000 psig (317 MPa); one-piece construction up to 40 feet (12 m) in height with access handhole in pole wall.
 - 1. Shape: as indicated on schedules.
 - 2. Mounting Provisions: Butt flange for bolted mounting on foundation or breakaway support.
- B. Brackets for Luminaires: Detachable, cantilever, without underbrace.
 - 1. Adapter fitting welded to pole, allowing the bracket to be bolted to the pole mounted adapter, then bolted together with stainless-steel bolts.
 - 2. Cross Section: Tapered oval, with straight tubular end section to accommodate luminaire.
 - 3. Match pole material and finish.
- C. Pole-Top Tenons: Fabricated to support luminaire or luminaires and brackets indicated, and securely fastened to pole top.
- D. Steps: Fixed steel, with nonslip treads, positioned for 15-inch (381-mm) vertical spacing, alternating on opposite sides of pole; first step at elevation 10 feet (3 m) above finished grade.
- E. Grounding and Bonding Lugs: Welded 1/2-inch (13-mm) threaded lug, complying with requirements in Section 26 0526 "Grounding and Bonding for Electrical Systems," listed for

attaching grounding and bonding conductors of type and size listed in that Section, and accessible through handhole.

- F. Cable Support Grip: Wire-mesh type with rotating attachment eye, sized for diameter of cable and rated for a minimum load equal to weight of supported cable times a 5.0 safety factor.
- G. Factory-Painted Finish: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
 - 1. Surface Preparation: Clean surfaces to comply with SSPC-SP 1, "Solvent Cleaning," to remove dirt, oil, grease, and other contaminants that could impair paint bond. Grind welds and polish surfaces to a smooth, even finish. Remove mill scale and rust, if present, from uncoated steel, complying with SSPC-SP 5/NACE No. 1, "White Metal Blast Cleaning," or with SSPC-SP 8, "Pickling."
 - 2. Interior Surfaces of Pole: One coat of bituminous paint, or otherwise treat for equal corrosion protection.
 - 3. Exterior Surfaces: Manufacturer's standard finish consisting of one or more coats of primer and two finish coats of high-gloss, high-build polyurethane enamel.
 - a. Color: As selected by Architect from manufacturer's full range.

2.6 DECORATIVE POLES

- A. Pole Material:
 - 1. Cast concrete or spun concrete.
- B. Mounting Provisions:
 - 1. Embedded.
- C. Fixture Brackets:
 - 1. Cast ductile iron.
- D. Pole Finish: as selected by architect.

2.7 PRESTRESSED CONCRETE POLES

- A. Poles: Manufactured by centrifugal spin-casting process.
 - 1. Shape: as selected by architect.
 - 2. Mounting Provisions: Embedded.
 - 3. Finishing: Capped at top and plugged at bottom. Seat each steel reinforcing strand with epoxy adhesive.
 - 4. Grounding: Continuous copper ground wire cast into pole. Terminate at top of pole and attach to 24-inch (610-mm) lightning rod.
- B. Cure with wet steam and age for a minimum of 15 days before installation.
- C. Fabricate poles with a hard, nonporous surface that is resistant to water, frost, and road and soil chemicals and that has a maximum water-absorption rate of 3 percent.

- D. Cast aluminum nameplate into pole wall at approximately 5 feet (1.5 m) above ground line, listing name of manufacturer, Project identifier, overall height, and approximate weight.
- E. Pole Brackets: Comply with ANSI C136.13.
- F. Finish Color: Provided by color material complying with ASTM C 979, uniformly impregnated throughout the pole concrete. Color material shall provide a uniform, stable, permanent color and be as follows:
 - 1. Inert, and carbon free.
 - 2. Unaffected by environmental conditions and contaminants including, but not limited to, UV solar radiation, salts, and alkalis.
- G. Finish Texture: as selected by architect.

PART 3 - EXECUTION

3.1 LUMINAIRE INSTALLATION

- A. Install lamps in each luminaire.
- B. Fasten luminaire to indicated structural supports.
- C. Adjust luminaires that require field adjustment or aiming.

3.2 POLE INSTALLATION

- A. Alignment: Align pole foundations and poles for optimum directional alignment of luminaires and their mounting provisions on the pole.
- B. Clearances: Maintain the following minimum horizontal distances of poles from surface and underground features unless otherwise indicated on Drawings:
 - 1. Fire Hydrants and Storm Drainage Piping: 60 inches (1520 mm).
 - 2. Water, Gas, Electric, Communication, and Sewer Lines: 10 feet (3 m).
 - 3. Trees: 15 feet (5 m) from tree trunk.
- C. Concrete Pole Foundations: Set anchor bolts according to anchor-bolt templates furnished by pole manufacturer.
- D. Foundation-Mounted Poles: Mount pole with leveling nuts and tighten top nuts to torque level recommended by pole manufacturer.
 - 1. Grout void between pole base and foundation. Use nonshrink or expanding concrete grout firmly packed to fill space.
 - 2. Install base covers unless otherwise indicated.
 - 3. Use a short piece of 1/2-inch- (13-mm-) diameter pipe to make a drain hole through grout. Arrange to drain condensation from interior of pole.
- E. Embedded Poles with Tamped Earth Backfill: Set poles to depth below finished grade indicated on Drawings, but not less than one-sixth of pole height.

- 1. Dig holes large enough to permit use of tampers in the full depth of hole.
- 2. Backfill in 6-inch (150-mm) layers and thoroughly tamp each layer so compaction of backfill is equal to or greater than that of undisturbed earth.
- F. Raise and set poles using web fabric slings (not chain or cable).

3.3 BOLLARD LUMINAIRE INSTALLATION

- A. Align units for optimum directional alignment of light distribution.
- B. Install on concrete base with top 4 inches (100 mm) above finished grade or surface at bollard location. Cast conduit into base, and shape base to match shape of bollard base. Finish by troweling and rubbing smooth.

3.4 INSTALLATION OF INDIVIDUAL GROUND-MOUNTING LUMINAIRES

A. Install on concrete base with top 4 inches (100 mm) above finished grade or surface at luminaire location. Cast conduit into base, and finish by troweling and rubbing smooth.

3.5 CORROSION PREVENTION

- A. Aluminum: Do not use in contact with earth or concrete. When in direct contact with a dissimilar metal, protect aluminum by insulating fittings or treatment.
- B. Steel Conduits: Comply with 260533 "Raceways and Boxes for Electrical Systems." In concrete foundations, wrap conduit with 0.010-inch- (0.254-mm-) thick, pipe-wrapping plastic tape applied with a 50 percent overlap.

3.6 GROUNDING

- A. Ground metal poles and support structures according to Section 26 0526 "Grounding and Bonding for Electrical Systems."
 - 1. Install grounding electrode for each pole unless otherwise indicated.
 - 2. Install grounding conductor pigtail in the base for connecting luminaire to grounding system.
- B. Ground nonmetallic poles and support structures according to Section 26 0526 "Grounding and Bonding for Electrical Systems."
 - 1. Install grounding electrode for each pole.
 - 2. Install grounding conductor and conductor protector.
 - 3. Ground metallic components of pole accessories and foundations.

3.7 FIELD QUALITY CONTROL

- A. Inspect each installed fixture for damage. Replace damaged fixtures and components.
- B. Illumination Observations: Verify normal operation of lighting units after installing luminaires and energizing circuits with normal power source.
 - 1. Verify operation of photoelectric controls.

END OF SECTION

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SECTION 27 0528

PATHWAYS FOR COMMUNICATIONS SYSTEMS

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. Metal conduits and fittings.
 - 2. Nonmetallic conduits and fittings.
 - 3. Optical-fiber-cable pathways and fittings.
 - 4. Metal wireways and auxiliary gutters.
 - 5. Nonmetallic wireways and auxiliary gutters.
 - 6. Metallic surface pathways.
 - 7. Nonmetallic surface pathways.
 - 8. Hooks.
 - 9. Boxes, enclosures, and cabinets.
 - 10. Polymer-concrete handholes and boxes for exterior underground cabling.

PART 2 - PRODUCTS

2.01 METAL CONDUITS AND FITTINGS

- A. Description: Metal raceway of circular cross section with manufacturer-fabricated fittings.
- B. General Requirements for Metal Conduits and Fittings:
 - 1. Listed and labeled as defined in NFPA 70, by a nationally recognized testing laboratory, and marked for intended location and application.
 - 2. Comply with TIA-569-D.
- C. EMT: Comply with ANSI C80.3 and UL 797.
- D. Fittings for Metal Conduit: Comply with NEMA FB 1 and UL 514B.
 - 1. Conduit Fittings for Hazardous (Classified) Locations: Comply with UL 1203 and NFPA 70.
 - 2. Fittings for EMT:
 - a. Material: Steel.
 - b. Type: Setscrew.
 - 3. Expansion Fittings: PVC or steel to match conduit type, complying with UL-467, rated for environmental conditions where installed, and including flexible external bonding jumper.

2.02 NONMETALLIC CONDUITS AND FITTINGS

- A. Description: Nonmetallic raceway of circular section with manufacturer-fabricated fittings.
- B. General Requirements for Nonmetallic Conduits and Fittings:
 - 1. Listed and labeled as defined in NFPA 70, by an NRTL, and marked for intended location and application.
 - 2. Comply with TIA-569-D.

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- C. RNC: Type EPC-40-PVC, complying with NEMA TC 2 and UL 651 unless otherwise indicated.
- D. Rigid HDPE: Comply with UL 651A.
- E. Continuous HDPE: Comply with UL 651A.
- F. RTRC: Comply with UL 2515A and NEMA TC 14.
 1. Fittings: Comply with NEMA TC 3; match to conduit or tubing type and material.
- G. Solvents and Adhesives: As recommended by conduit manufacturer.

2.03 METAL WIREWAYS AND AUXILIARY GUTTERS

- A. Description: Sheet metal trough of rectangular cross section fabricated to required size and shape, without holes or knockouts, and with hinged or removable covers.
- B. General Requirements for Metal Wireways and Auxiliary Gutters:
 - 1. Comply with UL 870 and NEMA 250, Type 1 unless otherwise indicated, and sized according to NFPA 70.
 - 2. Metal wireways installed outdoors shall be listed and labeled as defined in NFPA 70, by an NRTL, and marked for intended location and application.
 - 3. Comply with TIA-569-D.
- C. Fittings and Accessories: Include covers, couplings, offsets, elbows, expansion joints, adapters, hold-down straps, end caps, and other fittings to match and mate with wireways as required for complete system.

2.04 NONMETALLIC WIREWAYS AND AUXILIARY GUTTERS

- A. Description: Fiberglass polyester, extruded and fabricated to required size and shape, without holes or knockouts. Cover shall be gasketed with oil-resistant gasket material and fastened with captive screws treated for corrosion resistance. Connections shall be flanged and have stainless-steel screws and oil-resistant gaskets.
- B. Description: PVC, extruded and fabricated to required size and shape, and having snap-on cover, mechanically coupled connections, and plastic fasteners.
- C. General Requirements for Nonmetallic Wireways and Auxiliary Gutters:
 - 1. Listed and labeled as defined in NFPA 70, by an NRTL, and marked for intended location and application.
 - 2. Comply with TIA-569-D.
- D. Fittings and Accessories: Couplings, offsets, elbows, expansion joints, adapters, hold-down straps, end caps, and other fittings shall match and mate with wireways as required for complete system.
- E. Solvents and Adhesives: As recommended by conduit manufacturer.

2.05 SURFACE METAL PATHWAYS

- A. Description: Galvanized steel with snap-on covers, complying with UL 5.
- B. Listed and labeled as defined in NFPA 70, by an NRTL, and marked for intended location and application.
- C. Comply with TIA-569-D.

2.06 SURFACE NONMETALLIC PATHWAYS:

- A. Description: Two- or three-piece construction, complying with UL 5A, and manufactured of rigid PVC.
- B. Finish: Texture and color selected by Architect from manufacturer's standard colors.
- C. Listed and labeled as defined in NFPA 70, by an NRTL, and marked for intended location and application.
- D. Comply with TIA-569-D.

2.07 **HOOKS**

- A. Description: Prefabricated sheet metal cable supports for telecommunications cable.
- B. Listed and labeled as defined in NFPA 70, by an NRTL, and marked for intended location and application.
- C. Comply with TIA-569-D.
- D. Galvanized or stainless steel.
- E. J shape.

2.08 BOXES, ENCLOSURES, AND CABINETS

- A. Description: Enclosures for communications.
- B. General Requirements for Boxes, Enclosures, and Cabinets:
 - 1. Comply with TIA-569-D.
 - 2. Boxes, enclosures, and cabinets installed in wet locations shall be listed and labeled as defined in NFPA 70, by an NRTL, and marked for use in wet locations.
 - 3. Box extensions used to accommodate new building finishes shall be of same material as recessed box.
 - 4. Device Box Dimensions: 4 inches square by 2-1/8 inches deep (100 mm square by 60 mm deep).
 - 5. Gangable boxes are allowed.
- C. Sheet Metal Outlet and Device Boxes: Comply with NEMA OS 1 and UL 514A.

- D. Cast-Metal Outlet and Device Boxes: Comply with NEMA FB 1, ferrous alloy, Type FD, with gasketed cover.
- E. Metal Floor Boxes:
 - 1. Material: Cast metal or sheet metal.
 - 2. Type: Fully adjustable.
 - 3. Shape: Rectangular.
 - 4. Metal floor boxes shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- F. Nonmetallic Floor Boxes: Nonadjustable, rectangular.
 - 1. Nonmetallic floor boxes shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- G. Small Sheet Metal Pull and Junction Boxes: NEMA OS 1.
- H. Cast-Metal Access, Pull, and Junction Boxes: Comply with NEMA FB 1 and UL 1773, cast aluminum with gasketed cover.
- I. Nonmetallic Outlet and Device Boxes: Comply with NEMA OS 2 and UL 514C.
- J. Hinged-Cover Enclosures: Comply with UL 50 and NEMA 250, Type 1, with continuous-hinge cover with flush latch unless otherwise indicated.
 - 1. Metal Enclosures: Steel, finished inside and out with manufacturer's standard enamel.
 - 2. Nonmetallic Enclosures:
 - a. Material: Plastic.
 - b. Retain first subparagraph below to require radio-frequency-resistant paint.
 - c. Finished inside with radio-frequency-resistant paint.
 - 3. Interior Panels: Steel; all sides finished with manufacturer's standard enamel.
- K. Cabinets:
 - 1. NEMA 250, Type 1 galvanized-steel box with removable interior panel and removable front, finished inside and out with manufacturer's standard enamel.
 - 2. Hinged door in front cover with flush latch and concealed hinge.
 - 3. Key latch to match panelboards.
 - 4. Metal barriers to separate wiring of different systems and voltage.
 - 5. Accessory feet where required for freestanding equipment.
 - 6. Nonmetallic cabinets shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

PART 3 - EXECUTION

3.01 PATHWAY APPLICATION

- A. Minimum Pathway Size: 3/4-inch (21-mm) trade size for copper and aluminum cables, and 1 inch (25 mm) for optical-fiber cables.
- B. Pathway Fittings: Compatible with pathways and suitable for use and location.

C. Do not install aluminum conduits, boxes, or fittings in contact with concrete or earth. GOODWYN, MILLS & CAWOOD, LLC Pathways for Communications Systems GMC PROJECT NO.: AHUN210012 27 0528, 4 OF 9

- D. Install surface pathways only where indicated on Drawings.
- E. Do not install nonmetallic conduit where ambient temperature exceeds 120 deg F (49 deg C).

3.02 INSTALLATION

- A. Comply with the following standards for installation requirements except where requirements on Drawings or in this Section are stricter:
 - 1. NECA 1.
 - 2. NECA/BICSI 568.
 - 3. TIA-569-D.
 - 4. NECA 101
 - 5. NECA 102.
 - 6. NECA 105.
 - 7. NECA 111.
- B. Comply with NFPA 70 limitations for types of pathways allowed in specific occupancies and number of floors.
- C. Comply with requirements in Section 078413 "Penetration Firestopping" for firestopping materials and installation for penetrations through fire-rated walls, ceilings, and assemblies.
- D. Comply with requirements in Section 270529 "Hangers and Supports for Communications Systems" for hangers and supports.
- E. Keep pathways at least 6 inches (150 mm) away from parallel runs of flues and steam or hotwater pipes. Install horizontal pathway runs above water and steam piping.
- F. Complete pathway installation before starting conductor installation.
- G. Install no more than the equivalent of two 90-degree bends in any pathway run. Support within 12 inches (300 mm) of changes in direction. Utilize long radius ells for all optical-fiber cables.
- H. Conceal rigid conduit within finished walls, ceilings, and floors unless otherwise indicated. Install conduits parallel or perpendicular to building lines.
- I. Support conduit within 12 inches (300 mm) of enclosures to which attached.
- J. Pathways Embedded in Slabs:
 - 1. Run conduit larger than 1-inch (27-mm) trade size, parallel or at right angles to main reinforcement. Where at right angles to reinforcement, place conduit close to slab support. Secure pathways to reinforcement at maximum 10-foot (3-m) intervals.
 - 2. Arrange pathways to cross building expansion joints at right angles with expansion fittings. Comply with requirements for expansion joints specified in this article.
 - 3. Arrange pathways to keep a minimum of 1 inch (25 mm) of concrete cover in all directions.
 - 4. Do not embed threadless fittings in concrete unless specifically approved by Architect for each specific location.
 - 5. Some authorities having jurisdiction may not permit nonmetallic tubing in fire-rated slabs in subparagraph below.

- 6. Change from nonmetallic conduit and fittings to GRC or IMC and fittings before rising above floor.
- K. Stub-ups to Above Recessed Ceilings:
 - 1. Use EMT, IMC, or RMC for pathways.
 - 2. Use a conduit bushing or insulated fitting to terminate stub-ups not terminated in hubs or in an enclosure.
- L. Threaded Conduit Joints, Exposed to Wet, Damp, Corrosive, or Outdoor Conditions: Apply listed compound to threads of pathway and fittings before making up joints. Follow compound manufacturer's written instructions.
- M. Coat field-cut threads on PVC-coated pathway with a corrosion-preventing conductive compound prior to assembly.
- N. Do not rely on locknuts to penetrate nonconductive coatings on enclosures. Remove coatings in the locknut area prior to assembling conduit to enclosure, to assure a continuous ground path.
- O. Cut conduit perpendicular to the length. For conduits of 2-inch (50-mm) trade size and larger, use roll cutter or a guide to ensure cut is straight and perpendicular to the length.
- P. Install pull wires in empty pathways. Use polypropylene or monofilament plastic line with not less than 200-lb (90-kg) tensile strength. Leave at least 12 inches (300 mm) of slack at each end of pull wire. Secure pull wire, so it cannot fall into conduit. Cap pathways designated as spare alongside pathways in use.
- Q. Surface Pathways:
 - 1. Install surface pathway for surface telecommunications outlet boxes only where indicated on Drawings.
 - 2. Install surface pathway with a minimum 2-inch (50-mm) radius control at bend points.
 - 3. Secure surface pathway with screws or other anchor-type devices at intervals not exceeding 48 inches (1200 mm) and with no less than two supports per straight pathway section. Support surface pathway according to manufacturer's written instructions. Tape and glue are not acceptable support methods.
- R. Pathways for Optical-Fiber and Communications Cable: Install pathways, metal and nonmetallic, rigid and flexible, as follows:
 - 1. 3/4-Inch (21-mm) Trade Size and Smaller: Install pathways in maximum lengths of 50 feet (15 m).
 - 2. 1-Inch (25-mm) Trade Size and Larger: Install pathways in maximum lengths of 75 feet (23 m).
 - 3. Install with a maximum of two 90-degree bends or equivalent for each length of pathway unless Drawings show stricter requirements. Separate lengths with pull or junction boxes or terminations at distribution frames or cabinets where necessary to comply with these requirements.
- S. Install pathway-sealing fittings at accessible locations according to NFPA 70 and fill them with listed sealing compound. For concealed pathways, install each fitting in a flush steel box with a

blank cover plate having a finish similar to that of adjacent plates or surfaces. Install pathwaysealing fittings according to NFPA 70.

- T. Install devices to seal pathway interiors at accessible locations. Locate seals, so no fittings or boxes are between the seal and the following changes of environments. Seal the interior of all pathways at the following points:
 - 1. Where conduits pass from warm to cold locations, such as boundaries of refrigerated spaces.
 - 2. Where an underground service pathway enters a building or structure.
 - 3. Where otherwise required by NFPA 70.
- U. Comply with manufacturer's written instructions for solvent welding PVC conduit and fittings.
- V. Expansion-Joint Fittings:
 - 1. Install in each run of aboveground RNC that is located where environmental temperature change may exceed 30 deg F (17 deg C), and that has straight-run length that exceeds 25 feet (7.6 m). Install in each run of aboveground RMC[and EMT] that is located where environmental temperature change may exceed 100 deg F (55 deg C), and that has straight-run length that exceeds 100 feet (30 m).
 - 2. Install fitting(s) that provide expansion and contraction for at least 0.00041 inch per foot of length of straight run per deg F (0.06 mm per meter of length of straight run per deg C) of temperature change for PVC conduits. Install fitting(s) that provide expansion and contraction for at least 0.000078 inch per foot of length of straight run per deg F (0.0115 mm per meter of length of straight run per deg C) of temperature change for metal conduits.
 - 3. Install expansion fittings at all locations where conduits cross building or structure expansion joints.
 - 4. Install each expansion-joint fitting with position, mounting, and piston setting selected according to manufacturer's written instructions for conditions at specific location at time of installation. Install conduit supports to allow for expansion movement.

W. Hooks:

- 1. Size to allow a minimum of 25 percent future capacity without exceeding design capacity limits.
- 2. Shall be supported by dedicated support wires. Do not use ceiling grid support wire or support rods.
- 3. Hook spacing shall allow no more than 6 inches (150 mm) of slack. The lowest point of the cables shall be no less than 6 inches (150 mm) adjacent to ceilings, mechanical ductwork and fittings, luminaires, power conduits, power and telecommunications outlets, and other electrical and communications equipment.
- 4. Space hooks no more than 5 feet (1.5 m) o.c.
- 5. Provide a hook at each change in direction.
- X. Mount boxes at heights indicated on Drawings. Install boxes with height measured to center of box unless otherwise indicated.
- Y. Recessed Boxes in Masonry Walls: Saw-cut opening for box in center of cell of masonry block, and install box flush with surface of wall. Prepare block surface to provide a flat surface for a raintight connection between box and cover plate or supported equipment and box.
- Z. Horizontally separate boxes mounted on opposite sides of walls, so they are not in the same vertical channel.
- AA. Fasten junction and pull boxes to or support from building structure. Do not support boxes by conduits.
- BB. Set metal floor boxes level and flush with finished floor surface.
- CC. Set nonmetallic floor boxes level. Trim after installation to fit flush with finished floor surface.

3.03 INSTALLATION OF UNDERGROUND CONDUIT

- A. Direct-Buried Conduit:
 - 1. Excavate trench bottom to provide firm and uniform support for conduit. Install backfill.
 - 2. After installing conduit, backfill and compact.
 - 3. Install manufactured duct elbows for stub-ups at poles and equipment and at building entrances through floor unless otherwise indicated. Install manufactured rigid steel conduit elbows for stub-ups at poles and equipment and at building entrances through floor.
 - a. Couple steel conduits to ducts with adapters designed for this purpose, and encase coupling with 3 inches (75 mm) of concrete around conduit for a minimum of 12 inches (300 mm) on each side of the coupling.
 - b. For stub-ups at equipment mounted on outdoor concrete bases and where conduits penetrate building foundations, extend steel conduit horizontally a minimum of 60 inches (1500 mm) from edge of foundation or equipment base. Install insulated grounding bushings on terminations at equipment.
 - 4. Underground Warning Tape: Comply with requirements in Section 270553 "Identification for Communications Systems."

3.04 INSTALLATION OF UNDERGROUND HANDHOLES AND BOXES

- A. Install handholes and boxes level and plumb and with orientation and depth coordinated with connecting conduits to minimize bends and deflections required for proper entrances.
- B. Unless otherwise indicated, support units on a level bed of crushed stone or gravel, graded from 1/2-inch (12.5-mm) sieve to No. 4 (4.75-mm) sieve and compacted to same density as adjacent undisturbed earth.
- C. Elevation: In paved areas, set so cover surface will be flush with finished grade. Set covers of other enclosures 1 inch (25 mm) above finished grade.
- D. Field cut openings for conduits according to enclosure manufacturer's written instructions. Cut wall of enclosure with a tool designed for material to be cut. Size holes for terminating fittings to be used, and seal around penetrations after fittings are installed.

3.05 SLEEVE AND SLEEVE-SEAL INSTALLATION FOR COMMUNICATIONS PENETRATIONS

A. Install sleeves and sleeve seals at penetrations of exterior floor and wall assemblies. Comply with requirements in Section 270544 "Sleeves and Sleeve Seals for Communications Pathways and Cabling."

3.06 FIRESTOPPING

A. Install firestopping at penetrations of fire-rated floor and wall assemblies. Comply with requirements in Section 078413 "Penetration Firestopping."

3.07 **PROTECTION**

- A. Protect coatings, finishes, and cabinets from damage or deterioration.
 - 1. Repair damage to galvanized finishes with zinc-rich paint recommended by manufacturer.
 - 2. Repair damage to PVC coatings or paint finishes with matching touchup coating recommended by manufacturer.

END OF SECTION

SECTION 27 0529

HANGERS AND SUPPORTS FOR COMMUNICATIONS SYSTEMS

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. Steel slotted support systems for communication raceways.
 - 2. Conduit and cable support devices.
 - 3. Support for conductors in vertical conduit.
 - 4. Structural steel for fabricated supports and restraints.
 - 5. Mounting, anchoring, and attachment components, including powder-actuated fasteners, mechanical expansion anchors, concrete inserts, clamps, through bolts, toggle bolts, and hanger rods.
 - 6. Fabricated metal equipment support assemblies.

PART 2 - PRODUCTS

2.01 SUPPORT, ANCHORAGE, AND ATTACHMENT COMPONENTS

- A. Steel Slotted Support Systems: Preformed steel channels and angles, with minimum 13/32-inch-(10-mm-) diameter holes at a maximum of 8 inches (200 mm) o.c. in at least one surface.
 - 1. Standard: Comply with MFMA-4 factory-fabricated components for field assembly.
 - 2. Material for Channel, Fittings, and Accessories: Galvanized steel.
 - 3. Channel Width: 1-5/8 inches (41 mm).
 - 4. Metallic Coatings: Hot-dip galvanized after fabrication and applied according to MFMA-4.
 - 5. Channel Dimensions: Selected for applicable load criteria.
- B. Conduit and Cable Support Devices: Steel and malleable-iron clamps, hangers, and associated fittings, designed for types and sizes of raceway or cable to be supported.
- C. Support for Conductors in Vertical Conduit: Factory-fabricated assembly consisting of threaded body and insulating wedging plug or plugs for nonarmored communications conductors or cables in riser conduits. Plugs shall have number, size, and shape of conductor gripping pieces as required to suit individual conductors or cables supported. Body shall be made of malleable iron.
- D. Structural Steel for Fabricated Supports and Restraints: ASTM A 36/A 36M steel plates, shapes, and bars; black and galvanized.
- E. Mounting, Anchoring, and Attachment Components: Items for fastening electrical items or their supports to building surfaces include the following:
 - 1. Powder-Actuated Fasteners: Threaded-steel stud for use in hardened portland cement concrete, steel, or wood, with tension, shear, and pullout capacities appropriate for supported loads and building materials where used.
 - 2. Mechanical-Expansion Anchors: Insert-wedge-type zinc-coated steel for use in hardened portland cement concrete, with tension, shear, and pullout capacities appropriate for supported loads and building materials where used.

- 3. Concrete Inserts: Steel or malleable-iron, slotted support system units are similar to MSS Type 18 units and comply with MFMA-4 or MSS SP-58.
- 4. Clamps for Attachment to Steel Structural Elements: MSS SP-58 units are suitable for attached structural element.
- 5. Through Bolts: Structural type, hex head, and high strength. Comply with ASTM A 325.
- 6. Toggle Bolts: All-steel springhead type.
- 7. Hanger Rods: Threaded steel.

2.01 FABRICATED METAL EQUIPMENT SUPPORT ASSEMBLIES

- A. Description: Welded or bolted structural-steel shapes, shop or field fabricated to fit dimensions of supported equipment.
- B. Materials: Comply with requirements in Section 055000 "Metal Fabrications" for steel shapes and plates.

PART 3 - EXECUTION

3.01 APPLICATION

- A. Comply with the following standards for application and installation requirements of hangers and supports, except where requirements on Drawings or in this Section are stricter:
 - 1. NECA 1.
 - 2. NECA/BICSI 568.
 - 3. TIA-569-C.
 - 4. NECA 101
 - 5. NECA 102.
 - 6. NECA 105.
 - 7. NECA 111.
- B. Comply with requirements in Section 078413 "Penetration Firestopping" for firestopping materials and installation for penetrations through fire-rated walls, ceilings, and assemblies.
- C. Comply with requirements for pathways specified in Section 270528 "Pathways for Communications Systems."
- D. Maximum Support Spacing and Minimum Hanger Rod Size for Raceway: Space supports for EMTs, IMCs, and RMCs as required by NFPA 70. Minimum rod size shall be 1/4 inch (6 mm) in diameter.
- E. Multiple Raceways or Cables: Install trapeze-type supports fabricated with steel slotted or other support system, sized so capacity can be increased by at least 25 percent in future without exceeding specified design load limits.
 - 1. Secure raceways and cables to these supports with single-bolt conduit clamps, using spring friction action for retention in support channel.
- F. Spring-steel clamps designed for supporting single conduits without bolts may be used for 1-1/2-inch (38-mm) and smaller raceways serving branch circuits and communication systems above suspended ceilings and for fastening raceways to trapeze supports.

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3.01 SUPPORT INSTALLATION

- A. Strength of Support Assemblies: Where not indicated, select sizes of components, so strength will be adequate to carry present and future static loads within specified loading limits. Minimum static design load used for strength determination shall be weight of supported components plus 200 lb (90 kg).
- B. Mounting and Anchorage of Surface-Mounted Equipment and Components: Anchor and fasten communications items and their supports to building structural elements by the following methods unless otherwise indicated by code:
 - 1. To Wood: Fasten with lag screws or through bolts.
 - 2. To New Concrete: Bolt to concrete inserts.
 - 3. To Masonry: Use approved toggle-type bolts on hollow masonry units and expansion anchor fasteners on solid masonry units.
 - 4. To Existing Concrete: Use expansion anchor fasteners.
 - 5. Instead of expansion anchors, powder-actuated-driven threaded studs, provided with lock washers and nuts, may be used in existing standard-weight concrete 4 inches (100 mm) thick or greater. Do not use for anchorage to lightweight-aggregate concrete or for slabs less than 4 inches (100 mm) thick.
 - 6. To Steel: Beam clamps (MSS SP-58, Type 19, 21, 23, 25, or 27), complying with MSS SP-69.
 - 7. To Light Steel: Sheet metal screws.
 - 8. Items Mounted on Hollow Walls and Nonstructural Building Surfaces: Mount cabinets, panelboards, disconnect switches, control enclosures, pull and junction boxes, transformers, and other devices on slotted-channel racks attached to substrate.
- C. Drill holes for expansion anchors in concrete at locations and to depths that avoid the need for reinforcing bars.

3.01 INSTALLATION OF FABRICATED METAL SUPPORTS

- A. Comply with installation requirements in Section 055000 "Metal Fabrications" for site-fabricated metal supports.
- B. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor communications materials and equipment.
- C. Field Welding: Comply with AWS D1.1/D1.1M.

END OF SECTION

SECTION 27 1513

COMMUNICATIONS COPPER HORIZONTAL CABLING

PART 1 - GENERAL

101 SUMMARY

- A. Section Includes:
 - 1. Category 6 twisted pair cable.
 - 2. Twisted pair cable hardware, including plugs and jacks.
 - 3. Cable management system.
 - 4. Grounding provisions for twisted pair cable.
 - 5. Coaxial Cable
 - 6. Pathways
 - 7. Equipment Frames

102 COPPER HORIZONTAL CABLING DESCRIPTION

- A. The Horizontal (workstation) Cabling System shall consist of 4-pair Unshielded Twisted Pair (UTP) Copper Cables to each work area outlet as shown on the plans. The cables shall be installed from the Work Area Outlet to the Telecommunications Room location as called for and routed to the appropriate rack serving that area and terminated as specified in this document.
- B. A work area is approximately 100 sq. ft. (9.3 sq. m) and includes the components that extend from the equipment outlets to the station equipment.
- C. The maximum allowable horizontal cable length is 295 feet (90 m). This maximum allowable length does not include an allowance for the length of 16 feet (4.9 m) to the workstation equipment or in the horizontal cross-connect.

103 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: Reviewed and stamped by RCDD.
 - 1. Wiring diagrams and installation details of telecommunications equipment, to show location and layout of telecommunications equipment.
- C. Twisted pair cable testing plan.

104 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For RCDD, Installer, installation supervisor, and field inspector.
- B. Product Certificates: For each type of product.
- C. Field quality-control reports.

105 CLOSEOUT SUBMITTALS

A. Maintenance data.

106 QUALITY ASSURANCE

 A. BICSI is an industry trade association. See "Communications Copper Horizontal Cabling" Article in the Evaluations for summaries of qualifications for registration. Installer
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GMC PROJECT NO.: AHUN210012
27 1513, 1 OF 8 Qualifications: The successful telecommunications contractor shall be a company specializing in communication cabling installation and shall have been in business for a minimum of 5 years under the same name and with the same board of directors/ management Contractor must have successfully completed a minimum of 3 projects of similar size and scope within the last 5 years. At least 30 percent of the copper installation and termination crew must be certified by BICSI and the cable/connectivity manufacturer with a Technicians Level of Training. At least 10 percent of the optical fiber installation and termination crew must be certified by BICSI and the cable/connectivity manufacturer in optical fiber installation and termination practices. The contractor must have an RCDD on staff in responsible charge of the project. Provide all contact information for the RCDD as this will be the point of contact for the project.

- 1. Layout Responsibility: Preparation of Shop Drawings shall be under the direct supervision of an RCDD.
- 2. Installation Supervision: Installation shall be under the direct supervision of a BICSI certified Commercial Installer, Level 2, who shall be present at all times when work of this Section is performed at Project site.
- 3. Structured cabling contractor shall have on site for final inspection the RCDD who is in responsible charge of the project or the on-site installation supervisor.
- 4. Testing supervisor shall be currently certified by BICSI as an RCDD and shall be on-site

107 COORDINATION

A. Coordinate layout and installation of telecommunications pathways and cabling with Owner's telecommunications and LAN equipment and service suppliers.

PART 2 - PRODUCTS

201 PERFORMANCE REQUIREMENTS

- A. General Performance: Horizontal cabling system shall comply with transmission standards in TIA-568-C.1, when tested according to test procedures of this standard.
- B. Telecommunications Pathways and Spaces: Comply with TIA-569-D.
- C. Grounding: Comply with TIA-607-B.
- D. 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.

202 GENERAL CABLE CHARACTERISTICS

- A. Listed and labeled by an NRTL acceptable to authorities having jurisdiction as complying with the applicable standard and NFPA 70 for the following types:
 - 1. Communications, Plenum Rated: Type CMP complying with UL 1685 or Type CMP in listed plenum communications raceway or Type CMP in listed cable routing assembly.
- B. Surface-Burning Characteristics: Comply with ASTM E 84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - 1. Flame-Spread Index: 25 or less.
 - 2. Smoke-Developed Index: 450 or less.
- C. RoHS compliant.

203 CATEGORY 6 TWISTED PAIR CABLE

- A. Description: Four-pair, balanced-twisted pair cable, certified to meet transmission characteristics of Category 6 cable at frequencies up to 250MHz.
- B. Standard: Comply with NEMA WC 66/ICEA S-116-732 and TIA-568-C.2 for Category 6 cables.
- C. Conductors: 100-ohm, 23 AWG solid copper.
- D. Shielding/Screening: Unshielded twisted pairs (UTP).
- E. Cable Rating: Plenum.
- F. Jacket: Blue thermoplastic.

204 TWISTED PAIR CABLE HARDWARE

- A. Description: Hardware designed to connect, splice, and terminate twisted pair copper communications cable.
- B. Manufacturers: Subject to compliance with requirements, provide products by the following:
 - 1. Leviton Manufacturing Co., Inc.
 - 2. Or approved equal.
- C. General Requirements for Twisted Pair Cable Hardware:
 - 1. Comply with the performance requirements of Category 6 Category 6a.
 - 2. Comply with TIA-568-C.2, IDC type, with modules designed for punch-down caps or tools.
 - 3. Cables shall be terminated with connecting hardware of same category or higher.
- D. Source Limitations: Obtain twisted pair cable hardware from same manufacturer as twisted pair cable, from single source.
- E. Patch Panel: Modular panels housing numbered jack units with IDC-type connectors at each jack location for permanent termination of pair groups of installed cables.
 - 1. Features:
 - a. Universal T568A and T568B wiring labels.
 - b. Labeling areas adjacent to conductors.
 - c. Replaceable connectors.
 - d. 24 or 48 ports.
 - 2. Construction: 16-gauge steel and mountable on 19-inch (483 mm) equipment racks.
 - 3. Number of Jacks per Field: One for each four-pair cable indicated.
- F. Patch Cords: Factory-made, four-pair cables in 48-inch (1200-mm) lengths; terminated with an eight-position modular plug at each end.
 - 1. Patch cords shall have bend-relief-compliant boots and color-coded icons to ensure performance. Patch cords shall have latch guards to protect against snagging.
- G. Plugs and Plug Assemblies:
 - 1. Male; eight position; color-coded modular telecommunications connector designed for termination of a single four-pair, 100-ohm, unshielded or shielded twisted pair cable.
 - 2. Standard: Comply with TIA-568-C.2.
 - 3. Marked to indicate transmission performance.
- H. Jacks and Jack Assemblies:

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- 1. Female; eight position; modular; fixed telecommunications connector designed for termination of a single four-pair, 100-ohm, unshielded or shielded twisted pair cable.
- 2. Designed to snap-in to a patch panel or faceplate.
- 3. Standard: Comply with TIA-568-C.2.
- 4. Marked to indicate transmission performance.
- I. Faceplate:
 - 1. Two port, vertical single gang faceplates designed to mount to single gang wall boxes.
 - 2. Metal Faceplate: Stainless steel, complying with requirements in Section 262726 "Wiring Devices."
 - 3. For use with snap-in jacks accommodating any combination of twisted pair, optical fiber, and coaxial work area cords.
 - a. Flush mounting jacks, positioning the cord at a 45-degree angle.
- J. Legend:
 - 1. Machine printed, in the field, using adhesive-tape label.
 - 2. Snap-in, clear-label covers and machine-printed paper inserts.

205 GROUNDING

- A. Comply with requirements in Section 27 05 26 "Grounding and Bonding for Communications Systems" for grounding conductors and connectors.
- B. Comply with TIA-607-B.

206 PATCH CORDS

- A. Work Area Patch cords: Factory-made, four-pair, category 6 cables in 3-foot, 5 foot, 7 foot, 10 foot and 15 foot lengths; terminated with eight-position modular plug at each end.
- B. Contractor shall provide one each patch cord for each Data and Voice cable terminated in a work area outlet. Patch cord shall be provided in the following lengths:
 - 1. 10% of patch cords provided shall be 3 foot in length.
 - 2. 20% of patch cords provided shall be 5 foot in length.
 - 3. 30% of patch cords provided shall be 7 foot in length.
 - 4. 30% of patch cords provided shall be 10 foot in length.
 - 5. 10% of patch cords provided shall be 15 foot in length.

207 COAXIAL CABLE

- A. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:
 - 1. Superior Essex
 - 2. Belden Inc
 - 3. CommScope, Inc
- B. Cable Characteristics: Broadband type, recommended by cable manufacturer specifically for broadband data transmission applications. Coaxial cable and accessories shall have 75-ohm nominal impedance with a return loss of 20 dB maximum from 7 to 806 MHz.
- C. RG-11/U: NFPA 70, Type CATV.
 - 1. No. 14 AWG, solid, copper-covered steel conductor.

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- 2. Gas-injected, foam-PE insulation.
- 3. Quad shielded with 100 percent aluminum polyester tape and minimum 60 percent aluminum braid
- 4. Jacketed with sunlight-resistant, black PVC or PE, suitable for outdoor installations in ambient temperatures ranging from minus 40 to plus 85 deg C.
- D. RG-6/U: NFPA 70, Type CATV or CM.
 - 1. No. 16 AWG, solid, copper-covered steel conductor; gas-injected, foam-PE insulation.
 - 2. Quad shielded with 100 percent aluminum-foil shield and minimum 60 percent aluminum braid.
 - 3. Jacketed with black PVC or PE Suitable for indoor installations.
- E. NFPA and UL compliance listed and labeled by an NRTL acceptable to authorities having jurisdiction as complying with UL 1655 and with NFPA 70 "Radio and Television Equipment" and "Community Antenna Television and Radio Distribution" Articles. Types are as follows:
 - 1. CATV Cable: Type CATV, or CATVP or CATVR.
 - 2. CATV Plenum Rated: Type CATVP, complying with NFPA 262.
 - 3. CATV Riser Rated: Type CATVR; or CATVP, CATVR, or CATV, complying with UL 1666.
 - 4. CATV Limited Rating: Type CATVX.

208 PATHWAYS

- A. General Requirements: Comply with TIAIEIA-569-A.
- B. Cable Support: NRTL labeled for support of Category 6 cabling, designed to prevent degradation of cable performance and pinch points that could damage cable.
 - 1. Support brackets with cable tie slots for fastening cable ties to brackets.
 - 2. Lacing bars, spools, J-hooks, and O-rings.
 - 3. Straps and other devices.

209 EQUIPMENT FRAMES

A. Equipment racks/cabinets shall provide vertical cable management and support for the patch cords at the front of the rack and wire management, support, and protection for the horizontal cables inside the legs of the rack. Waterfall cable management shall be provided at the top of the rack for patch cords and for horizontal cables entering the rack channels for protection and to maintain proper bend radius and cable support. Horizontal Wire management shall also be mounted above and below each patch panel and/or piece of equipment on the rack at a ratio of 1 rack unit of horizontal cable management per each rack unit of patching or equipment or 1 rack unit of horizontal cable management per 24 ports of patching or active network equipment (whichever is greater). The rack shall include mounting brackets for cable tray ladder rack cable runway to mount to the top of the rack. Velcro cable ties shall be provided inside the rack channels to support the horizontal cable. Rack shall be black in color to match the patch panels and cable management.

PART 3 - EXECUTION

301 INSTALLATION OF TWISTED-PAIR HORIZONTAL CABLES

- A. Comply with NECA 1 and NECA/BICSI 568.
- B. Wiring Method: Install cables in raceways and cable trays, except within consoles, cabinets, desks, and counters and except in accessible ceiling spaces, attics, and gypsum board partitions where unenclosed wiring method may be used. Conceal raceway and cables, except in unfinished spaces.
 - 1. Install plenum cable in environmental air spaces, including plenum ceilings.
- C. Wiring within Enclosures: Bundle, lace, and train cables within enclosures. Connect to terminal points with no excess and without exceeding manufacturer's limitations on bending radii. Provide and use lacing bars and distribution spools. Install conductors parallel with or at right angles to sides and back of enclosure.
- D. General Requirements for Cabling:
 - 1. Comply with TIA-568-C.1.
 - 2. Comply with BICSI's Information Transport Systems Installation Methods Manual, Ch. 5, "Copper Structured Cabling Systems," "Cable Termination Practices" Section.
 - 3. Install 110-style IDC termination hardware unless otherwise indicated.
 - 4. Do not untwist twisted pair cables more than 1/2 inch (12 mm) from the point of termination to maintain cable geometry.
 - 5. Terminate all conductors; no cable shall contain unterminated elements. Make terminations only at indicated outlets, terminals, cross-connects, and patch panels.
 - 6. Cables may not be spliced. Secure and support cables at intervals not exceeding 30 inches (760 mm) and not more than 6 inches (150 mm) from cabinets, boxes, fittings, outlets, racks, frames, and terminals.
 - 7. Install lacing bars to restrain cables, prevent straining connections, and prevent bending cables to smaller radii than minimums recommended by manufacturer.
 - 8. Bundle, lace, and train conductors to terminal points without exceeding manufacturer's limitations on bending radii, but not less than radii specified in BICSI information Transport Systems Installation Methods Manual, Ch. 5, "Copper Structured Cabling Systems," "Cable Termination Practices" Section. Use lacing bars and distribution spools.
 - 9. Do not install bruised, kinked, scored, deformed, or abraded cable. Do not splice cable between termination, tap, or junction points. Remove and discard cable if damaged during installation and replace it with new cable.
 - 10. Cold-Weather Installation: Bring cable to room temperature before dereeling. Heat lamps shall not be used for heating.
 - 11. In the communications equipment room, install a 10-foot- (3-m-) long service loop on each end of cable.
 - 12. Pulling Cable: Comply with BICSI Information Transport Systems Installation Methods Manual, Ch. 5, "Copper Structured Cabling Systems," "Pulling and Installing Cable" Section. Monitor cable pull tensions.
- E. Group connecting hardware for cables into separate logical fields.
- F. Separation from EMI Sources:
 - 1. Comply with recommendations from BICSI's "Telecommunications Distribution Methods Manual" and TIA-569-D for separating unshielded copper communication cable from potential EMI sources, including electrical power lines and equipment.

302 FIRESTOPPING

- A. Comply with requirements in Section 07 84 13 "Penetration Firestopping."
- B. Comply with TIA-569-D, Annex A, "Firestopping."
- C. Comply with "Firestopping Systems" Article in BISCI's "Telecommunications Distribution Methods Manual."

303 GROUNDING

- A. Install grounding according to the "Grounding, Bonding, and Electrical Protection" chapter in BICSI's "Telecommunications Distribution Methods Manual."
- B. Comply with TIA-607-B and NECA/BICSI-607.
- C. Locate grounding bus bar to minimize the length of bonding conductors. Fasten to wall, allowing at least a 2-inch (50-mm) clearance behind the grounding bus bar. Connect grounding bus bar to suitable electrical building ground, using a minimum No. 4 AWG grounding electrode conductor.
- D. Bond metallic equipment to the grounding bus bar, using not smaller than a No. 6 AWG equipment grounding conductor.

304 IDENTIFICATION

- A. Identify system components, wiring, and cabling complying with TIA-606-B.
- B. Paint and label colors for equipment identification shall comply with TIA-606-B for Class 2 level of administration.
- C. Equipment grounding conductors.
- D. Cable and Wire Identification:
 - 1. Label each cable within 4 inches (100 mm) of each termination and tap, where it is accessible in a cabinet or junction or outlet box, and elsewhere as indicated.
 - 2. Each wire connected to building-mounted devices is not required to be numbered at the device if wire color is consistent with associated wire connected and numbered within panel or cabinet.
 - 3. Exposed Cables and Cables in Cable Trays and Wire Troughs: Label each cable at intervals not exceeding 15 feet (4.5 m).
 - 4. Label each terminal strip, and screw terminal in each cabinet, rack, or panel.
 - a. Individually number wiring conductors connected to terminal strips, and identify each cable or wiring group, extended from a panel or cabinet to a buildingmounted device, with the name and number of a particular device.
 - b. Label each unit and field within distribution racks and frames.
 - 5. Identification within Connector Fields in Equipment Rooms and Wiring Closets: Label each connector and each discrete unit of cable-terminating and -connecting hardware. Where similar jacks and plugs are used for both voice and data communication cabling, use a different color for jacks and plugs of each service.
- E. Labels shall be preprinted or computer-printed type, with a printing area and font color that contrast with cable jacket color but still comply with TIA-606-B requirements for the following:
 - 1. Cables use flexible vinyl or polyester that flexes as cables are bent.

305 FIELD QUALITY CONTROL

- A. Perform tests and inspections.
- B. Tests and Inspections:
 - 1. Visually inspect jacket materials for NRTL certification markings. Inspect cabling terminations in communications equipment rooms for compliance with color-coding for pin assignments and inspect cabling connections for compliance with TIA-568-C.1.
 - 2. Visually inspect cable placement, cable termination, grounding and bonding, equipment and patch cords, and labeling of all components.
 - 3. Test twisted pair cabling for DC loop resistance, shorts, opens, intermittent faults, and polarity between conductors. Test operation of shorting bars in connection blocks. Test cables after termination but not cross-connection.
- C. Data for each measurement shall be documented. Data for submittals shall be printed in a summary report that is formatted similarly to Table 10.1 in BICSI's "Telecommunications Distribution Methods Manual," or shall be transferred from the instrument to the computer, saved as text files, printed, and submitted.
- D. Remove and replace cabling where test results indicate that they do not comply with specified requirements.
- E. End-to-end cabling will be considered defective if it does not pass tests and inspections.
- F. Prepare test and inspection reports.

END OF SECTION

SECTION 28 31 11

DIGITAL, ADDRESSABLE FIRE-ALARM SYSTEM

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Fire-alarm control unit.
 - 2. Manual fire-alarm boxes.
 - 3. System smoke detectors.
 - 4. Heat detectors.
 - 5. Notification appliances.
 - 6. Device guards.
 - 7. Magnetic door holders.
 - 8. Addressable interface device.
 - 9. Digital alarm communicator transmitter.
 - 10. Network communications.

1.3 DEFINITIONS

- A. EMT: Electrical Metallic Tubing.
- B. FACP: Fire Alarm Control Panel.
- C. NICET: National Institute for Certification in Engineering Technologies.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product, including furnished options and accessories.
 - 1. Include construction details, material descriptions, dimensions, profiles, and finishes.
 - 2. Include rated capacities, operating characteristics, and electrical characteristics.
- B. Shop Drawings: For fire-alarm system.
 - 1. Comply with recommendations and requirements in the "Documentation" section of the "Fundamentals" chapter in NFPA 72.
 - 2. Include plans, elevations, sections, details, and attachments to other work.
 - 3. Include details of equipment assemblies. Indicate dimensions, weights, loads, required clearances, method of field assembly, components, and locations. Indicate conductor sizes, indicate termination locations and requirements, and distinguish between factory and field wiring.
 - 4. Detail assembly and support requirements.
 - 5. Include voltage drop calculations for notification-appliance circuits.
 - 6. Include battery-size calculations.
 - 7. Include input/output matrix.
 - 8. Include statement from manufacturer that all equipment and components have been tested as a system and meet all requirements in this Specification and in NFPA 72.

- 9. Include performance parameters and installation details for each detector.
- 10. Verify that each duct detector is listed for complete range of air velocity, temperature, and humidity possible when air-handling system is operating.
- 11. Include plans, sections, and elevations of heating, ventilating, and air-conditioning ducts, drawn to scale; coordinate location of duct smoke detectors and access to them.
 - a. Show critical dimensions that relate to placement and support of sampling tubes, detector housing, and remote status and alarm indicators.
 - b. Show field wiring required for HVAC unit shutdown on alarm.
 - c. Locate detectors according to manufacturer's written recommendations.
- 12. Include voice/alarm signaling-service equipment rack or console layout, grounding schematic, amplifier power calculation, and single-line connection diagram.
- 13. Include floor plans to indicate final outlet locations showing address of each addressable device. Show size and route of cable and conduits and point-to-point wiring diagrams.
- C. General Submittal Requirements:
 - 1. Shop Drawings shall be prepared by persons with the following qualifications:
 - a. Trained and certified by manufacturer in fire-alarm system design.
 - b. NICET-certified, fire-alarm technician; Level IV minimum.
 - c. Licensed or certified by authorities having jurisdiction.

1.5 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For fire-alarm systems and components to include in emergency, operation, and maintenance manuals.
 - 1. Include the following and deliver copies to authorities having jurisdiction:
 - a. Comply with the "Records" section of the "Inspection, Testing and Maintenance" chapter in NFPA 72.
 - b. Provide "Fire Alarm and Emergency Communications System Record of Completion Documents" according to the "Completion Documents" Article in the "Documentation" section of the "Fundamentals" chapter in NFPA 72.
 - c. Complete wiring diagrams showing connections between all devices and equipment. Each conductor shall be numbered at every junction point with indication of origination and termination points.
 - d. Riser diagram.
 - e. Device addresses.
 - f. Record copy of site-specific software.
 - g. Provide "Inspection and Testing Form" according to the "Inspection, Testing and Maintenance" chapter in NFPA 72, and include the following:
 - 1) Equipment tested.
 - 2) Frequency of testing of installed components.
 - 3) Frequency of inspection of installed components.
 - 4) Requirements and recommendations related to results of maintenance.
 - 5) Manufacturer's user training manuals.
 - h. Manufacturer's required maintenance related to system warranty requirements.
 - i. Abbreviated operating instructions for mounting at fire-alarm control unit and each annunciator unit.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: Personnel shall be trained and certified by manufacturer for installation of units required for this Project.

- B. Installer Qualifications: Installation shall be by personnel certified by NICET as fire-alarm Level III technician.
- C. NFPA Certification: Obtain certification according to NFPA 72 by a UL-listed alarm company.

1.7 PROJECT CONDITIONS

A. Use of Devices during Construction: Protect devices during construction unless devices are placed in service to protect the facility during construction.

1.8 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace fire-alarm system equipment and components that fail in materials or workmanship within specified warranty period.
 - 1. Warranty Extent: All equipment and components not covered in the Maintenance Service Agreement.
 - 2. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 SYSTEM DESCRIPTION

- A. Existing Radionics system.
- B. All components provided shall be listed for use with the selected system.
- C. 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.

2.2 SYSTEMS OPERATIONAL DESCRIPTION

- A. Fire-alarm signal initiation shall be by one or more of the following devices:
 - 1. Manual stations.
 - 2. Heat detectors.
 - 3. Smoke detectors.
 - 4. Duct smoke detectors.
 - 5. Automatic sprinkler system water flow.
 - 6. Fire-extinguishing system operation.
 - 7. Fire standpipe system.
 - 8. Dry system pressure flow switch.
 - 9. Fire pump running.
- B. Fire-alarm signal shall initiate the following actions:
 - 1. Continuously operate alarm notification appliances, including voice evacuation notices.
 - 2. Identify alarm and specific initiating device at fire-alarm control unit, connected network control panels, off-premises network control panels, and remote annunciators.
 - 3. Transmit an alarm signal to the remote alarm receiving station.
 - 4. Unlock electric door locks in designated egress paths.
 - 5. Release fire and smoke doors held open by magnetic door holders.
 - 6. Activate voice/alarm communication system.
 - 7. Switch heating, ventilating, and air-conditioning equipment controls to fire-alarm mode.
 - 8. Recall elevators to primary or alternate recall floors.
 - 9. Activate elevator power shunt trip.
 - 10. Activate emergency lighting control.
 - 11. Record events in the system memory.

- C. Supervisory signal initiation shall be by one or more of the following devices and actions:
 - 1. Valve supervisory switch.
 - 2. Elevator shunt-trip supervision.
 - 3. Fire pump running.
 - 4. Fire-pump loss of power.
 - 5. Fire-pump power phase reversal.
 - 6. Independent fire-detection and -suppression systems.
 - 7. User disabling of zones or individual devices.
 - 8. Loss of communication with any panel on the network.
- D. System trouble signal initiation shall be by one or more of the following devices and actions:
 - 1. Open circuits, shorts, and grounds in designated circuits.
 - 2. Opening, tampering with, or removing alarm-initiating and supervisory signal-initiating devices.
 - 3. Loss of communication with any addressable sensor, input module, relay, control module, remote annunciator, printer interface, or Ethernet module.
 - 4. Loss of primary power at fire-alarm control unit.
 - 5. Ground or a single break in internal circuits of fire-alarm control unit.
 - 6. Abnormal ac voltage at fire-alarm control unit.
 - 7. Break in standby battery circuitry.
 - 8. Failure of battery charging.
 - 9. Abnormal position of any switch at fire-alarm control unit or annunciator.
 - 10. Voice signal amplifier failure.
- E. System Supervisory Signal Actions:
 - 1. Initiate notification appliances.
 - 2. Identify specific device initiating the event at fire-alarm control unit, connected network control panels, off-premises network control panels, and remote annunciators.
 - 3. After a time delay of 200 seconds, transmit a trouble or supervisory signal to the remote alarm receiving station.
 - 4. Transmit system status to building management system.
 - 5. Display system status on graphic annunciator.

2.3 **PERFORMANCE REQUIREMENTS**

2.4 FIRE-ALARM CONTROL UNIT

A. Manufacturer: Existing Radionics System

2.5 MANUAL FIRE-ALARM BOXES

- A. Manufacturers: Subject to compliance with requirements, provide products by same manufacturer as FACP.
- B. General Requirements for Manual Fire-Alarm Boxes: Comply with UL 38. Boxes shall be finished in red with molded, raised-letter operating instructions in contrasting color; shall show visible indication of operation; and shall be mounted on recessed outlet box. If indicated as surface mounted, provide manufacturer's surface back box.
 - 1. Double-action mechanism requiring two actions to initiate an alarm, pull-lever type; with integral addressable module arranged to communicate manual-station status (normal, alarm, or trouble) to fire-alarm control unit.
 - 2. Station Reset: Key- or wrench-operated switch.

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2.6 SYSTEM SMOKE DETECTORS

- A. Manufacturers: Subject to compliance with requirements, provide products by same manufacturer as FACP.
- B. General Requirements for System Smoke Detectors:
 - 1. Comply with UL 268; operating at 24-V dc, nominal.
 - 2. Integral Addressable Module: Arranged to communicate detector status (normal, alarm, or trouble) to fire-alarm control unit.
 - 3. Self-Restoring: Detectors do not require resetting or readjustment after actuation to restore them to normal operation.
 - 4. Integral Visual-Indicating Light: LED type, indicating detector has operated and poweron status.
- C. Photoelectric Smoke Detectors:
 - 1. Detector address shall be accessible from fire-alarm control unit and shall be able to identify the detector's location within the system and its sensitivity setting.
 - 2. An operator at fire-alarm control unit, having the designated access level, shall be able to manually access the following for each detector:
 - a. Primary status.
 - b. Device type.
 - c. Present average value.
 - d. Present sensitivity selected.
 - e. Sensor range (normal, dirty, etc.).
- D. Duct Smoke Detectors: Photoelectric type complying with UL 268A.
 - 1. Detector address shall be accessible from fire-alarm control unit and shall be able to identify the detector's location within the system and its sensitivity setting.
 - 2. An operator at fire-alarm control unit, having the designated access level, shall be able to manually access the following for each detector:
 - a. Primary status.
 - b. Device type.
 - c. Present average value.
 - d. Present sensitivity selected.
 - e. Sensor range (normal, dirty, etc.).
 - 3. Weatherproof Duct Housing Enclosure: NEMA 250, Type 4X; NRTL listed for use with the supplied detector for smoke detection in HVAC system ducts.
 - 4. Each sensor shall have multiple levels of detection sensitivity.
 - 5. Sampling Tubes: Design and dimensions as recommended by manufacturer for specific duct size, air velocity, and installation conditions where applied.
 - 6. Relay Fan Shutdown: Fully programmable relay rated to interrupt fan motor-control circuit.

2.7 HEAT DETECTORS

- A. Manufacturers: Subject to compliance with requirements, provide products by same manufacturer as FACP.
- B. General Requirements for Heat Detectors: Comply with UL 521.
 - 1. Temperature sensors shall test for and communicate the sensitivity range of the device.
- C. Heat Detector, Fixed-Temperature Type: Actuated by temperature that exceeds a fixed temperature of 190 deg F (88 deg C).

- 1. Mounting: Twist-lock base interchangeable with smoke-detector bases.
- 2. Integral Addressable Module: Arranged to communicate detector status (normal, alarm, or trouble) to fire-alarm control unit.

2.8 NOTIFICATION APPLIANCES

- A. Manufacturers: Subject to compliance with requirements, provide products by same manufacturer as FACP.
- B. General Requirements for Notification Appliances: Connected to notification-appliance signal circuits, zoned as indicated, equipped for mounting as indicated, and with screw terminals for system connections.
 - 1. Combination Devices: Factory-integrated audible and visible devices in a singlemounting assembly, equipped for mounting as indicated, and with screw terminals for system connections.
- C. Horns: Electric-vibrating-polarized type, 24-V dc; with provision for housing the operating mechanism behind a grille. Comply with UL 464. Horns shall produce a sound-pressure level of 90 dBA, measured 10 feet (3 m) from the horn, using the coded signal prescribed in UL 464 test protocol.
- D. Visible Notification Appliances: Xenon strobe lights complying with UL 1971, with clear or nominal white polycarbonate lens mounted on an aluminum faceplate. The word "FIRE" is engraved in minimum 1-inch- (25-mm-) high letters on the lens.
 - 1. Rated Light Output:
 - a. 15/30/75/110 cd, selectable in the field.
 - 2. Mounting: Wall mounted unless otherwise indicated.
 - 3. For units with guards to prevent physical damage, light output ratings shall be determined with guards in place.
 - 4. Flashing shall be in a temporal pattern, synchronized with other units.
 - 5. Strobe Leads: Factory connected to screw terminals.
 - 6. Mounting Faceplate: Factory finished, red.
- E. Voice/Tone Notification Appliances:
 - 1. Comply with UL 1480.
 - 2. Speakers for Voice Notification: Locate speakers for voice notification to provide the intelligibility requirements of the "Notification Appliances" and "Emergency Communications Systems" chapters in NFPA 72.
 - 3. High-Range Units: Rated 2 to 15 W.
 - 4. Low-Range Units: Rated 1 to 2 W.
 - 5. Mounting: semirecessed.
 - 6. Matching Transformers: Tap range matched to acoustical environment of speaker location.
- F. Exit Marking Audible Notification Appliance:
 - 1. Exit marking audible notification appliances shall meet the audibility requirements in NFPA 72.
 - 2. Provide exit marking audible notification appliances at the entrance to all building exits.
 - 3. Provide exit marking audible notification appliances at the entrance to areas of refuge with audible signals distinct from those used for building exit marking.

2.9 MAGNETIC DOOR HOLDERS

- A. Description: Units are equipped for wall or floor mounting as indicated and are complete with matching doorplate.
 - 1. Electromagnets: Require no more than 3 W to develop 25-lbf (111-N) holding force.
 - 2. Wall-Mounted Units: Flush mounted unless otherwise indicated.
 - 3. Rating: 24-V ac or dc.
- B. Material and Finish: Match door hardware.

2.10 ADDRESSABLE INTERFACE DEVICE

A. General:

- 1. Include address-setting means on the module.
- 2. Store an internal identifying code for control panel use to identify the module type.
- 3. Listed for controlling HVAC fan motor controllers.
- B. Monitor Module: Microelectronic module providing a system address for alarm-initiating devices for wired applications with normally open contacts.
- C. Integral Relay: Capable of providing a direct signal to elevator controller to initiate elevator recall and to circuit-breaker shunt trip for power shutdown.
 - 1. Allow the control panel to switch the relay contacts on command.
 - 2. Have a minimum of two normally open and two normally closed contacts available for field wiring.
- D. Control Module:
 - 1. Operate notification devices.
 - 2. Operate solenoids for use in sprinkler service.

2.11 DIGITAL ALARM COMMUNICATOR TRANSMITTER

- A. Digital alarm communicator transmitter shall be acceptable to the remote central station and shall comply with UL 632.
- B. Functional Performance: Unit shall receive an alarm, supervisory, or trouble signal from firealarm control unit and automatically capture two telephone line(s) and dial a preset number for a remote central station. When contact is made with central station(s), signals shall be transmitted. If service on either line is interrupted for longer than 45 seconds, transmitter shall initiate a local trouble signal and transmit the signal indicating loss of telephone line to the remote alarm receiving station over the remaining line. Transmitter shall automatically report telephone service restoration to the central station. If service is lost on both telephone lines, transmitter shall initiate the local trouble signal.
- C. Local functions and display at the digital alarm communicator transmitter shall include the following:
 - 1. Verification that both telephone lines are available.
 - 2. Programming device.
 - 3. LED display.
 - 4. Manual test report function and manual transmission clear indication.
 - 5. Communications failure with the central station or fire-alarm control unit.
- D. Digital data transmission shall include the following:
 - 1. Address of the alarm-initiating device.

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- 2. Address of the supervisory signal.
- 3. Address of the trouble-initiating device.
- 4. Loss of ac supply.
- 5. Loss of power.
- 6. Low battery.
- 7. Abnormal test signal.
- 8. Communication bus failure.
- E. Secondary Power: Integral rechargeable battery and automatic charger.
- F. Self-Test: Conducted automatically every 24 hours with report transmitted to central station.

2.12 NETWORK COMMUNICATIONS

- A. Provide network communications for fire-alarm system according to fire-alarm manufacturer's written requirements.
- B. Provide network communications pathway per manufacturer's written requirements and requirements in NFPA 72 and NFPA 70.
- C. Provide integration gateway using UAB Network Protocol for connection to building automation system.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas and conditions for compliance with requirements for ventilation, temperature, humidity, and other conditions affecting performance of the Work.
 - 1. Verify that manufacturer's written instructions for environmental conditions have been permanently established in spaces where equipment and wiring are installed, before installation begins.
- B. Examine roughing-in for electrical connections to verify actual locations of connections before installation.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 EQUIPMENT INSTALLATION

- A. Comply with NFPA 72, NFPA 101, and requirements of authorities having jurisdiction for installation and testing of fire-alarm equipment. Install all electrical wiring to comply with requirements in NFPA 70 including, but not limited to, Article 760, "Fire Alarm Systems."
 - 1. Devices placed in service before all other trades have completed cleanup shall be replaced.
 - 2. Devices installed but not yet placed in service shall be protected from construction dust, debris, dirt, moisture, and damage according to manufacturer's written storage instructions.
- B. Install wall-mounted equipment, with tops of cabinets not more than 78 inches (1980 mm) above the finished floor.
- C. Manual Fire-Alarm Boxes:
 - 1. Install manual fire-alarm box in the normal path of egress within 60 inches (1520 mm) of the exit doorway.
 - 2. Mount manual fire-alarm box on a background of a contrasting color.

- 3. The operable part of manual fire-alarm box shall be between 42 inches (1060 mm) and 48 inches (1220 mm) above floor level. All devices shall be mounted at the same height unless otherwise indicated.
- D. Install a cover on each smoke detector that is not placed in service during construction. Cover shall remain in place except during system testing. Remove cover prior to system turnover.
- E. Duct Smoke Detectors: Comply with NFPA 72 and NFPA 90A. Install sampling tubes so they extend the full width of duct. Tubes more than 36 inches (9100 mm) long shall be supported at both ends.
 - 1. Do not install smoke detector in duct smoke-detector housing during construction. Install detector only during system testing and prior to system turnover.
- F. Elevator Shafts: Coordinate temperature rating and location with sprinkler rating and location. Do not install smoke detectors in sprinklered elevator shafts.
- G. Remote Status and Alarm Indicators: Install in a visible location near each smoke detector, sprinkler water-flow switch, and valve-tamper switch that is not readily visible from normal viewing position.
- H. Audible Alarm-Indicating Devices: Install not less than 6 inches (150 mm) below the ceiling. Install bells and horns on flush-mounted back boxes with the device-operating mechanism concealed behind a grille. Install all devices at the same height unless otherwise indicated.
- I. Visible Alarm-Indicating Devices: Install adjacent to each alarm bell or alarm horn and at least 6 inches (150 mm) below the ceiling. Install all devices at the same height unless otherwise indicated.
- J. Device Location-Indicating Lights: Locate in public space near the device they monitor.

3.3 PATHWAYS

- A. Pathways above recessed ceilings and in nonaccessible locations may be routed exposed.
 - 1. Exposed pathways located less than 96 inches (2440 mm) above the floor shall be installed in EMT.
- B. Pathways shall be installed in EMT.
- C. Exposed EMT shall be painted red enamel.

3.4 CONNECTIONS

- A. Make addressable connections with a supervised interface device to the following devices and systems. Install the interface device less than 36 inches (910 mm) from the device controlled. Make an addressable confirmation connection when such feedback is available at the device or system being controlled.
 - 1. Alarm-initiating connection to smoke-control system (smoke management) at firefighters' smoke-control system panel.
 - 2. Magnetically held-open doors.
 - 3. Alarm-initiating connection to elevator recall system and components.
 - 4. Alarm-initiating connection to activate emergency lighting control.
 - 5. Supervisory connections at valve supervisory switches.
 - 6. Supervisory connections at elevator shunt-trip breaker.
 - 7. Data communication circuits for connection to building management system.
 - 8. Data communication circuits for connection to mass notification system.

- 9. Supervisory connections at fire-extinguisher locations.
- 10. Supervisory connections at fire-pump power failure including a dead-phase or phase-reversal condition.
- 11. Supervisory connections at fire-pump engine control panel.

3.5 **IDENTIFICATION**

- A. Identify system components, wiring, cabling, and terminals.
- B. Install framed instructions in a location visible from fire-alarm control unit.

3.6 GROUNDING

- A. Ground fire-alarm control unit and associated circuits; comply with IEEE 1100. Install a ground wire from main service ground to fire-alarm control unit.
- B. Ground shielded cables at the control panel location only. Insulate shield at device location.

3.7 FIELD QUALITY CONTROL

- A. Field tests shall be witnessed by authorities having jurisdiction.
- B. Manufacturer's Field Service: Engage a factory-authorized service representative to test and inspect components, assemblies, and equipment installations, including connections.
- C. Perform tests and inspections.
- D. Perform the following tests and inspections with the assistance of a factory-authorized service representative:
 - 1. Visual Inspection: Conduct visual inspection prior to testing.
 - a. Inspection shall be based on completed record Drawings and system documentation that is required by the "Completion Documents, Preparation" table in the "Documentation" section of the "Fundamentals" chapter in NFPA 72.
 - b. Comply with the "Visual Inspection Frequencies" table in the "Inspection" section of the "Inspection, Testing and Maintenance" chapter in NFPA 72; retain the "Initial/Reacceptance" column and list only the installed components.
 - 2. System Testing: Comply with the "Test Methods" table in the "Testing" section of the "Inspection, Testing and Maintenance" chapter in NFPA 72.
 - 3. Test audible appliances for the public operating mode according to manufacturer's written instructions. Perform the test using a portable sound-level meter complying with Type 2 requirements in ANSI S1.4.
 - 4. Test visible appliances for the public operating mode according to manufacturer's written instructions.
 - 5. Factory-authorized service representative shall prepare the "Fire Alarm System Record of Completion" in the "Documentation" section of the "Fundamentals" chapter in NFPA 72 and the "Inspection and Testing Form" in the "Records" section of the "Inspection, Testing and Maintenance" chapter in NFPA 72.
- E. Reacceptance Testing: Perform reacceptance testing to verify the proper operation of added or replaced devices and appliances.
- F. Fire-alarm system will be considered defective if it does not pass tests and inspections.
- G. Prepare test and inspection reports.

- H. Maintenance Test and Inspection: Perform tests and inspections listed for weekly, monthly, quarterly, and semiannual periods. Use forms developed for initial tests and inspections.
- I. Annual Test and Inspection: One year after date of Substantial Completion, test fire-alarm system complying with visual and testing inspection requirements in NFPA 72. Use forms developed for initial tests and inspections.

3.8 MAINTENANCE SERVICE

- A. Initial Maintenance Service: Beginning at Substantial Completion, maintenance service shall include 12 months' full maintenance by skilled employees of manufacturer's designated service organization. Include preventive maintenance, repair or replacement of worn or defective components, lubrication, cleaning, and adjusting as required for proper operation. Parts and supplies shall be manufacturer's authorized replacement parts and supplies.
 - 1. Include visual inspections according to the "Visual Inspection Frequencies" table in the "Testing" paragraph of the "Inspection, Testing and Maintenance" chapter in NFPA 72.
 - 2. Perform tests in the "Test Methods" table in the "Testing" paragraph of the "Inspection, Testing and Maintenance" chapter in NFPA 72.
 - 3. Perform tests per the "Testing Frequencies" table in the "Testing" paragraph of the "Inspection, Testing and Maintenance" chapter in NFPA 72.

3.9 **DEMONSTRATION**

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain fire-alarm system.

END OF SECTION



FOR SPECIFICATION SECTIONS: 31 1000, 31 2000, 31 2500, 32 1216, 32 1313, 32 1613, 32 1723, 33 1000, 33 3000, 33 4000

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SECTION 31 1000

SITE CLEARING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
- B. Related work specified elsewhere includes Sections:
 - .. Section 31 2000 "Earthwork"

1.2 SUMMARY:

- A. This Section includes the following:
 - 1. Protection of existing trees and landscaping to remain, if any, and boundary and property line markers, bench marks, survey control points, and existing structures and improvements which are to remain.
 - 2. Environmental and erosion control measures, as indicated and as otherwise required by applicable codes, regulations, and authorities having jurisdiction.
 - 3. Removal of trees and other vegetation, as indicated, and within "controlled areas."
 - 4. Topsoil stripping, and stockpiling, as indicated, and within "controlled areas."
 - 5. Removing above-grade improvements as indicated, and as required to accommodate new construction.
 - 6. Removing below-grade improvements as indicated, and as required to accommodate new construction.

1.3 PROJECT CONDITIONS:

- A. Traffic: Conduct site clearing operations to ensure minimum interference with roads, streets, walks, and other adjacent occupied or used facilities. Do not close or obstruct streets, walks or other occupied or used facilities without permission from Owner and other authorities having jurisdiction.
- B. Protection of Existing Improvements:

- 1. Provide protection necessary to prevent damage to existing improvements indicated to remain in place. Clearing, demolition and any excavation within 5'-0" of existing buildings and structures to remain shall be performed by hand.
- 2. Protect improvements on adjoining properties and on Owner's property.
- 3. Protect boundary and property line markers, bench marks, and survey control points.
- 4. Restore damaged improvements and markers to their original condition, as acceptable to property owners.
- C. Protection of Existing Trees and Vegetation:
 - Protect existing trees and other vegetation indicated to remain in place, against unnecessary cutting, breaking or skinning of roots, skinning or bruising of bark, smothering of trees by stockpiling construction materials or excavated materials within drip line, excess foot or vehicular traffic, or parking of vehicles within drip line. Provide temporary fencing, barricades, and/or other precautions as necessary to protect trees and vegetation to be left standing.
 - 2. Water trees and other vegetation to remain within limits of contract work as required to maintain their health during course of construction operations.
 - 3. Provide protection for roots over 1-1/2-inch diameter that are cut during construction operations. Coat cut faces with an emulsified asphalt, or other acceptable coating, formulated for use on damaged plant tissues. Temporarily cover exposed roots with wet burlap to prevent roots from drying out; cover with earth as soon as possible.
 - 4. Repair or replace trees and vegetation indicated to remain which are damaged by construction operations, in a manner acceptable to Architect. Employ a licensed arborist to repair damages to trees and shrubs.
 - 5. Replace trees which cannot be repaired and restored to full-growth status, as determined by arborist.

PART 2 - PRODUCTS

A. Not applicable to this Section.

PART 3 - EXECUTION

- **3.1** SITE CLEARING:
 - A. General:

- 1. Remove trees, shrubs, grass and other vegetation, improvements, or obstructions as required to permit installation of new construction. Remove similar items elsewhere on site or premises as specifically indicated. "Removal" includes digging out and off-site disposing of stumps and roots.
- 2. Cut minor roots and branches of trees indicated to remain in a clean and careful manner, where such roots and branches obstruct installation of new construction.
- B. Topsoil:
 - 1. Topsoil is defined as friable clay loam surface soil found in a depth of not less than 4 inches. Satisfactory topsoil is reasonably free of subsoil, clay lumps, stones, and other objects over 2 inches in diameter, and without weeds, roots, and other objectionable material.
 - a. Sift, rake, and/or hand work as required in order to ensure acceptable top soil properties.
 - 2. Strip topsoil to whatever depths encountered in a manner to prevent intermingling with underlying subsoil or other objectionable material.
 - a. Remove heavy growths of grass from areas before stripping.
 - b. Where existing trees are indicated to remain, leave existing topsoil in place within drip lines to prevent damage to root system.
 - 3. Stockpile topsoil in storage piles in areas indicated or directed. Stockpiles are not allowed in the flood plain. Construct storage piles to provide free drainage of surface water. Cover storage piles, as required, to prevent wind erosion or seed and mulch if left undisturbed for a period of time greater than 14 consecutive days.
 - 4. Legally dispose of unsuitable topsoil and debris off site.
 - 5. Fill depressions caused by site clearing operations with satisfactory soil material, unless further excavation or earthwork is indicated.
 - a. Place fill material in horizontal layers not exceeding 6 inches loose depth, and thoroughly compact to a density equal to adjacent original ground, unless specific compaction is otherwise indicated in Section 02314.
- C. Removal of Improvements:
 - 1. Remove existing above-grade and below-grade improvements as indicated and as necessary to facilitate new construction.

2. Abandonment or removal of certain underground pipe or conduits may be indicated on mechanical or electrical drawings, and is included under work of related Division 15 and 16 sections. Removal of abandoned underground piping or conduit interfering with construction is included under this Section.

3.2 DISPOSAL OF WASTE MATERIALS:

- A. Burning on Owner's Property: Burning will not be permitted.
- B. Removal from Owner's Property: Remove waste materials, trash and debris, and legally dispose of same.

END OF SITE CLEARING

SECTION 31 2000

EARTHWORK

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
- B. Related work specified elsewhere includes:
 - .. Section 01 2200 "Unit Prices"
 - .. Section 31 1000- "Site Clearing"

1.2 SUMMARY:

- A. This Section includes the following:
 - 1. Earthwork for this project is to be bid as Unclassified Excavation.
 - a. Finished grades are shown in the plans. Subgrade is the ground surface below finishes such as pavement, building slabs, topsoil etc. Subgrade will be considered the "Cut-line" for this project in areas of cut. All grading work shown in the plans at and above the cut line is unclassified. No additional compensation will be given regardless of whether this material is soil, rock, debris, etc. Grading work below the cut line, except designated undercut areas, will be paid for by change order using the predetermined amounts in the "Unit Prices" for the particular material encountered.
 - b. Definitions for soil, rock, etc. are only relevant for descriptive purposes related to the handling of material and for work below the cut line.
 - 2. Preparing of subgrade for future building slabs, walks, and pavements; and additional work indicated on the Drawings and in the Project Manual.
 - a. Comply with this Section 31 1000, and other Division 2 Sections; Refer also to Civil and Structural Drawings and the Geotechnical report for additional information and requirements.
 - Perform excavation by hand within 5'-0" of existing buildings and structures to remain. Design and provide all necessary supports, shoring, etc., as required to prevent settlement, collapse, and/or other damage to existing buildings and structures to remain.

- DO NOT EXCAVATE BELOW THE EFFECTIVE BEARING AREA OF FOUNDATIONS OF EXISTING BUILDINGS AND STRUCTURES. In the event of conflict during construction, notify Architect prior to proceeding with work in the affected area.
- c. Compaction of backfill at any basement and below grade walls shall only be by hand-directed compaction equipment. Heavy construction equipment and/or heavy trucks shall not be allowed within 10-feet of any basement walls, and within 5-feet of foundation walls.
- 3. Excavating and backfilling of trenches within building lines and "controlled areas".
- 4. Stripping and stockpiling of topsoil (if any) is specified in Section 31 1000 "Site Clearing."
- 5. The extent of earthwork is indicated on the Drawings.
- 6. Removal of existing improvements may also be specified under various Division 2 Sections.
- B. Excavating and Backfilling for Mechanical and Electrical Work: Refer to Divisions 15 and 16 sections for excavation and backfill required in conjunction with underground mechanical and electrical utilities and buried mechanical and electrical appurtenances, not work of this Section.
 - 1. However, construction materials and execution for Mechanical and Electrical work shall comply with requirements of this Section 31 2000, and related Division 2 Sections, when the work and/or materials required are not indicated or only partially indicated in Divisions 15 and 16.
- C. Placement and compaction of at least 4-inches of topsoil up to finish grades is included in the work of this Section.
 - 1. Allow for thickness of topsoil and sod.

1.3 DEFINITIONS:

- A. "Excavation" consists of removal of materials and existing improvements encountered to subgrade elevations indicated and subsequent disposal of materials removed.
- B. "Unauthorized" excavation consists of removal of materials beyond indicated subgrade elevations or dimensions without specific direction of Owner's Geotechnical Engineer. Unauthorized excavation, as well as remedial work directed by Owner's Geotechnical Engineer, shall be at Contractor's expense.
 - 1. Under footings, foundation bases, or retaining walls, fill unauthorized excavation by extending indicated bottom elevation of footing or base to excavation bottom,

without altering required top elevation. Lean concrete fill may be used to bring elevations to proper position, when acceptable to Owner's Geotechnical Engineer.

- 2. In locations other than those above, backfill and compact unauthorized excavations as specified for authorized excavations of same classification, unless otherwise directed by Owner's Geotechnical Engineer.
- C. "Additional Excavation": When excavation has reached required subgrade elevations or designated undercut elevation, if required, notify Owner's Geotechnical Engineer, who will make an inspection of conditions. If Owner's Geotechnical Engineer determines that bearing materials at required subgrade elevations are unsuitable, continue excavation until suitable bearing materials are encountered and replace excavated material as directed by Owner's Geotechnical Engineer.
- D. "Subgrade": The undisturbed earth or the compacted soil layer immediately below pavement base course, drainage fill, or topsoil materials.
- E. "Structure": Buildings, foundations, slabs, tanks, curbs, or other man-made stationary features occurring above or below ground surface.
- F. "Building Control Area" and/or "Controlled Area": Below and at least 10-feet beyond future building foot print or exterior walls, and below roofs, to include covered porches and canopies, and below and at least 5-feet beyond all future walks and pavements subject to bearing vehicular traffic.
- G. "Mud Footings" (if any): The at least 2-inches to 4-inches of lean 2,500 psi (minimum) concrete placed in the bottom of footing and foundation trenches and excavations, which is required if permanent or structural concrete cannot be placed the same day they are excavated.
 - 1. Unless mud footings are indicated on Structural Drawings, their depth shall be compensated for by over-excavation.
 - 2. Mud footings (if any) shall be completely clean prior to placement of any reinforcing and/or permanent or structural concrete.
 - 3. Refer to the Owner's "Report of Subsurface Exploration and Geotechnical Engineering Evaluation," and Structural Drawings for additional information and requirements for other "mud footings" (or "mud mats", or "mud seals").
- H. Rock: Rock material in beds, ledges, unstratified masses, and conglomerate deposits and boulders of rock material exceeding 1 cu. yd. (0.76 cu. m) for bulk excavation or 1/2 cu. yd. (0.38 cu. m) for footing, trench, and pit excavation that cannot be removed by rock excavating equipment equivalent to the following in size and performance ratings, without systematic drilling, ram hammering, ripping, or blasting, when permitted:

- 1. Excavation of Footings, Trenches, and Pits: Late-model, track-mounted hydraulic excavator; equipped with a 42-inch- (1065-mm-) wide, short-tip-radius rock bucket; rated at not less than 120-hp (89-kW) flywheel power with bucket-curling force of not less than 25,700 lbf (114 kN) and stick-crowd force of not less than 18,700 lbf (83 kN); measured according to SAE J-1179.
- 2. Bulk Excavation: Late-model, track-mounted loader; rated at not less than 210-hp (157-kW) flywheel power and developing a minimum of 45,000-lbf (200-kN) breakout force; measured according to SAE J-732.
- 3. Definitions for rock are only relevant for descriptive purposes related to the handling of material and for work below the cut line.

1.4 SUBMITTALS:

- A. Test Reports: Submit the following reports directly to Architect, Civil Engineer, Structural Engineer, and the Owner, directly from the testing service, with copy to Contractor:
 - 1. Test reports on fill and borrow material.
 - 2. Verification of suitability of each foundation, floor slab and subgrade condition and material, in accordance with specified requirements.
 - 3. Field reports; and in-place soil density tests.
- B. Submit a blasting and rock excavation plan, prior to the start of excavation, to be reviewed by the Geotechnical engineer.
 - 1. Include a description of the typical placement procedure, compaction equipment, methods of water addition, etc.
- C. Site survey: Upon Completion of the work included in this contact, the Contractor shall give to the Owner a topographic survey of the work performed. This survey shall include but is not limited to contour lines and elevations of all graded areas, locations and elevations of drainage structures, and locations and elevations of other utilities installed. This survey shall be performed by and Alabama Professional Land Surveyor shall have his/her signature and seal and shall also be made available electronically.

1.5 QUALITY ASSURANCE:

A. Codes and Standards: Perform excavation work on site and in right-of-ways in compliance with applicable requirements of authorities having jurisdiction.

- B. Testing and Inspection Service: All required soil testing and inspection services during earthwork operations shall be performed by a qualified independent geotechnical testing laboratory.
 - 1. Refer to Section 01 0150 "Special Conditions", for additional information and requirements.
 - 2. Provide samples of material to be used as fill to the testing laboratory at least 1 week prior to placement of material tested.

1.6 PROJECT CONDITIONS:

- A. Site Information: Refer to Section 31 1000 "Site Clearing", and Civil Drawings, for additional information and recommendations.
- B. Existing Utilities: Locate existing underground utilities in areas of excavation work. If utilities are indicated to remain in place, provide adequate means of support and protection during earthwork operations in the vicinity, and as may also be required for other construction work.
 - 1. Notify the Alabama Line Location Center at 1-800-292-8525 at least 2-full working days (48 hours), excluding weekends and holidays, prior to any excavation work. This organization will contact its member utility companies to locate and mark all of their own underground facilities.
 - a. Notify non-member companies directly, for them to perform this service.
 - 2. Should uncharted, or incorrectly charted, piping or other utilities be encountered during excavation, consult utility owner immediately for directions and record locations on as-built record drawings. Cooperate with Owner and utility companies in keeping respective services and facilities in operation. Repair damaged utilities to satisfaction of utility owner.
 - 3. Do not interrupt existing utilities serving facilities occupied by Owner or others, during occupied hours, except when permitted in writing by Architect and then only after acceptable temporary utility services have been provided.
 - a. Provide minimum of 48-hour notice to Owner and copy Architect, and receive written notice to proceed before interrupting any utility.
 - 4. Demolish and completely remove from the site any existing underground utilities indicated to be removed, and all existing underground utilities in "controlled areas". Coordinate with utility companies for shutoff of services if lines are active.
- C. Use of Explosives: Use of explosives is not permitted.

- 1. Blasting and monitoring procedures shall be dictated by the City of Livingston and any other local utility.
- D. Protection of Persons and Property:
 - 1. Barricade open excavations occurring as part of this work and post with warning lights.
 - 2. Operate warning lights as recommended by authorities having jurisdiction.
 - 3. Comply with requirements of current regulations of OSHA, applicable Codes, ordinances, and authorities having jurisdiction.
 - 4. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earthwork operations.
 - 5. Perform excavation by hand within 5'-0" of existing buildings and structures to remain, and within dripline of large trees to remain. Protect root systems from damage or dryout to the greatest extent possible. Maintain moist condition for root system and cover exposed roots with moistened burlap. Paint root cuts of 1-inch and larger with emulsified asphalt tree paint.
 - a. Do not under-mine or excavate below footings and/or foundations which are to remain.

PART 2 - PRODUCTS

2.1 SOIL MATERIALS - DEFINITIONS:

A. Satisfactory soil materials are defined as clean, non-saturated, non-organic sections of earth taken from acceptable sources complying with ASTM D2487 soil classification groups and meet the following characteristics:

Liquid Limit (LL)	Less than 50%
Plasticity Index (PI)	Less than 25%
Maximum Dry Density (ASTM D-698)	Greater than 100 pcf
Maximum Particle Size	3 inches or less
Organic Matter	Less than 5%

- B. Unsatisfactory soil materials are defined as those complying with ASTM D2487 soil classification groups other than those indicated above.
- C. Backfill and Fill Materials (Grassed areas only; Cuts and fills outside "controlled areas", during general grading): Satisfactory soil materials from on-site excavations, free of clay, rock or gravel larger than 2-inches in any dimension, debris, waste, frozen materials, vegetation and other deleterious matter.
 - 1. All fill soils must be compatible with existing soils, so they can bond together.
- D. Topsoil: Refer to Section 31 1000- "Site Clearing."
- E. Rock Fill: Fill Material with a particle size larger than 4 inches.
 - 1. Rock fill is not to be used within the Building Controlled Area.
 - 2. Rock Fill is only to be used within future pavement areas if allowed by the Owner's Geotechnical Engineer.
 - 3. Excess rock material is to be removed from the site and legally disposed of.

PART 3 - EXECUTION

3.1 PROOFROLLING:

- A. Areas throughout significant slopes and beneath and 10'-0" beyond new building and covered areas, and beneath and 5'-0" beyond new pavement areas (back-of-curb or other paving edge termination) shall be designated as "controlled areas." Prior to placement of fill earth and following removal of cut earth, the controlled areas shall be proofrolled. Areas to be filled shall be proofrolled prior to any fill placement and again after fill is placed in the building controlled area; cut areas shall be proofrolled after they are brought to subgrade level. Proofrolling shall be performed with a partially loaded truck with a rear single axle weight of 8 to 10 tons, or similarly weighted construction equipment. The proofroller shall make at least two passes over each section in perpendicular directions over the "controlled areas". Soft, organic, or excessively wet soils found during the proofrolling operations shall be excavated and replaced with suitable compacted fill. The exposed subgrade must be well drained to prevent the accumulation of water.
 - 1. Proofrolling shall be conducted in the presence of testing lab's Geotechnical Engineer.
 - 2. Do not proofroll when the ground surface is wet or saturated with water.

3.2 EXCAVATION:
- A. Excavation includes removal of pavements and other obstructions visible on surface; underground structures, utilities, and other items indicated to be demolished and removed; together with earth and other materials encountered that are not classified as structures, foundations, or unauthorized excavation.
- B. Perform excavation by hand within 5'-0" of existing buildings and structures to remain.
 - 1. Do not under-mine or excavate below footings and/or foundations which are to remain.
- C. Refer to "Definitions" paragraph above for any "mud footings" required.
- D. Shallow and pinnacled limestone bedrock conditions are present on the site. Blasting and/or pneumatic hammering will likely be required for excavation.
- E. The Contractor is responsible for performing his/her own quantity take-off. However, do not assume that the cut to fill quantities on this site balance.
- F. Some areas of poorly compacted fill, debris laden fill, and soft native soils may exist on the site and may be considered unsuitable by the Owner's Geotechnical Engineer. Unsuitable material is not to be placed in the structural fill mass and is to be discarded, hauled off site and legally disposed of.

3.3 STABILITY OF EXCAVATIONS:

- A. General: Comply with local codes, ordinances, and requirements of agencies having jurisdiction.
- B. Slope sides of excavations to comply with local codes, ordinances, and requirements of agencies having jurisdiction. Shore and brace where sloping is not possible because of space restrictions or stability of material excavated. Maintain sides and slopes of excavations in safe condition until completion of backfilling.
- C. Shoring and Bracing: Provide materials for shoring and bracing, such as sheet piling, uprights, stringers, and cross braces, in good serviceable condition. Maintain shoring and bracing in excavations regardless of time period excavations will be open. Extend shoring and bracing as excavation progresses.

3.4 DEWATERING:

- A. Prevent surface water and ground water from flowing into excavations and from flooding project site and surrounding area.
 - 1. Do not allow water to accumulate in excavations. Remove water to prevent softening of foundation bottoms, undercutting footings, and soil changes detrimental to stability of subgrades and foundations. Provide and maintain pumps,

well points, sumps, suction and discharge lines, and other dewatering system components necessary to convey water away from excavations.

2. Establish and maintain temporary drainage ditches and other diversions outside excavation limits to convey rain water and water removed from excavations to collecting or runoff areas. Do not use trench excavations as temporary drainage ditches.

3.5 STORAGE OF EXCAVATED MATERIALS:

- A. Stockpile excavated materials acceptable for backfill and fill where directed. Stockpiles are not allowed within the flood plain. Place, grade, and shape stockpiles for proper drainage.
 - 1. Locate and retain soil materials away from edge of excavations. Do not store within drip line of trees indicated to remain.
 - 2. Suitable excess excavated soil material may be stock piled on site as directed for future re-use. Stockpiles are not allowed within the flood plain. Unsuitable soil and excess rock material is to be removed from the site and legally disposed of.

3.6 EXCAVATION FOR STRUCTURES:

- **A.** Conform to elevations and dimensions shown within a tolerance of plus or minus 0.10 foot, and extending a sufficient distance from footings and foundations to permit placing and removal of concrete formwork, installation of services, and other construction and for inspection.
 - 1. For areas within the "Building Controlled Area", excavate and remove existing material as acceptable to Geotechnical Engineer. Replace with properly compacted structural fill as required and specified by this specification section. Existing material may be reused as structural fill following proper moisture conditioning and recompaction.
 - 2. Excavations for Footings and Foundations: Do not disturb bottom of excavation. Excavate by hand to final grade just before concrete reinforcement is placed. Trim bottoms to required lines and grades to leave solid base to receive other work.
 - 3. Excavation for Underground Tanks, Basins, and Mechanical or Electrical Structures: Conform to elevations and dimensions indicated within a tolerance of plus or minus 0.10 foot; plus a sufficient distance to permit placing and removal of concrete formwork, installation of services, and other construction and for inspection. Do not disturb bottom of excavations, intended for bearing surface.

3.7 EXCAVATION FOR WALKS AND PAVEMENTS:

- A. Cut surface under pavements to comply with cross-sections, elevations and grades as indicated.
 - 1. For areas to be paved, excavate in place material as directed by the Geotechnical Engineer and replace with properly compacted structural fill as required and specified by this specification section. Existing material may be reused as structural fill following proper moisture conditioning and recompaction.

3.8 TRENCH EXCAVATION FOR PIPES AND CONDUIT:

- A. Excavate trenches to uniform width, sufficiently wide to provide ample working room and a minimum of 6-inches to 9-inches of clearance on both sides of pipe or conduit.
 - 1. More clearance may be required to achieve required compaction. This is a minimum.
- B. Excavate trenches and conduit to depth indicated or required to establish indicated slope and invert elevations and to support bottom of pipe or conduit on minimum of 4-inches of compacted "select fill" bedding. Beyond building perimeter, excavate trenches to allow installation of top of pipe below frost line.
- C. Except as otherwise indicated, excavate for exterior water-bearing piping (water, steam, condensate, drainage, etc.) so top of piping is not less than 3'-0" below finished grade and/or paving.
- D. Where rock or concrete is encountered, carry excavation 6" below required elevation and backfill with a 6" layer of dense graded aggregate, prior to installation of pipe. This is to be considered base bid except in the case of additional work.

3.9 COLD WEATHER PROTECTION:

A. Protect excavation bottoms against freezing when atmospheric temperature is less than 35 degrees F.

3.10 BACKFILL AND FILL:

- A. General: Place soil material in layers to required subgrade elevations, for each area classification listed below, using materials specified in Part 2 of this Section.
 - 1. Under all areas, use satisfactory material. Refer to Owner's "Geotechnical Engineering Report," and this Section 31 2000, for minimum testing requirements.
 - a. Previously placed debris laden fill may be present on this site and may be considered unsuitable by the Owner's Geotechnical Engineer. Unsuitable

material is not to be placed in the structural fill mass and is to be discarded, hauled off site and legally disposed of.

- 2. Under future building slabs, use drainage fill material of compacted and finished depth indicated, or if not indicated, **at least 4-inches** compacted and completed thickness.
- 3. Backfill trenches with concrete where trench excavations pass within 18-inches of column or wall footings and that are carried below bottom of such footings or that pass under wall footings. Place concrete to level of bottom of adjacent footing.
 - a. Concrete is specified in Division 3.
 - b. Do not backfill trenches until inspections and any required testing have been made and backfilling is authorized by Architect based on test results. Use care in backfilling to avoid damage or displacement of pipe systems.
 - c. Utility trenches shall be backfilled with acceptable borrow or dense graded crushed stone in 6" loose lifts compacted with mechanical piston tampers to the project requirements.
- B. Backfill excavations as promptly as work permits, but not until completion of the following:
 - 1. Acceptance of construction below finish grade including, where applicable, dampproofing, waterproofing, etc.
 - 2. Inspections, testing, approval, and recording locations of underground utilities have been performed and recorded.
 - 3. Removal of concrete formwork, if any.
 - 4. Removal of shoring and bracing, and backfilling of voids with satisfactory materials.
 - a. Cut off temporary sheet piling driven below bottom of structures and remove in manner to prevent settlement of the structure or utilities, or leave in place if required.
 - 5. Removal of trash and debris from excavation.
 - 6. Permanent or temporary horizontal bracing is in place on horizontally supported walls, where necessary.

3.11 PLACEMENT AND COMPACTION:

A. Ground Surface Preparation:

- 1. Remove vegetation, debris, unsatisfactory soil materials, obstructions, and deleterious materials from ground surface prior to placement of fills. Plow strip, or break up sloped surfaces steeper than 1-vertical to 4-horizontal so that fill material will bond with existing surface.
- 2. Where new fill is placed against sloped surfaces steeper than 1-vertical to 5horizontal, the existing slope shall be benched. Benching shall commence at the toe of the proposed fill and proceed upwards as fill is placed at a maximum of 4 vertical feet. Benches shall be at least 6 feet wide.
- 3. Prior to placement of fill earth and following removal of cut earth, the controlled areas shall be proofrolled. Areas to be filled shall be proofrolled prior to any fill placement and again after fill is placed in the building controlled area; cut areas shall be proofrolled after they are brought to subgrade. Proofrolling shall be performed with a partially loaded truck with a rear single axle weight of 8 to 10 tons, or similarly weighted construction equipment. The proofroller shall make at least two passes over each section in perpendicular directions over the "controlled areas". Soft, organic, or excessively wet soils found during the proofrolling operations shall be excavated and replaced with suitable compacted fill. The exposed subgrade must be well drained to prevent the accumulation of water.
- B. Place backfill and fill materials in layers not more than 8-inches in loose depth for material compacted by heavy compaction equipment, and not more than 4-inches in loose depth for material compacted by hand-operated tampers.
- C. Before compaction, moisten or aerate each layer as necessary to provide optimum moisture content. Compact each layer to required percentage of maximum dry density or relative dry density for each area classification. Do not place backfill or fill material on surfaces that are muddy, frozen, or contain frost or ice.
- D. Place backfill and fill materials evenly adjacent to structures, piping, or conduit to required elevations. Prevent wedging action of backfill against structures or displacement of piping or conduit by carrying material uniformly around structure, piping, or conduit to approximately same elevation in each lift.
- E. General Fill Embankment Construction
 - 1. Embankment construction shall commence at the toe of the proposed slope and continue upwards as additional fill is placed. The engineered fill placed shall be benched into the natural slopes.
 - 2. The embankment is to be overfilled and then cut back to the required geometry to remove the uncompacted material that is usually present on the face of fill slopes.
 - 3. The face of slopes shall be promptly vegetated according to the Erosion Control Plan, the CBMPP and Section 31 2500 Erosion Control to prevent erosion after

construction. Prior to vegetation 4" minimum topsoil is to be placed and tracked in by a dozer moving up and down the slope to create horizontal track lines.

- F. Rock Fill:
 - 1. Rock Fill is not to be used unless acceptable to the Owner's Geotechnical Engineer. Break larger particles down to 4 inches or less and treat as soil fill.
- G. Control soil and fill compaction, providing minimum percentage of density specified for each area classification indicated below. Correct improperly compacted areas or lifts as directed by testing lab's Geotechnical Engineer if soil density tests indicate inadequate compaction.
 - 1. Percentage of Maximum Density Requirements: Compact soil to not less than the following percentages of maximum density, in accordance with ASTM D 698 A:
 - a. Under future structures, future building foundations and slabs, and 10' beyond those perimeters, compact full depth of fill placement to at least 98% standard proctor maximum dry density.
 - Refer to paragraph 1.2 above for areas where additional depth(s) of preparation and compaction of exposed subgrade are or may be required.
 - b. Under steps, covered areas, sidewalks, mechanical/utility and in all other "controlled areas", compact full depth of fill placement to at least 98 percent standard proctor maximum dry density.
 - Refer to paragraph 1.2 above for areas where additional depth(s) of preparation and compaction of exposed subgrade are or may be required.
 - c. Under pavements and at least 5-feet beyond (measured from back-of-curb or edge of paving, where occurs), compact full depth of fill placement to at least 98-percent standard proctor maximum density for top 18 inches.
 - d. Under lawn or unpaved areas beyond "controlled areas", compact each layer of backfill or fill material to at least 98-percent standard proctor maximum dry density.
 - e. On-site Borrow (where allowed): 98-percent standard proctor maximum dry density.
 - f. Select and/or Structural Fill: 98-percent standard proctor maximum dry density.
 - g. Porous Fill (drainage course): 98-percent standard proctor maximum dry density.

- 2. Moisture Control:
 - a. Where subgrade or layer of soil material must be moisture conditioned before compaction, uniformly apply water to surface of subgrade or layer of soil material. Apply water in minimum quantity as necessary to prevent free water from appearing on surface during or subsequent to compaction operations.
 - b. Remove and replace, or scarify and moisture condition, soil material that is too wet to permit compaction to specified density.
 - c. Stockpile or spread soil material that has been removed because it is too wet to permit compaction. Assist moisture conditioning by discing, harrowing, or pulverizing until moisture content is reduced to a satisfactory value.
 - d. At the time of densification, the moisture content of "engineered fill", "structural fill", and "select fill" should within -2 and +2 percentage points of the materials ASTM-698 optimum moisture content.
 - e. Structural fill areas exposed to excessive wetting, drying or otherwise disturbed by the construction following acceptance for moisture and density should be retested followed by the correction of deficient areas just prior to the installation of additional fill or structures.
 - f. In no instance should placement of structural fill or ground supported structures be permitted if the ground surface soils contain a moisture content in excess of 3 percentage points of the materials optimum moisture content.
 - g. In no case shall porous drainage backfill (except as specifically indicated at foundation drains only) or masonry sand material be used adjacent to foundations. Care shall be taken to prevent masonry brick/block debris from falling or being pushed into foundation excavations.

3.12 GRADING:

- A. General: Uniformly grade areas within limits of grading under this section, including adjacent transition areas. Smooth finished surface within specified tolerances, compact with uniform levels or slopes between points where elevations are indicated or between such points and existing grades.
- B. Grading Outside Building Lines: Grade areas adjacent to building lines to drain away from structures and to prevent ponding. Finish surfaces free from irregular surface changes and as follows:

- 1. Lawn or Unpaved Areas: Finish areas to receive topsoil to within not more than 0.10-foot above-or-below required subgrade elevations.
- 2. Walks: Shape surface of areas under walks to line, grade, and cross-section, with finish surface not more than 0.10-foot above-or-below required subgrade elevation.
- 3. Pavements: Shape surface of areas under pavement to line, grade, and cross-section, with finish surface not more than 1/2-inch above or below required subgrade elevation.
- 4. Connection of Existing and New Work: Provide flush transition, unless specifically indicated otherwise.
- C. Grading Surface of Fill under Building Slabs and "Building Control Areas": Grade smooth and even, free of voids, compacted as specified, and to required elevation. Provide final grades within a tolerance of 1/2-inch when tested with a 10-foot straightedge.
- D. Compaction: After grading, compact subgrade surfaces to the depth and indicated percentage of maximum or relative density for each area classification.

3.13 FIELD QUALITY CONTROL:

- A. Quality Control Testing During Construction:
 - 1. Allow testing service to inspect and approve each subgrade and fill layer before further backfill or construction work is performed.
 - 2. Perform field density tests in accordance with ASTM D 698 (sand cone method), ASTM 1557, or acceptable nuclear testing method, as applicable.
 - 3. New Footing Subgrade: All foundation excavations shall be observed by the geotechnical engineer or his representative to verify required design bearing capacities of the bearing soils.
 - 4. Perform at least 3 field density tests of subgrade for each lift of fill placed or 1 test per 2500 square feet, whichever is more.
 - 5. Foundation Wall Backfill: Perform at least 2-field density tests at locations and elevations as directed.
 - 6. Trenches: Perform at least one field density test for every 50-linear feet for each 8 inches of vertical thickness of fill placed in utility or similar trenches, which extend through the "controlled areas".
 - a. Retaining walls, if any, same as for "Trenches", as indicated above.

- 7. A laboratory soil particle size, Atterberg limit, and Proctor density test shall be performed on each different type of fill soil used in the "controlled areas".
- 8. Based on the Project Geotechnical Engineer's testing reports, inspections, and recommendations, subgrade or fills that are below specified density, additional earthwork, compaction, and/or other operations, and re-testing, shall be performed until specified density is obtained. If additional trips are required for re-testing, re-testing will be paid for by the contractor.

3.14 EROSION CONTROL:

A. Provide erosion control methods in accordance with the BMP plan and the requirements of authorities having jurisdiction and per drawings.

3.15 MAINTENANCE:

- A. Protection of Graded Areas: Protect newly graded areas from traffic and erosion. Keep free of trash and debris.
- B. Repair and reestablish grades in settled, eroded, and rutted areas to specified tolerances.
- C. Repair edges of existing pavements, sidewalks, etc., and other existing and/or new improvements flush with and to match existing materials and thicknesses, subject to acceptance by Owner and Architect.
- D. Reconditioning Compacted Areas: Where completed compacted areas are disturbed by subsequent construction operations or adverse weather, scarify surface, reshape, and compact to required density prior to further construction.
- E. Settling: Where settling is measurable or observable at excavated areas during general project warranty period, remove surface (pavement, lawn, or other finish), add backfill material, compact, and replace surface treatment. Restore appearance, quality, and condition of surface or finish to match adjacent work, and eliminate evidence of restoration to greatest extent possible.

3.16 DISPOSAL OF EXCESS AND WASTE MATERIALS:

- A. Removal from Owner's Property:
 - 1. Remove excess and waste materials, including unacceptable excavated materials, trash and debris, and legally dispose of off Owner's property.
 - 2. Suitable excess excavated soil material may be stock piled on site as directed for future re-use. Stockpiles are not allowed within the flood plain.

END OF EARTHWORK

SECTION 31 2500

EROSION AND SEDIMENTATION CONTROL

PART 1 – GENERAL

1.1 SECTION INCLUDES

- A. Temporary and permanent erosion control systems.
- B. Slope Protection Systems.

1.2 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary and Division 1 Specification Sections, apply to this Section.
 - 1. Section 31 1000 Site Clearing
 - 2. Section 31 2000 Earthwork
 - 3. The Alabama Handbook for Erosion Control, Sediment Control and Stormwater Management on Construction Sites and Urban Areas, March 2014 edition or most current edition
 - 4. Erosion and Sediment Control Plan

1.3 ENVIRONMENTAL REQUIREMENTS

- A. The Contractor shall protect adjacent properties and water resources from erosion and sediment damage throughout the life of the contract.
 - 1. The Contractor shall be responsible for the removal of sediments and debris escaping the project site, the remediation and/or repair of any damage that may occur as a result to adjoining and/or downstream affected properties or offsite structures and any fines or penalties levied against the project by regulatory agencies due to deficiencies of control measures.
- B The Contractor will designate, by name, a Qualified Credentialed Professional (QCP) or equivalent person responsible for monitoring of all erosion control measures for this project. Specific responsibilities will include:
 - Assuring and certifying the Contractor's construction sequence is in conformance with the specified schedule. In addition, a weekly certification stating compliance, any deviations, and corrective measures shall be filed with the Owners by this person. A copy of the certification form may be obtained from the Alabama Department of Environmental Management (ADEM) or the consulting Engineer who obtained the permit.

- 2. Inspection of all erosion control measures and drainage inlets within 24-hours after any significant rainfall. A significant rainfall shall be defined as over 3/4 inch of precipitation in any consecutive 24 hour period.
- 3. Inspect areas for catch of grass. A minimum catch of 75 percent is required prior to warrant removal of erosion control measures.
- 4. Obtain the NPDES permit. All fees associated with the correspondence with ADEM and inspections as part of the maintenance of the permit are the responsibility of the contractor.
- C. Other than the land clearing activities required to install the appropriate erosion and sediment control measure in accordance with the erosion and sediment control plans, any down slope erosion and sediment control measures, on-site stream channel protection and upslope diversion of drainage required by site conditions, shall be in place and functional before any clearing or earth moving operations begin and shall be constructed and maintained throughout the construction period.
 - 1. Temporary measures may be removed at the beginning of the workday but shall be replaced at the end of the workday.
- D. The angle for graded slopes and fills shall be no greater than the angle which can be retained by vegetative cover or other adequate erosion control devices or structures. Any slope or fill which has been graded shall, within thirteen (13) days of the completion of such grading or the completion of any phase of grading, be planted or otherwise be provided with ground cover, materials, devices, or structures sufficient to retain erosion. The devices, structures, and measures shall remain in place until the graded slope or fill is stabilized.
- E. All hazardous substances used for this project shall be stored in accordance with current Spill Prevention Control and Countermeasures (SPCC) regulations.
 - 1. Store substances away from storm drains, ditches, and gutters in water-tight containers.
 - 2. Dispose of substances in accordance with ADEM regulations.
 - 3. Provide adequate trash containers on-site for the disposal of material waste.
 - 4. Prevent trash and debris from entering storm drainage system.
- F. All construction materials shall be properly stored, not exposed to rain, and stockpiled. All containers shall be stored closed or under cover. All excess or waste material shall be disposed of properly.
 - 1. Provide a construction waste dumpster or trailer on-site for disposal of construction waste.
 - 2. Dispose of trash and waste to an acceptable offsite facility every week at a minimum.
 - 3. Prevent trash and debris from entering storm drainage system.
- G. There shall be no distinctly visible floating scum, oil, or other matter contained in the storm water discharge to a receiving water, must not cause an unnatural color (except dyes or other substances discharged for the purpose of environmental studies and which do not have a harmful effect on the

receiving water) or odor in the receiving waters. The storm water discharge to receiving water must result in no material in concentration sufficient to be hazardous or otherwise detrimental to humans, livestock, wildlife, plant life, or fish and aquatic life in the receiving water.

- 1. Ensure all materials are handled appropriately.
- 2. No pollutants are allowed to be disposed of on-site or allowed to enter the storm drainage system.
- H. Upon completion of the land disturbing activity and stable vegetation or other permanent controls have been established on all remaining exposed soil, the Contractor shall notify the Owner of this and request a final inspection.
 - 1. The Owner, or his authorized agent, will inspect the site within 5 working days after receipt of notice.
- I. The Contractor shall prevent the tracking of mud and debris onto paved roadways from construction areas.
 - 1. Provide a construction exit pad in accordance with the erosion and sediment control plans and in accordance with the approved installation procedures, and maintain it on a daily basis.
 - a. Provide a spray hose for the washing of tires and equipment
 - b. Rework or supplement the construction exit pad stone as required to ensure its continued effectiveness throughout the duration of the construction period.
 - 2. Remove any sediments tracked offsite or deposited on the adjacent roadways.
 - a. Utilize a mechanically operated street sweeper to remove any mud and sediment deposited on the adjacent roadways.
- J. The Contractor shall be responsible for keeping dust to a minimum through the use of water trucks or other dust controlling methods throughout the construction duration.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Seed:
 - 1. Use Winter Rye Grass as a temporary grass during the cool months, defined as October to March. Seed is to meet purity standards as outlined in AHD Section 860.01a.

- 2. Use Cynodon Dactylon (Common Bermuda) for seeding during the warm months, defined as April through September. Seed is to meet purity standard as outlined in the AHD Section 860.01a. Seed at a rate of 50 lbs. per acre.
- 3. Do not broadcast or drop seed when wind velocity exceeds 10 mph. Evenly distribute seed by sowing equal quantities in two directions at right angles to each other. Do not seed against existing trees. Limit extent of seed to outside edge of planting saucer.
- 4. Sow seed at a total rate of 1.5 lb/1000 sf (Common Bermuda).
- 5. Rake seed lightly into top 1/8 inch of soil, roll lightly, and water with fine spray.
- B. Fencing for siltation control as specified on the plans.
- C. Temporary mulches such as loose hay, straw, netting, wood cellulose or agricultural silage.
- D. Fence stakes shall be metal stakes a minimum of 54 inches in length.
- E. Stone check dams shall be spaced according to the Plans.
- F. Stone Sediment Barriers or SiltSacks [™], or approved equal for inlet protection.
- G. High Density Poly-Ethylene (HDPE) Filters or Silt-Saver[™], or approved equal for inlet protection.
- H. A stabilized construction entrance shall be constructed temporarily.
- I. Riprap for slopes, culvert, storm drain inlet, and outlet aprons.
- J. Water for dust control.
- K. Wattle check dams shall be spaced according to plans.
- L. Erosion control blankets and/or turf reinforcement mats to protect seed and prevent erosion on slopes.

PART 3 – EXECUTION

3.1 PREPARATION

- A. Review site erosion and sediment control plan attached to this section of the specifications.
- B. Deficiencies or changes in the erosion control plan as it is applied to current conditions will be brought to the attention of the Engineer for remedial action.

3.2 IMPLEMENTATION

- A. Provide catalog cuts and information concerning the erosion control products which will be used for construction for review by the Engineer.
- B. Provide information concerning the installation of the erosion and sedimentation control including anchorage trench provisions and anchorage devices and spacing for review by the Engineer.
- C. Provide construction exit pad in accordance with the erosion and sediment control plan and in accordance with the approved installation procedures.
- D. Place erosion control systems in accordance with the erosion and sediment control plan and in accordance with approved installation procedures.
- E. The Engineer has the authority to limit the surface area of erodible earth material exposed by clearing and grubbing, excavation, borrow and embankment operations. The Owner has the authority to direct the Contractor to provide immediate permanent or temporary pollution control measures. The Contractor will be required to incorporate all permanent erosion control features into the project at the earliest practical time to minimize the need for temporary controls. Cut slopes shall be permanently seeded and mulched as the excavation proceeds to the extent considered desirable and practical.
- F. The temporary erosion control systems installed by the Contractor shall be maintained as directed by the Engineer to control siltation at all times during the life of the Contract. The Contractor must respond to any maintenance or additional work ordered by the Engineer within a 48 hour period.
- G. Any additional material work required beyond the extent of the erosion control plan shall be paid for by the Owner except where such measures are required to correct deficiencies caused by the failure of the Contractor to construct the work in accordance with the erosion and sediment control plan.
- H. Slopes that erode easily shall be temporarily seeded as the work progresses according to the ALDOT seeding schedule or according to the seeding schedule contained in the plans.
- I. Remove and properly dispose of accumulated silt and sediment from all erosion control measures on a daily basis off site unless material is reusable.
- J. Remove and properly dispose of all trash and sediments accumulated in existing and new storm drainage inlets, structures, and pipes on a daily basis off site unless material is reusable.
- K. Provide temporary diversion berms and ditches as required during construction to protect work areas from up-slope runoff and/or to divert sediment-laden water to appropriate sediment control devices, traps, or stabilized outlets.
- L. Provide water trucks or other adequate method for controlling dust throughout the construction period.

END OF EROSION AND SEDIMENT CONTROL

SECTION 32 1216

HOT-MIXED ASPHALT PAVING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

- A. Drawings and general provisions of Contract, including General and Supplemental Conditions and Division 1 Specification Sections, apply to this Section.
- B. Related work described elsewhere includes:
 - .. Section 31 2000 "Earthwork"
 - .. Section 32 1313 "Portland Cement Concrete Paving"
 - .. Section 32 1723 "Pavement Marking"

1.2 DESCRIPTION OF WORK:

- A. Work described in this section includes new bituminous paving, and a new base, as indicated on drawings.
- B. Work shall also include pavement patching for any utility trenches under existing paving and this Contract, with prepared subgrade, 8" crushed aggregate base, 6 inch thick 3,000 psi concrete, prime coat, and 1-1/2 inches bituminous concrete overlay, and as indicated on the Drawings.
 - 1. Pavement patch shall extend 9" to 1'-0" beyond each side or edge of trench, and to abut flush with edge where existing paving was cut out.

1.3 QUALITY CONTROL:

- A. Certifications: The Contractor shall submit to the Architect copies of certificates from suppliers of bituminous materials and other manufactured items, certifying that these products comply with specifications and standards listed hereinafter.
 - 1. All asphalt used for pavement shall be produced by a plant certified by the Alabama Department of Transportation (ALDOT).
- B. Standard Specifications: Unless otherwise noted, all specifications referred to shall be the "ALDOT Standard Specifications for Highway Construction", 2014 edition, or latest edition.
- C. Testing: All laboratory and field testing required to ensure compliance with these specifications will be performed by an independent testing laboratory.

1.4 JOB CONDITIONS:

- A. Any base or sub-base areas damaged by weather or construction operations shall be scarified, remixed and recompacted in accordance with requirements before application of the prime coat.
- B. Special care and attention shall be given to be certain that paving operations and/or equipment do not cause damage to any existing and/or new buildings, structures, or improvements which are to remain.

PART 2 - PRODUCTS

2.1 MATERIALS:

A. Provide the paving system(s) indicated on the Drawings, installed in accordance with Part 3 of this Section 32 1216, and referenced standards.

PART 3 - EXECUTION

3.1 PRIME COAT:

A. Application rates and construction requirements shall be as specified in ALDOT Specification Section 401, Bituminous Surface Treatments, for a Bituminous Treatment type "A" which is a prime coat.

3.2 TACK COAT:

A. Construction requirements, including preparation of the existing surface or substrate and maximum application rates, are specified in Article 405.03 of the ALDOT Specifications.

3.3 PLANT MIX BITUMINOUS CONCRETE BINDER LAYER AND BITUMINOUS CONCRETE WEARING SURFACE:

A. Construction details, including finished surface tolerance, density requirements, and maintenance and protection shall be as specified in Articles 410.03 through 410.07, and 429.04, as applicable. Rate of application shall be not less than the number of pounds per square yard for a 1-inch wearing surface or pavement patching layer, pro-rated for other thicknesses, as required by referenced ALDOT Specifications.

3.4 CRUSHED AGGREGATE BASE:

A. Construction requirements shall comply with the ALDOT Specifications for the materials indicated, including in part, applicable portions of Section 825, Type B, and ALDOT section 301 compacted to 98% AASHTO T-180 maximum dry density.

3.5 COMPACTION EQUIPMENT:

- A. Compaction equipment shall be self-propelled, capable of compacting the mixture throughout the depth of the layer while it is still in a workable condition without damage to the material.
 - 1. Self-propelled rollers shall have a minimum weight of 10 tons.

3.6 PAVEMENT PATCH:

- A. Saw cut perimeter of existing paving to a neat straight line where removal is indicated and/or required.
 - 1. Protect edges of paving and base exposed to prevent cracking, breaking-up, wash-out, erosion, and/or other damage; apply prime coat as specified and at all such vertical edges prior to placing new pavement.
- B. Patch pavement with components stated in Paragraph 1.2-B above, in compliance with each component's specified requirements, and as per details and sections on Drawings, if any.

END OF HOT-MIXED ASPHALT PAVING

SECTION 32 1313

PORTLAND CEMENT CONCRETE PAVING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

- A. Drawings and general provisions of Contract, including General and Supplemental Conditions and Division 1 specification sections apply to this Section.
- B. Related work specified elsewhere includes:
 - .. Section 31 2000 "Earthwork"
 - .. Section 31 1723 "Pavement Markings"
 - .. Section 03 3000 "Cast-In-Place Concrete"
 - .. Section 07 9000 "Joint Sealers"

1.2 DESCRIPTION OF WORK:

A. Extent of portland cement concrete paving is shown on drawings, including exterior walks, paving, entry pads, dumpster pads, and mechanical equipment pads.

1.3 QUALITY ASSURANCE:

- A. Codes and Standards: Comply with "Alabama Department of Transportation (ALDOT) Standard Specifications for Highway Construction," 2014 Edition, or latest edition, and local governing regulations if more stringent than herein specified.
- B. Testing: All laboratory and field testing required to insure compliance with these specifications will be performed by a qualified independent testing laboratory.

PART 2 - PRODUCTS

2.1 MATERIALS:

- A. Forms:
 - 1. Steel, wood, or other suitable material of size and strength to resist movement during concrete placement and to retain horizontal and vertical alignment until removal. Use straight forms, free of distortion and defects.
 - 2. Use flexible spring steel forms or laminated boards to form radius bends as required.

- 3. Coat forms with a non-staining form release agent that will not discolor or deface surface of concrete.
- B. Fiber Reinforcement:
 - 1. ABC polymer Fibril-Pro Micro synthetic Fiber Reinforcement.
 - 2. Add to concrete mix at 1.5 pounds per cubic yard of concrete.
 - 3. Finishing: Broom finish; pull broom in one direction such that fibers lay down.
 - 4. Locations for Use: All concrete sidewalks, paving and handicap ramps.
- C. Reinforcing Bars: Deformed steel bars, ASTM A 615, Grade 40 or 60.
- D. Concrete Materials: Comply with requirements of the Section 03 3000 "Cast-In-Place Concrete", for concrete materials, admixtures, bonding materials, and other materials as required.
- E. Curing and Sealing Compound: Conform to TT-C-800, with 30% solids content minimum.

2.2 CONCRETE MIX, DESIGN AND TESTING:

- A. Comply with requirements of the Section 03 3000 "Cast-in- Place Concrete", for concrete mix design, sampling and testing, and quality control, and as herein specified.
- B. Design mix to produce normal-weight concrete consisting of portland cement, aggregate, water-reducing or high-range water-reducing admixture (super-plasticiser), air-entraining admixture and water to produce the following properties:
 - 1. Sidewalks, entry pads, and mechanical equipment pads subject only to pedestrian traffic:
 - a. Compressive Strength: 3,000 psi, minimum at 28 days.
 - b. Maximum Slump: 5".
 - c. Air Content: 4% to 6%.
 - d. Thickness: 4", unless greater thickness is indicated on the Drawings.
 - e. Compacted Subgrade: See Section 31 2000 "Earthwork" and drawings.
 - 2. Paving and pads subject to vehicular traffic, valley gutters, curbs and gutters, dumpster pads, and where indicated:
 - a. Compressive Strength: 4,000 psi, minimum at 28 days (minimum 650 psi flexural strength) in accordance with ALDOT Section 450 "Portland Cement Concrete Pavement", of the Alabama Department of Transportation, Standard

Specifications for Highway Construction, 2014 edition, or most current edition.

- b. Slump: 4" max
- c. Air Content: 4% 6% entrained air
- d. Thickness: 7" unless shown otherwise in drawings.
- e. Base: 4" ALDOT 825 B at 98% Modified Proctor Dry Density
- f. Subgrade: See Section 31 2000 "Earthwork" and drawings

PART 3 - EXECUTION

3.1 SURFACE PREPARATION:

- A. Remove loose material from compacted subbase surface immediately before placing concrete.
- B. Proof-roll prepared subbase surface to check for unstable areas and need for additional compaction. Do not begin paving work until such conditions have been corrected and are ready to receive paving.
- C. Subgrade shall be approved by the Geotechnical Engineer before paving is begun.

3.2 FORM CONSTRUCTION:

- A. Set forms to required grades and lines, rigidly braced and secured. Install sufficient quantity of forms to allow continuous progress of work and so that forms can remain in place at least 24 hours after concrete placement.
- B. Check completed formwork for grade and alignment to following tolerances:
 - 1. Top of forms not more than 1/8" in 10'.
 - 2. Vertical face on longitudinal axis, not more than 1/4" in 10'.
- C. Clean forms after each use, and coat with form release agent as often as required to ensure separation from concrete without damage.

3.3 REINFORCEMENT:

A. Locate, place and support reinforcement as specified in Section 03 3000 - "Cast-In-Place Concrete", unless otherwise indicated.

3.4 CONCRETE PLACEMENT:

A. Comply with the more stringent requirements of ALDOT Section 450(A) and Section 03 3000 - "Cast-In-Place Concrete", for mixing and placing concrete, and as herein specified.

- B. Do not place concrete until subbase and forms have been checked for line and grade. Moisten subbase, if required, to provide a uniform dampened condition at time concrete is placed. Do not place concrete around manholes or other structures until they are at required finish elevation and alignment.
- C. Place concrete using methods which prevent segregation of mix. Consolidate concrete along face of forms and adjacent to transverse joints with internal vibrator. Keep vibrator away from joint assemblies, reinforcement, or side forms. Use only square-faced shovels for hand-spreading and consolidation. Consolidate with core to prevent dislocation of reinforcing, dowels, and joint devices.
 - 1. Deposit and spread concrete in a continuous operation between transverse joints, as far as possible. If interrupted for more than ½-hour, place a construction joint.

3.5 JOINTS:

- A. General: Construct expansion, weakened-plane (contraction), and construction joints true-toline with face perpendicular to surface of concrete. Construct transverse joints at right angles to the centerline, unless otherwise indicated.
- B. Weakened-Plane (Contraction) Joints:
 - 1. Provide weakened-plane (contraction) joints, sectioning concrete into areas as shown on drawings, or if not shown, at spacing no greater than twice the thickness in feet. Construct weakened-plane joints for a depth equal to at least 1/4 concrete thickness, as follows below.
 - 2. Tooled Joints: Form weakened-plane joints in fresh concrete by grooving top portion with a recommended cutting tool 1/8" wide.
 - 3. Sidewalks shall be scored at 5-foot intervals unless otherwise indicated.
- C. Construction Joints: Place construction joints at end of placements and at locations where placement operations are stopped for a period of more than ½-hour, except where such placements terminate at expansion joints.
- D. Expansion (Isolation) Joints:
 - 1. Provide expansion joints with premolded joint filler at locations abutting concrete curbs, catch basins, manholes, inlets, structures, walks and other fixed objects, unless otherwise indicated.
 - 2. Extend joint fillers full-width and depth of joint.
 - 3. Furnish joint fillers in one-piece lengths for full width being placed, wherever possible. Where more than one length is required, lace or clip joint filler sections together.

4. Expansion joints for sidewalks shall be placed at 30-foot maximum intervals and along all intersections with other walks, steps, curbs, or other vertical surfaces.

3.6 CONCRETE FINISHING:

- A. After striking-off and consolidating concrete, smooth surface by screeding and floating. Using hand methods only where mechanical floating is not possible. Adjust floating to compact surface and produce uniform texture.
- B. After floating, test surface for trueness with a 10' straightedge. Distribute concrete as required to remove surface irregularities, and refloat repaired areas to provide a continuous smooth finish.
- C. Work edges of slabs and formed joints with an edging tool, and round to 1/4" radius, unless otherwise indicated. Eliminate tool marks on concrete surface.
- D. After completion of floating and troweling, when excess moisture or surface sheen has disappeared, complete surface finishing, as follows:
 - 1. Light and smooth broom finish, by drawing a fine-hair broom across concrete surface, perpendicular to line of traffic in one direction.
- E. On inclined slab surfaces, provide a coarse, non-slip finish by scoring surface with a stiffbristled broom, perpendicular to line of traffic.
- F. Do not remove forms for 24 hours after concrete has been placed. After form removal, clean ends of joints and point-up any minor honeycombed areas. Remove and replace areas or sections with major defects, as directed by Architect.
 - 1. Provide rubbed finish for exposed edged of concrete work, and apply light and smooth broom finish.

3.7 CURING:

- Protect and cure finished concrete paving, complying with applicable requirements of Section
 03 3000 "Cast-In-Place Concrete". Use curing and sealing compound or approved moistcuring methods.
- B. Begin initial curing as soon as free water has disappeared from exposed surfaces. Where possible, keep continuously moist for not less than 72 hours. Continue curing by use of moisture-retaining cover or membrane-forming curing compound. Cure formed surfaces by moist curing until forms are removed. Provide protections as required to prevent damage to exposed concrete surfaces.

3.8 REPAIRS AND PROTECTIONS:

- A. Repair or replace broken or defective concrete, as directed by Architect.
- B. Drill test cores where directed by the Architect, when necessary to determine magnitude of cracks or defective areas. Fill drilled core holes in satisfactory pavement areas with portland cement concrete bonded to pavement with epoxy resign grout.
- C. Protect concrete from damage until acceptance of work. Exclude traffic from pavement for at least 14 days after placement. When construction traffic is permitted, maintain pavement as clean as possible by removing surface stains and spillage of materials as they occur.
 - 1. Sweep concrete pavement and wash free of stains, discolorations, dirt and other foreign material just prior to final inspection.

END OF PORTLAND CEMENT CONCRETE PAVING

SECTION 32 1613

CONCRETE CURBS AND GUTTERS

PART 1 - GENERAL

1.1 <u>RELATED DOCUMENTS</u>:

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division I Specification Sections, apply to this section.
- B. Related work specified elsewhere includes:
 - .. Section 02314 "Earthwork"
 - .. Section 02751 "Portland Cement Concrete Paving"
 - .. Section 03300 "Cast-In-Place Concrete"
 - .. Section 07900 "Joint Sealers"

1.2 DESCRIPTION OF WORK:

- A. Work described in this section includes the construction of new concrete curbs and gutters, and/or straight curbs where indicated, and patching between any existing paving and new curb and gutters, sidewalks, etc., to match existing pavement.
- B. Refer to Drawings and Report of Subsurface Exploration and Geotechnical Engineering Evaluation, for additional information and base requirements.
- C. Refer to Section 02314 "Earthwork" for subgrade requirements below and beyond curbs and gutters.
- D. Refer to Section 02751 "Portland Cement Concrete Paving", for valley gutters, turn-outs, and paving.

1.3 **QUALITY CONTROL**:

- A. Certifications: The Contractor shall submit to the Architect copies of certificates from suppliers of ready-mix concrete, reinforcing steel, curing material, joint fillers, and other manufactured items, certifying that these products comply with the specifications and standards listed hereinafter.
- B. Standard Specifications: Unless otherwise noted, all specifications referred to shall be the Alabama Department of Transportation (ALDOT) Standard Specifications for Highway Construction, 2014 Edition, or latest edition.
- C. Testing: All laboratory and field testing as required to ensure compliance with these specifications shall be performed by a qualified independent testing laboratory.

PART 2 - PRODUCTS

DESHLER ADDITION TUSCUMBIA CITY SCHOOLS

2.1 <u>MATERIALS</u>:

- A. Concrete shall be Class "A", Type 4 (3,000 psi), in accordance with Section 501, "Structural Portland Cement Concrete", of the Alabama Department of Transportation (ALDOT) Standard Specifications for Highway Construction, 2014 edition or most current edition. A modified mix shall be used if optional machine laid curb and gutter is constructed.
- B. Reinforcing steel, where called for on the drawings, shall meet the requirements of Section 502, "Steel Reinforcement".
- C. Curing material shall be either burlap cloth, waterproof paper, polyethylene sheeting, or impervious membrane specified in Articles 830.01 and 830.02.
- D. Joint filler and sealer for expansion and construction joints shall meet the appropriate requirements of A.H.D. Section 832, and Section 07900 "Joint Sealers" herein.
- E. Asphalt for repairs shall comply with referenced Alabama Department of Transportation Specifications, and city requirements, and shall match existing pavement at location(s) requiring patching.

PART 3 - EXECUTION

3.1 <u>CURBS AND GUTTERS</u>:

- A. Comply with requirements of Section 02520 "Portland Cement Concrete Paving," Section 03310 "Concrete," and the following:
 - 1. Construction requirements, including foundation, forms, sections, joints, placing and finishing concrete, curing and protection, and backfilling shall be as specified in Article 623.03. Curbs and gutters shall match the profile of existing adjoining curb and gutter, if any, and otherwise as detailed.
 - 2. Curb and gutter shall be constructed in sections having a maximum length of 10-feet. Transverse expansion joints with filler and joint sealer shall be installed at all curb returns and in curb and gutter at intervals not exceeding 40-feet. Similar joints shall be installed behind the curb where sidewalks adjoin the curb and gutter, and at all fixed objects which adjoin or extend through the curb and gutter.
 - 3. Care shall be exercised that "tilt-out" curb and gutter is installed where pavement slopes away from the curb, and that 10-foot long transition sections are used where required to transition between "standard" and "tilt-out" curb and gutter.

3.2 <u>REPAIRS AND PROTECTIONS</u>:

- A. Repair or replace broken or defective concrete, as directed by Architect or project engineer.
- B. Protect concrete from damage until acceptance of work. Exclude traffic from pavement for at least 14-days after placement. When construction traffic is permitted, maintain pavement as clean as possible by removing surface stains and spillage of materials as they occur.

1. Sweep concrete pavement and wash free of stains, discolorations, dirt and other foreign material just prior to final inspection. Pull broom in one direction if fiber is used to lay down fibers.

END OF CONCRETE CURBS AND GUTTERS

SECTION 32 1723

PAVEMENT MARKING

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK:

- A. Work described in this section includes marking of graphic symbols, lane separations, parking stripes, and lettering on concrete and asphalt pavements, if any, at locations indicated and as shown on the Drawings.
- B. Related work specified elsewhere includes:
 - .. Section 32 1216 "Hot-Mixed Asphalt Paving"
 - .. Section 32 1313 "Portland Cement Concrete Paving"

1.2 QUALITY CONTROL:

- A. Certifications: The Contractor shall submit to the Architect copies of certificates from suppliers of materials, certifying that these products comply with specifications and standards listed hereinafter.
- B. Standard Specifications: Unless otherwise noted, all specifications referred to shall be Alabama Department of Transportation (ALDOT) Standard Specifications for Highway Construction, 2014 Edition or most current edition.

PART 2 - PRODUCTS

2.1 MATERIALS:

- A. Paint for pavement marking shall be, traffic marking paint complying with Section 856, of the Alabama Department of Transportation (ALDOT) specifications, and as follows:
 - 1. Class 1, Type A (reflective) in public Right-of-Ways.
 - 2. Class 1, Type B (non-reflective) within property lines of this project's site, 2 coats.

PART 3 - EXECUTION

3.1 PAVEMENT MARKING:

A. Each individual painted parking stripe shall be 5-inches wide, and shall be laid out as indicated on drawings. Construction requirements shall conform to the applicable parts of Article

701.03 of the Alabama Department of Transportation (ALDOT) Specifications for Class 1, Type as specified, traffic stripe.

- 1. Color shall be white for asphalt, yellow for concrete pavement, and international blue for striping and graphics for parking spaces for the disabled and handicapped.
- 2. Use same materials and construction methods for any arrows and symbols indicated on paved areas.
- 3. Mark paving at each space for the disabled and handicapped (H.C.) with acceptable international graphics symbol, unless otherwise indicated, approximately 4' x 4' in size. Locate centered in space width and approximately 2'-0" from end of space where vehicle enters.

END OF PAVEMENT MARKING

SECTION 32 9000

LANDSCAPE WORK

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The general provisions of the Contract, including General and Supplementary and General Requirements apply to the work specified herein.

1.2 DESCRIPTION

- A. Provide all labor, equipment, materials and services necessary to complete the Work of this Section, including:
 - 1. Providing, placing, grading topsoil and sand/rootzone for landscape grading as indicated in the Drawings.
 - 2. Providing and installing trees, shrubs, ground covers, and solid sod for landscape planting.
 - 3. Maintenance for thirty days after Substantial Completion.

1.3 SUBMITTALS

- A. Qualification Data for firms specified in "Quality Assurance" article to demonstrate their capabilities and experience. Include a list of a minimum of five (5) similar projects completed with the last five (5) years with project name, address, names of Architects and Owners, overall description of scope of work, and contract value.
- B. Materials Lists:
 - 1. Within ten (10) days of award of Contract, submit a complete list of materials and unit prices demonstrating source, availability, and complete conformance with requirements specified.
 - 2. Substitutions not permitted unless proof is submitted to the Landscape Architect's satisfaction that the material is unavailable as specified.
- C. Certificates: Deliver all certificates of inspection to the Engineer.
- D. Product Data:
 - 1. Submit manufacturer's product literature, instructions and guaranteed analysis for fertilizer.

1.4 DEFINITIONS

A. Trees, shrubs, and groundcovers are plant materials listed in Plant Schedule on Drawings.

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1.5 JOB CONDITIONS

- A. Coordinate the Work of this Section with that of other trades.
- B. Examine conditions under which Work is to be performed and notify Landscape Architect and Landscape Architect in writing of unsatisfactory conditions.
- C. Do not perform Work until conditions are satisfactory and acceptable.
- D. Notify utility companies, prior to digging, for locations of underground utilities (electrical power, telephone, cable, water, sewer and gas) and perform Work in a manner which will avoid all possible damage. Hand excavate as required.
- E. Maintain stakes or other location markers and controls set by others until removal is mutually agreed upon by all parties.

1.6 QUALITY ASSURANCE

- A. Codes and Standards:
 - 1. Applicable Sections of Alabama Highway Department (ALDOT) Standard Specifications for Highway Construction, 2001 Edition as amended.
 - 2. All plant materials to comply with State and Federal laws relating to inspection for disease and insect control.
 - 3. Plant material quality to conform to *American Standard for Nursery Stock*, American Association of Nurserymen, Inc., 1986, ANSI Z-60.1.1
 - 4. Plant Material nomenclature to conform to:
 - a. *Hortus Third*, a Concise Dictionary of Plants Cultivated in the United States and Canada, MacMillan Publishing Company, Inc., New York, 1976 Edition.
 - b. Names not listed in the above standard to comply with those most commonly used in the trade.
 - c. In all cases, botanical names take precedence over common names.
- B. Installer Qualifications: Firm shall hold Alabama General Contractor's License for Classification S - Specialty Construction, Subclassification 4 - Landscaping. Firm experienced in the successful installation of a minimum of five (5) projects within the past five (5) years similar in scope, quality, and contract value to that indicated for this project. Firm shall have sufficient manpower, equipment and financial resources to complete the Work of this Section.
- C. Personnel: Use adequate numbers of skilled workmen trained and experienced in the Work and familiar with requirements and methods needed for performance of the Work. At all times during planting operations, have on the site a person knowledgeable in horticultural practices as a superintendent.
- D. Inspection and Approval:

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- 1. All plant material is subject to inspection and approval in the field or nursery before digging, by the Landscape Architect.
- 2. All plant materials and other materials are subject to inspection and/or rejection at the site before planting or placing, or at any other time.
- 3. Attach secure, durable, legible waterproof labels, stating correct botanical and common names as specified, to a least one (1) plant, bundle or container of each plant variety.
- 4. Remove from site plant materials or other materials not complying with specified requirements within 5 days of rejection.
- 5. Approval is for visual qualities only and does not relieve the Contractor of his obligation to provide materials and workmanship in full compliance with the requirements of the Contract Documents.

1.7 PRODUCT DELIVERY, STORAGE and HANDLING

- A. Deliver packaged materials in manufacturer's original containers showing weight, analysis and name of manufacturer. Protect materials from deterioration during delivery, and while stored at the site.
- B. Deliver all non-packaged or non-containerized materials to site in a manner that will prevent loss, damage, deterioration or contamination.
- C. Store all materials in approved locations to prevent loss, damage, deterioration or contamination.
- D. Deliver, storage and handling of all plant materials shall conform to ALDOT Specification Section 860.06(c) and the following:
 - 1. Deliver freshly dug plants, which have not been in cold storage or heeled-in.
 - 2. Do not prune prior to delivery.
 - 3. Do not bend or bind trees or shrubs in such a manner as to damage bark, break branches or destroy natural shape.
 - 4. Provide necessary protective covering during transport and delivery.
 - 5. Deliver plants after preparations for planting have been completed and approved, and plant immediately.

1.8 SITE MAINTENANCE

- A. Keep roads, paving and structures adjacent to maintenance operations clean and free of obstructions, mud and debris at all times.
- B. Do not permit flushing of roads or disposal of dirt or debris into sewers or drainage ditches.
- C. Control dust from maintenance operations.

PART 2 - PRODUCTS

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2.1 **SOIL MATERIALS**

- Α. Topsoil:
 - 1. This Contractor shall furnish topsoil in sufficient quantity, to complete grading and planting operations as specified.
 - 2. Characteristics of topsoil to be furnished:
 - a. Fertile, friable, naturally occurring. Free of stones, clay, lumps, hardpan, roots, stumps, branches, sticks and other debris larger than two (2) inches in any dimension; free of noxious weeds, grasses, seeds, plants, extraneous matter and any substance harmful to plant growth. Topsoil from open fields will not be accepted.
 - b. Ph: 5.0 to 7.0
 - Organic Matter: 5% to 10% c.
 - d. Sand: 50% to 70%
 - Silt: less than 30% e. f.
 - Clav: 10% to 25%
 - Permeability Rate of 5 x 10 <-3> centimeters or greater at 85% compaction. g.
- Β. Notify Landscape Architect and Owner of location of proposed topsoil for his inspection before testing or transporting to site.
- C. Topsoil testing for furnished topsoil: Sample and test, minimum of three (3) samples, for compliance with specified characteristics. Tests to be performed by soil testing lab approved in advance by Engineer, by this Contractor at his expense. Submit Soil Test Reports to Landscape Architect and Owner for approval before transporting topsoil. Amend per recommendations of Soil Test Report and as approved to meet specified characteristics.

2.2 SOIL AMENDMENTS

- Α. Fertilizer:
 - 1. Characteristics:
 - Uniform in composition. a.
 - b. Dry and free-flowing.
 - c. Commercially available.
 - d. Conforming to the State of Federal Fertilizer Laws.
 - 2. Of the formulation recommended in the Soil Test Report as specified.
- Β. Lime:
 - 1. Ground or crushed agricultural lime.
 - 2. Containing not less than 85% of total carbonates.
 - 3. 90% passing 20-mesh screen.
 - 4. Not less than 50% passing a 60-mesh screen.

- 5. Dry and free-flowing.
- 6. Apply at rate specified in Soil Test Report.

2.3 LANDSCAPE PLANTING MATERIALS

- A. Water:
 - 1. Provide fresh water, free of impurities or any substance harmful to plant growth.
 - 2. Provide all hose, attachments, and accessories necessary to complete the Work as specified.
- B. Topsoil: Refer to Paragraph 2.1.A, this Section, for specified topsoil for use in all planting operations.
- C. Topsoil Mix:
 - 1. Prepare all topsoil mix used in tree and shrub pits and ground cover beds in the following proportions:
 - a. 2 parts by volume topsoil as specified. 2.1.A.
 - b. 1 parts by volume decomposed organic matter, 2.3.E.
 - 2. Add three (3) pounds of 12-6-6 fertilizer to each cubic yard of topsoil mix during the mixing process, for all plants.
- D. Decomposed Organic Matter:
 - 1. Well rotted organic matter.
 - 2. Containing no weeds, grasses or plants, their seeds, or any substance harmful to plant growth.
 - 3. Of uniform composition.
 - 4. Acceptable Materials:
 - a. Mushroom Compost
 - b. Ground pine bark
 - c. Approved equal.
- E. Chemical Weed Control:
 - 1. Pre-Emergent (in bed areas):
 - a. Selective pre-emergent with no residual soil activity. Active ingredient: Trifluralin.
 - b. Commercially available.
 - c. Adhere to manufacturer's recommendations for strength, rate, and method of application.

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- d. Acceptable Manufacturers:
 - 1) Elanco: Treflan
 - 2) Approved substitution.
- 2. Herbicide:
 - a. Non-selective post-emergent with no residual soil activity. Active ingredient: Isopropylamine salt of Glyphosate.
 - b. Commercially available.
 - c. Adhere to manufacturer's recommendations for strength, rate and method of application.
 - d. Acceptable Manufacturers:
 - 1) Monsanto Agricultural Products Company: Round Up.
 - 2) Approved substitution.
- F. Mulch:
 - 1. Pine straw: Free from leaves, twigs, insects, grasses, weeds, plants and their seeds, other foreign material and any substances harmful to plant growth.
- G. Solid Sod:
 - 1. Obtain solid sod from sources having growing conditions similar to the area to be planted.
 - 2. Sod shall be true to name and type of the species named in the plant Schedule.
 - 3. Sod shall be 100 percent of the type specified and shall contain no other grasses.
 - 4. Sod shall be well cultivated and weed, disease and insect-free, of good texture, and free from extraneous roots, stones and other foreign material. The presence of nutgrass or other weeds shall be cause for rejection and replacement prior to Substantial completion, or during the Guarantee Period.
 - 5. Contractor shall lay sod within 24 hours of harvesting. Contractor shall not lay sod if dormant or if ground is frozen or muddy.
- H. Plant Material:
 - 1. Definition: Trees and shrubs listed in the Plant Schedule in the Drawings.
 - 2. General:
 - a. Species, sizes, manner in which to be planted, and approximate quantities to complete the planting as indicated are included in the Plant Schedule.
 - b. Scientific and common plant names conform to those given in *Hortus Third*, or are those generally accepted in the nursery trade.
 - 3. Quality:

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- a. Conform to the standards set forth in *American Standard for Nursery Stock*.
- b. Standard quality and first-class representatives of their species or variety and true to name and type.
- c. Nursery-grown, unless specified otherwise.
- d. In compliance with State and Federal laws relating to disease and insect infestation; file certificates with Landscape Architect.
- e. Having normal, well-developed branches and vigorous root systems, free from defects, decay, disfigurements, sun scaled, bark abrasions, plant diseases, insect pests or eggs, borers and any and all infestations.
- 4. Rejection of plants for:
 - a. Lack of compactness or proper proportion;
 - b. Weak, thin growth in rows too close together;
 - c. Cut back from larger stock to meet specified requirements;
 - d. Undersized, dry, cracked or broken balls, or plants that are loose in their balls;
 - e. Root bound within container or ball;
 - f. Lacking proper proportion as to height and spread and specified characteristics or plant material.
- 5. Size:
 - a. Sizes and proportions of all plant materials shall equal those recommended by the *American Standard for Nursery Stock* for specified grades.
 - b. Measure plants before pruning, with branches in normal position.
 - c. Equal or exceed measurements specified in Plant Schedule, which are the minimum acceptable; provide 50-percent of plant material maximum size specified.
 - d. Height and spread dimensions: General body mass of plant, not from branch tip to tip.
 - e. Well-proportioned as to height; reject plants which meet specified measurements but do not possess an overall balance.
 - f. Take caliper measurement on trunk six-inches above natural ground level up to and including four-inch caliper size; twelve-inches above natural ground level for larger sizes.
 - g. B&B plants shall have firm natural balls of a diameter and depth not less than that recommended in *American Standard For Nursery Stock*.
 - h. Container-grown plants: Conform to standards set forth in *American Standard For Nursery Stock* for container-grown plants.
 - i. The following landscape plugs are required where specified on the plant schedule and are not to be substituted for 4-inch pots or pints unless written approval is given by the Landscape Architect.
 - 1) LP50(or equivalent): 5 inch depth by 2 inch square top.
 - 2) LP32(or equivalent): 4 inch depth by 2.22 inch square top.
- 6. Quantity: Furnish plants in sufficient quantity to satisfy the intent of the Drawings and Specifications. Locate in sufficient quantity to that time is not lost if some plants
are rejected.

- I. Guying and Staking Materials:
 - 1. Tree staking & guying to utilize the ArborBrace Tree Guying System (www.treestaking.com)

Trees up to 4-inch caliper: ATG-R/ATG-HD

- a. ¾-inch polypropylene guylines, olive drab in color,
- b. Nickel plated spring cam-lock tension clips.
- c. Arrowhead Ancors (4-inch by 3 3/4"-inch)

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Planting Season:
 - 1. A period of acceptable weather conditions, during seasons in which satisfactory results can be expected as determined by acceptable practice in the locality and approved by the Landscape Architect.
 - 2. Commence planting operations as soon as portions of the site are available, as approved by the Landscape Architect.
- B. Site Inspection:
 - 1. Examine areas and conditions under which Work is to take place.
 - 2. Inform Landscape Architect in writing, prior to planting, of conditions existing which could be considered detrimental to the successful planting and growth of any plant material, including but not limited to, subsurface drainage conditions, utility locations, subgrade compaction, percolation rate and elevations.
- C. Site Preparation:
 - 1. Topsoil (4" in sod areas and 6" in shrub and groundcover beds) shall be spread by the Contractor and fine graded. Topsoil, regardless of the source, shall meet all requirements of the paragraph above.
 - 2. Stockpile material that does not meet the requirements may, at the option of the contractor, be improved by screening and the addition of organic matter and chemical admixtures.
 - 3. Do not place or spread topsoil in an area until subgrade is approved by Landscape Architect and is acceptable to this Contractor.
 - 4. Remove all vegetative growth from topsoil by approved means before commencing with planting operations.
 - 5. Remove all unwanted vegetative growth from areas designated to receive new planting or sod with chemical herbicide or by other approved means, prior to scarifying and placing topsoil.

- 6. Remove extraneous matter measuring 1-2-inch or larger in any dimension from top 4inches of placed topsoil.
- 7. Uniformly grade areas including adjacent transition areas to line and grade shown on Drawings.
- 8. Obtain approval of finished grades before proceeding with planting operations; eliminate irregularities and ponding.
- 9. Protect stockpiled or spread topsoil from erosion by force of wind, water, or other force; re-establish eroded, rutted or settled grades to proper finished grade.
- D. Plant Location Staking and Excavating Compacted Subgrade Tree Pits:
 - 1. Stake plant locations and areas for approval prior to planting.
 - 2. Do not dig plant pits prior to obtaining Landscape Architect's approval of plant locations.
 - 3. Make adjustments in plant locations as directed.
 - 4. If underground obstructions are encountered in planting areas that would prevent the installation of the plant material, contact the Landscape Architect immediately. Alternate locations may be selected by the D & D at no additional cost to the Owner.
 - 5. All locations where trees are to be installed shall have the topsoil broken up to an 18" depth and 10' radius (if space allows) with a mini excavator.
- E. Topsoil Mix:
 - 1. Prepare topsoil mix to specification 2.3.C off site, using approved topsoil.
 - 2. Obtain approval of topsoil mix before delivery to site, and prior to commencing planting operations. Do not mix in place with placed topsoil.
 - 3. Place topsoil mix as backfill for tree and shrub pits and beds as drawn. Place 2-inches of topsoil mix in all shrub beds unless otherwise indicated on the Drawings.
 - 4. Protect stockpiled topsoil mix from erosion by force of wind of water, or damaged by traffic.
- F. Planting(Typical):
 - 1. Place plants comprising a planting composition in approved staked locates for approval by Landscape Architect.
 - 2. Planting pits and beds:
 - a. Drainage:
 - 1) This Contractor is responsible for achieving and maintaining adequate drainage from all planting beds. Use specified drainage system, or other approved means, in all tree pits.
 - 2) 48-hours prior to planting, test each plant pit for adequate drainage.
 - Owner reserves the right to test tree or plant pits at any time, before or after planting, for adequate drainage. Correct immediately any inadequate drainage encountered.
 - b. Pits are generally circular in outline with vertical sides.
 - c. Tree pits: 3-feet greater in diameter than ball or root spread.

- d. Shrub pits: 1-foot greater in diameter than ball or root spread.
- e. Excavate to specified dimensions and dispose of excavated material off site.
- f. Prepare as specified in detail Drawings.
- 3. Setting plants:
 - Set plants uniformly 2-inches to 4-inches higher than surrounding grade or as necessary to provide adequate positive drainage away from roots. Slope soil gradually from saucer.
 - b. Cut rope, wire or string from top of ball after plant has been set; turn down and bury burlap.
- 4. Backfilling plants:
 - a. Backfill to 2/3 full with specified topsoil mix.
 - b. Water thoroughly to eliminate air pockets and settling before filling to grade.
 - c. Form shallow saucer at plant pit edge to hold water.
 - d. Water in thoroughly.
- 5. Pre-Emergent application:
 - a. Apply per manufactures instructions.
- 6. Staking:
 - a. Inspect tree trunks for injury, improper pruning and insect infestation; take corrective measure.
 - b. Immediately after planting, stake trees as detailed.
- 7. Pruning:
 - a. Do not prune plants without approval.
 - b. Prune after plants are in place and *ONLY* at the direction of Landscape Architect.
 - c. Main leaders of trees to remain intact.
 - d. Paint all cuts over 2-inch diameter with approved tree wound dressing.
- 8. Finished Grading: Handgrade and rake planting areas so that grades conform to surrounding areas and surface water drains freely.
- 9. Mulching:
 - a. Mulch all plant pits and beds with 4-inch deep specified mulch.
 - b. Spread mulch solid in planting beds.
 - c. Thickness is uniform throughout.
 - d. Mulch for trees shall be eight (8) feet in diameter from base of tree.

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- G. Solid Sod:
 - 1. Procure and handle sod per ALDOT Section 860.05(b) 1-4.
 - 2. Preparation of Sod Bed:
 - a. Spread and scarify amended topsoil as specified.
 - b. Rake and otherwise manipulate to form smooth-draining grades, remove all stones and clay lumps 1-inch in diameter or larger.
 - c. Leave the surface of the topsoil 1- 1/2-inches below finished grade.
 - d. Do not move heavy objects over areas to be sodded after the soil has been prepared. Planting in compacted areas will not be permitted.
 - e. The finished surface of the areas to be sodded shall be approved by the Landscape Architect prior to sod placement.
 - 3. Solid Sod Placement:
 - a. Lay sod when sod bed is not excessively wet or frozen, but when soil is damp for a depth of 4-inches.
 - b. Immediately upon approval of bed preparation, lay sod smoothly, edge-toedge, with staggered joints.
 - c. Press firmly into contact with sod bed by tamping or rolling by approved means to eliminate all air pockets, providing a true and even surface, and assuring knitting.
 - d. Fill cracks between sod blocks with strips of living sod, topsoil, or humus.
 - e. Water thoroughly by use of sprinkler or spray, without erosive force.

3.2 SUBSTANTIAL COMPLETION and GUARANTEE

- A. Substantial Completion and Payment:
 - 1. Submit written requests for inspection for Substantial Completion to Landscape Architect at least three calendar days prior to anticipated date of inspection and testing.
 - 2. Substantial Completion cannot be granted and at the same time no further applications for payment shall be for more than 85 percent of Contract until there has been a walk thru for planting at which time a "punch list" will be written consisting of items to be addressed and corrected by Landscape Contractor immediately. Depending on extent of work on "punch list", Landscape Architect will determine job to be "substantially complete" or pending the completion of punch list".
 - 3. Submit Record Drawings and Maintenance manuals to Landscape Architect with written request for inspection.
 - 4. Review "punch list" work jointly with Owner and Landscape Architect for Substantial Completion of total (contract) work.
 - 5. Upon completion of repairs and replacements found necessary at time of review, Owner and Landscape Architect will confirm date of Substantial Completion and issue written notice of Substantial Completion if items on punch list have been completed. If necessary, another punch list will be written to itemize deficiencies still existing and

will be attached to written notice of substantial completion. Landscape Contractor shall complete all "punch list" items if possible within 30 days while continuing maintenance.

- 6. Date of Substantial Completion will constitute beginning date of One Year Guarantee. This date also constitutes beginning of warranty responsibilities and acceptance by Owner and Landscape Architect.
- B. Guarantee:
 - 1. Guarantee all materials and workmanship for a period of 1-year from the Date of Substantial Completion.
 - 2. During the period of the Guarantee, replace with no additional compensation, and as soon as weather permits, all dead plant materials and all materials not in a thriving condition; replace all other workmanship and materials which are unsatisfactory in the opinion of the Landscape Architect; make good any other damage, loss, destruction, or failure to flourish sufficiently as the result of inferior or defective materials or workmanship, including, but not limited to inadequate drainage.
 - 3. All replacement material shall match the size attained by original materials at the time of the replacement.
 - 4. Remove dead or dying material from the site within 5 days of notice, refer to section 1.6 paragraph D(4).
 - 5. Repair grades and other Work necessitated due to planting replacements.
 - 6. If the replacement is not acceptable during or at the end of the Guarantee Period, the Owner may elect either subsequent replacement or credit. Replacements shall have a similar 1-year Guarantee from date of replacement.
 - 7. Guarantee applies to losses or damage other than those due to vandalism, Owner neglect, or Acts of Nature, as determined by the Landscape Architect. Acts of Nature, but may not be limited to, high winds of hurricane or tornado force, sleet, hail, freezing rain, and extreme cold (as determined by the Landscape Architect). Contractor agrees to replace losses due to Acts of Nature at fifteen percent (15%) less than original contract price for the damaged work.

3.3 FINAL INSPECTION and ACCEPTANCE

- A. Contractor is responsible for contacting the Landscape Architect at the end of the Guarantee Period to schedule final inspection. Should the Contractor fail to contact the Landscape Architect at this time, the Guarantee Period is automatically extended until he does so.
- B. At the end of the Guarantee Period, submit request for inspection for Final Acceptance to Landscape Architect at least 1-week prior to anticipated date of inspection; include list of Work substantially accepted and list of Work replaced during Guarantee Period.
- C. Upon request for inspection, jointly review with Landscape Architect all guaranteed Work for Final Acceptance.
- D. Remove tree staking apparatus and saucers from all trees, unless otherwise directed; replace mulch to specified thickness.

E. Upon completion by the Contractor of all required repairs and replacements, the Landscape Architect will confirm the date of Final Acceptance of the Work.

END OF LANDSCAPE WORK

SECTION 33 1000

WATER SERVICE PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.
- B. Related work specified elsewhere includes:
 - 1. Section 31 2000 "Earthwork"
 - 2. Division 23 Mechanical
 - 3. Division 22 Plumbing

1.2 SUMMARY:

- A. This Section includes water service piping system, meters, vaults, valves, and appurtenances from the existing on-site utility source of potable water to a point 5 feet outside the building, and as indicated on the Drawings, and in this Section of the Project Manual.
- B. Note that the Contractor shall furnish and install connection, back flow preventer, etc., acceptable to the City of Tuscumbia and notify them to request an inspection prior to covering. The contractor shall also coordinate with the City of Tuscumbia prior to procuring the equipment to verify equipment selected is acceptable.
- C. All fees and charges for water service, meters, taps, permits, impact fees, etc., shall be paid by the Contractor from their contract amount.
- D. The extent of water service piping system, fire hydrants, etc., is indicated on the Drawings, in this Section, other referenced Sections of the Project Manual, and as otherwise required by authorities having jurisdiction.

1.3 SUBMITTALS:

- A. General: Submit the following in accordance with conditions of Contract and Division 1 Specification Sections
 - 1. Product data for water service piping and specialties.
 - 2. Shop drawings for vaults, junction boxes, valve boxes, manholes, meters, backflow preventers, and other similar water service equipment.

PART 2 – PRODUCTS

2.1 PIPE AND PIPE FITTINGS - GENERAL:

- A. General: Pipe, valves, fittings and installation in R.O.W. and on site shall comply with requirements of this Section, other referenced Sections of the Project Manual, the Drawings, and the City of Tuscumbia.
 - 1. Pipe, fittings, hydrants and valves shall be as specified herein, subject to acceptance by City of Tuscumbia, unless other specific materials acceptable to utility company are indicated on the Drawings.
 - 2. Water piping and fittings smaller than 4" shall be type K copper or SDR-21 PVC Plastic Pipe; and pipe 4" and larger, below paving and fire lines shall be Ductile Iron, of type(s) acceptable to the City of Tuscumbia, unless other specific materials acceptable to the utility are indicated on the Drawings.
- B. Ductile-Iron, Push-on-Joint Pipe: AWWA C151, with cement-mortar lining and seal coat according to AWWA C104. Include rubber compression gasket according to AWWA C111.
 - 1. Ductile-Iron, Push-on-Joint Fittings: AWWA C110, ductile-iron; or AWWA C153, ductile-iron, compact type. Include cement-mortar lining and seal coat according to AWWA C104 and rubber compression gaskets according to AWWA C111.
 - 2. Joining Materials: AWWA C111 rubber gaskets and lubricant.
- C. Ductile-Iron, Mechanical-Joint Pipe: AWWA C151, with cement-mortar lining and seal coat according to AWWA C104. Include gland, rubber gasket, and bolts and nuts according to AWWA C111.
 - 1. Ductile-Iron, Mechanical-Joint Fittings: AWWA C110, ductile-iron; or AWWA C153, ductile-iron, compact type. Include cement-mortar lining and seal coat according to AWWA C104 and glands, rubber gaskets, and bolts and nuts according to AWWA C111.
 - 2. Joining Materials: AWWA C111 ductile-iron or gray-iron glands, high-strength steel bolts and nuts, and rubber gaskets.
- D. Where copper pipe is indicated, provide Soft Copper Tube, ASTM B 88, Type K, water tube, annealed temper.

- 1. Copper, Solder-Joint Fittings: ASME B16.18, cast-copper-alloy or ASME B16.22, wrought-copper, solder-joint pressure type. Furnish only wrought-copper fittings if indicated.
- E. PVC Plastic, Water Pipe: Pressure Class 200 (minimum) conforming to SDR 21 (minimum wall thickness). Comply with ASTM D1784 for PVC compounds, ASTM D2241 Product Standard 22 for PVC pipe, and ASTM D-3139 and F-477 for gaskets and joints.
- F. Pipe Sleeves: Provide pipe sleeves at least one size larger than water service piping required below existing concrete and paving, and as follows.
 - 1. Below Concrete, Entry Pads, and Paving Subject to Only Pedestrian Traffic: Schedule 40 PVC.
 - 2. Below Concrete, Equipment Pads, Dumpster Pads, Valley Gutters, Curbs and Gutters, Paving Subject to Vehicular Traffic, and Where Indicated: Ductile Iron, as specified above herein this Section.
- G. Identification for Underground Plastic Pipe:
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Allen Systems, Inc.; Reef Industries, Inc.
 - b. Brady (W.H.) Co.; Signmark Div.
 - c. Calpico, Inc.
 - d. Carlton Industries, Inc.
 - e. EMED Co., Inc.
 - f. Seton Name Plate Co.
- H. Valves Provide in accordance with City of Tuscumbia specifications.
 - 1. Valve box and cover shall be provided for access.
 - 2. Valve box and cover shall be traffic-bearing in all paved areas.
- I. Domestic Water Meter Provide in accordance with City of Tuscumbia specifications.
 - 1. Meter box and cover shall be traffic-bearing in all paved areas.

PART 3 - EXECUTION:

3.1 INSTALLATION:

- A. Comply with requirements of Division 22, the International Plumbing Code, Drawings, and requirements of authorities having jurisdiction.
- B. Comply with requirements of the State Health Department, the local Health Department, and authorities having jurisdiction.

3.2 DEPTH OF COVER:

A. Provide minimum cover of 36-inches for all water-bearing piping.

3.3 INSTALLATION OF IDENTIFICATION:

A. Install continuous plastic underground warning tape during back-filling of trench for underground water service piping. Locate 6 to 8 inches below finished grade, directly over piping.

3.4 CLEANING:

- A. Clean and disinfect water distribution piping as follows, or as required by utility company, Code, and authorities having jurisdiction:
 - 1. Purge all new water distribution piping systems and parts of existing systems that have been altered, extended, or repaired, prior to use.
 - 2. Use the purging and disinfecting procedure prescribed by the authority having jurisdiction or, in case a method is not prescribed by that authority, use the procedure described in AWWA C651, or as described below:
 - a. Fill the system or part thereof with a water/chlorine solution containing at least 50 parts per million of chlorine. Isolate (valve off) the system or part thereof and allow to stand for 24 hours.
 - b. Drain the system or part thereof of the previous solution and refill with a water/chlorine solution containing at least 200 parts per million of chlorine and isolate and allow to stand for 3 hours.
 - c. Following the allowed standing time, flush the system with clean, potable water until chlorine does not remain in the water coming from the system.
 - d. Submit water samples in sterile bottles to the authority having jurisdiction. Repeat the procedure if the biological examination made by the authority shows evidence of contamination.
- B. Prepare reports for all purging and disinfecting activities, and submit for review and along with each set of "Record Documents".

END OF WATER SERVICE PIPING