architects: engineers: interior design

PROJECT MANUAL

Addition at Career and Technical Center

Itawamba County School District (Fulton, Mississippi)



CONSTRUCTION DOCUMENTS

June 28, 2024

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PROJECT NO. 2023111

SET NO. _____



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Addition at Career and Technical Center (Itawamba County School District)

SECTION 00 01 06

CONSULTANT LIST AND SEALS

Project Addition at Career and Technical Center

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Engineer Rod Hogan

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Addition at Career and Technical Center (Itawamba County School District)

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NOTICE TO BIDDERS

Sealed bids will be received at the School Board Central Office, 605 South Cummings Street, Fulton, Mississippi, 38843, until 2:00 p.m. on Thursday, August 15, 2024, for:

Addition at Career and Technical Center Itawamba County School District (Fulton, Mississippi)

PryorMorrow Project Number: 2023111

Bid documents are being made available via original paper copy or electronically. Planholders are required to log-in or register for an account at www.pryormorrowplans.com to view and order Bid Documents. All planholders are required to have a valid email address for registration. Bid documents are non-refundable and must be purchased through the website. Electronic bids are not required; however, a submission of an electronic bid in lieu of a sealed bid shall be submitted at www.pryormorrowplans.com. Questions regarding website registration, online orders, and electronic bidding please contact Plan House Printing at (662) 407-0193.

Bid preparation will be in accordance with Section 00 21 13 – Instructions to Bidders, bound in the Project Manual.

BID GUARANTEE: Proposals shall be submitted with Proposal Security in the form of Certified Check or acceptable Bid Bond in an amount equal to at least five percent (5%) of the base bid; such security is to be forfeited as liquidated damages, not penalty, by any bidder who fails to carry out the terms of the proposal. The Bid Bond, if used, shall be payable to the Owner. Bonds on the project must be received on or before the period scheduled for the project and no bid may be withdrawn after the scheduled closing time for the project. Bids must be firm for a period of forty-five (45) days after the scheduled time of opening.

PERFORMANCE-PAYMENT BOND: A 100% Performance-Payment Bond issued by a surety company authorized to do business in the State of Mississippi will be required within ten (10) days after the successful bidder has been notified of the award of the contract to him.

CERTIFICATE OF RESPONSIBILITY: All bids submitted by a prime or subcontractor for public works or public projects where said bid is in excess of fifty thousand dollars (\$50,000) to perform contracts enumerated in Section 31-3-21, Mississippi Code of 1972, shall contain on the outside or exterior of the envelope or container of such bid the contractor's current certificate number. No bid shall be opened or considered unless such contractor's current certificate number appears on the outside or exterior of said envelope or container or unless there appears a statement on the outside or exterior of such envelope or container to the effect that the bid enclosed therewith does not exceed fifty thousand dollars (\$50,000). When bids are submitted electronically, the requirement for including a certificate of responsibility, or a statement that the bid enclosed does not exceed Fifty Thousand Dollars (\$50,000.00), on the exterior of the bid envelope shall be deemed in compliance by including the same information as an attachment with the electronic bid submittal.

The Owner reserves the right to reject any or all bids and to waive irregularities.

Publish: Wednesday, July 17, 2024

Wednesday, July 24, 2024

Addition at Career and Technical Center (Itawamba County School District)

SECTION 00 21 13

INSTRUCTIONS TO BIDDERS

PART 1 - GENERAL

1.01 GENERAL INFORMATION

- A. Should a bidder find discrepancies in or omissions from the drawings or specifications or be in doubt as to their written meaning, the bidder should immediately notify the Architect who will then send a written instruction or interpretation to all known holders of the documents. Neither the Owner nor the Architect will be responsible for oral instructions or any other communications not included in the documents or addenda.
- B. It is understood and agreed that refinement and detailing of the drawings and specifications will occur from time to time. No adjustment in the contract sum or completion date shall be made unless such refinement results in changes to the scope, quality, or function of the work not reasonably inferable or anticipatable. Notwithstanding anything contained in this Contract to the contrary, the Contractor will receive no increase in the contract sum based on the increased cost of the work resulting from change orders or increased cost of any allowance items unless the change required is beyond the scope of the work.
- C. The Contractor shall not use in the project any new materials containing asbestos, asbestos products, polychlorinated biphenyl (PCB), or other toxic substances. If the Contractor discovers that such substances as described herein have been specified or do exist in the project, the Contractor shall promptly notify the Architect in writing and make substitutions for these products at no cost to the Owner.

1.02 METHOD OF BIDDING

A. Lump sum single bids received from General Contractors for all work shown on drawings or specified herein.

1.03 BID DOCUMENTS

A. Bid documents are being made available via original paper copy or electronically. Planholders are required to log-in or register for an account at www.pryor-morrowplans.com to view and order Bid Documents. All planholders are required to have a valid email address for registration. Bid documents are non-refundable and must be purchased through the website. Questions regarding website registration and online orders please contact Plan House Printing at (662) 407-0193

1.04 PREPARATION OF BID

A. Condition of Work: Each bidder must fully inform himself of the conditions relating to the construction of the project and employment of labor thereon. Failure to do so will not relieve a successful bidder of his obligation to furnish all material and labor necessary to carry out the provisions of his contract.

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B. Examination of Site: All bidders, including the General Contractor and subcontractors, will visit the site of the project and inform themselves of all conditions. Failure to visit the site will in no way relieve the successful bidder from furnishing any materials or performing any work required to complete work in accordance with the drawings and the Project Manual without additional cost to the Owner.

1.05 PROPOSALS

- A. Make all proposals on the forms provided and fill in all applicable blank spaces without interlineation, alteration, erasure, or recapitulation of the work to be done.
- B. Oral proposals will not be considered.
- C. Indicate receipt of addenda issued during the bidding on the proposal form.
- D. On the outside of the bid envelope, indicate the following:
 - 1. Name of the company submitting the bid.
 - 2. Certificate of Responsibility number.
 - 3. Project name.
- E. Provide one (1) original copy of the Proposal Form.
- F. If the bid is mailed, place the bid envelope inside a second envelope to prevent inadvertent premature opening of the proposal. Indicate on the outside envelope "Bid Enclosed."
- G. When bids are submitted electronically, the requirement for including a certificate of responsibility, or a statement that the bid enclosed does not exceed Fifty Thousand Dollars (\$50,000.00), on the exterior of the bid envelope shall be deemed in compliance by including the same information as an attachment with the electronic bid submittal.

1.06 OPENING OF BIDS

A. Bids will be publicy opened shortly after the time stated in the Advertisement for Bids. Bidder representatives are invited; however, attendance is not mandatory. Preventing the opening of bids at the advertised date and time due to Force Majeure Event reasons will result in bids being received and publicly opened by the next business day that the agency shall be open and at the previously advertised time unless an Addendum is issued.

1.07 CERTIFICATE OF RESPONSIBILITY

A. Each Contractor submitting a bid equal to or in excess of \$50,000 must show on his bid and on the face of the envelope containing the bid his Certificate of Responsibility number, as required by Section 31-3-21, Mississippi Code (latest revision) and as required by the Statutory Amendments of the Contractors Act of 1985.

Addition at Career and Technical Center (Itawamba County School District)

- B. Sufficient evidence that said Certificate of Responsibility has been issued and is in effect at the time of receiving bids must be submitted as required by the Owner and the Architect.
- C. If the submitted bid does not exceed \$50,000, a Certificate of Responsibility is not required. If a bidder submits a bid not exceeding \$50,000, a notation stating "BID DOES NOT EXCEED \$50,000" must appear on the face of the envelope.
- D. Bids without a Certificate of Responsibility number or the notation "BID DOES NOT EXCEED \$50,000" will not be opened.

1.08 NON-RESIDENT CONTRACTORS

A. A non-resident Contractor submitting a bid for a public project in Mississippi must submit a copy of his or her state's policy on non-resident contractors with the bid as required by the Mississippi Code.

1.09 SUBCONTRACTS

- A. The bidder is specifically advised that any proposed subcontractors must be acceptable to the Owner.
- B. Each subcontractor whose portion of the work exceeds \$50,000 shall maintain a valid Certificate of Responsibility.
- C. Within five (5) days after the bid opening, the successful bidder shall identify all proposed subcontractors. Indicate the Certificate of Responsibility number for all subcontractors whose portion of the work exceeds \$50,000. The bidder assumes the risk that the proposed subcontractors are acceptable to the Owner and shall not make substitutions unless agreed to by the Owner.

1.10 BID SECURITY

- A. Each bid must be accompanied by the bidder's certified check or a bid bond, duly executed by the bidder as principal and having surety thereon, a surety company approved by the Owner and signed by a resident agent in Mississippi, in the amount of five percent (5%) of the Base Bid.
- B. When the bid is submitted electronically, the low bidder shall provide an original bid bond as required herein within 72 hours of opening bids to the Architect. If the original bid bond is not received within the 72 hours, the proposal will be rejected as non-responsive.
- C. All bid bonds must be accompanied by an appropriate Power of Attorney designating the Mississippi Resident Agent.
- D. If written acceptance of the Bid is mailed, telegraphed, or delivered to the successful bidder within 45 days after the opening of bids, the bidder shall execute and deliver the specified form of agreement to the Owner within 10 days of receiving written acceptance or face forfeiture of the Bid Security. The Bid Security, in the sum of five percent (5%)

Addition at Career and Technical Center (Itawamba County School District)

of the Base Bid amount, shall become the property of the Owner in the event the contract and bond required are not executed within the established time frame. The Bid Security becomes the property of the Owner as liquidated damages for the delay of the project and the additional expense caused to the Owner thereby.

E. If written acceptance of the Bid is mailed, telegraphed, or delivered to the successful bidder after the 45-day deadline and the successful bidder does not withdraw his or her proposal, the bidder shall execute and deliver the specified form of agreement to the Owner within 10 days of receiving written acceptance. After 45 days, the bid bond is not forfeited.

1.11 AWARD OF CONTRACT

- A. Contract will be awarded on the basis of the lowest and best bid or lowest and best combination of base bid and those alternates, which produce a total within available funds.
- B. The Owner reserves the right to waive irregularities and to reject any or all bids.
 - 1. Irregularities: the omission of any information requested on the Proposal Form may be considered as an informality, or irregularity, by the awarding public body when in their opinion the omitted information does not alter the amounts contained in the submitted bid proposal, or place other Bidders at a disadvantage.
- C. The Owner reserves the right to disqualify and reject the low bidder and make award to other than the low bidder if, in the Owner's judgment, it is in the Owner's best interest. A bidder may be disqualified for:
 - 1. Being in arrears on existing contracts.
 - 2. Being in litigation with the Owner.
 - 3. Having defaulted on or failed to satisfactorily complete a previous contract including warranty obligations.

1.12 NOTICE TO PROCEED

A. The Contractor shall commence work to be performed under this Agreement on a date to be specified in a written order of Notice to Proceed from the Architect.

SECTION 00 25 14 PRE-BID MEETING

PART 1 - GENERAL

1.01 PRE-BID CONFERENCE

A. A pre-bid conference will be held on Thursday, August 1, 2024, at 11:00am in the conference room at the School Board Central Office, 605 South Cummings Street, Fulton, Mississippi, 38843. All planholders are encouraged to attend.

Addition at Career and Technical Center (Itawamba County School District)

SECTION 00 31 32 GEOTECHNICAL DATA

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. A copy of the Geotechnical Report is enclosed herein (Appendix No. 1).
- B. Related Sections:
 - 1. Section 31 10 00 Site Clearing (ESI)
 - 2. Section 31 22 13 Rough Grading (ESI)
 - 3. Section 31 22 19 Finish Grading (ESI)
 - 4. Section 31 23 00 Excavation and Fill (ESI)
 - 5. Section 31 25 00 Erosion and Sedimentation Control (ESI)
 - 6. Section 33 40 00 Storm Drainage Utilities (ESI)
- C. Any party discovering a conflict between the Specifications and the Geotechnical Report shall immediately notify the Architect in writing.

PART 2 - PRODUCTS

2.01 NOT USED

PART 3 - EXECUTION

3.01 EXAMINATION

A. Prospective bidders should read and understand the Geotechnical Report before submitting bids or executing the Agreement.

SECTION 00 41 00 BID FORM

Date: Thursday, August 15, 2024			Certificate of Responsibility Number:			
Proposal o	of:					
Project:	Addition at Career and Technical Center Itawamba County School District (Fulton, Mississippi)		Owner: Itawamba County School District 605 South Cummings Street Fulton, Mississippi 38843			
The receip	t of the following Ad	denda to the Contract	ct Documents is hereb	y acknowledg	ed:	
Addendum	No Date	Pages:	Addendum No	Date	Pages:	
Addendum	No Date	Pages:	Addendum No	Date	Pages:	
prepared by the work, t	y PryorMorrow PC, a he undersigned propos s for the work describ	and dated June 28, 2 oses to furnish all lal	s entitled Addition at 2024, as well as the prebor, materials, and serv	emises and co	nditions affecting	
			D	OLLARS (<u>\$</u>)	
sacrificial s			nit price for the over-e d be a cubic yard cost a			
Note: 100	cubic yards shall be		OLLARS PER CUBIC e Bid per section 01 2			
Allowance	s: Products. <u>Do not e</u>	exceed 100 cubic yar	ds without prior appro	val by the Are	chitect.	

Time is an important consideration on the project. The project shall be substantially complete no later than **Friday**, **August 1**, **2025**.

The Owner will deduct \$1,000.00 per day liquidated damages for each day of delay exceeding the contract time until such time substantial completion is reached.

The Contractor represents that it has (1) examined all available records and data furnished by the Owner and the Architect and has from such examination informed itself fully concerning all surface conditions in connection with the work and the services to be performed hereunder, (2) determined that the site of the work is satisfactory in all respects for the work, and (3) read the Contract Documents and is fully cognizant of and is familiar with all of the terms and conditions thereof.

Respectfully Sul	bmitted:		
Signed:		 	
Print Name:		 	
Title:		 	
Address:			

*If the bidder is a corporation, write State of Incorporated under signature. If the bidder is a partnership, show the names of all partners.

Note: The bidder's Certificate of Responsibility number is required on the outside of the envelope that contains the proposal of the bidder.

SECTION 00 52 00 AGREEMENT

PART 1 - GENERAL

1.01 CONTRACT

- A. Work to be executed under a single fixed-price contract, Standard Form of Agreement Between Owner and Contractor, AIA Document A101, 2017 Edition.
- B. A copy of the Agreement is available at the Architect's office for the Contractor's examination. The Agreement is incorporated by reference as though fully written herein.
- C. Prospective bidders should read and understand the Agreement form before submitting bids or executing the Agreement.

Addition at Career and Technical Center (Itawamba County School District)

SECTION 00 61 00 BONDS

PART 1 - GENERAL

1.01 SECURITY FOR FAITHFUL PERFORMANCE

- A. A Performance Bond and a Payment (Labor and Material) Bond are required as a condition of this Contract.
- B. Simultaneous with delivery of the executed contract, the Contractor shall furnish a surety bond or bonds as security for the faithful performance of this Contract and for the payment of all persons performing labor on the project under this Contract and furnishing materials in connection with this Contract in the amount of 100% of the contract sum for payment, executed on AIA Document A312.
- C. The surety on such bond or bonds will be a duly authorized surety company who is licensed by the State of Mississippi's Commissioner of Insurance and who has a B++ or higher rating in accordance with the most recent edition of the A.M. Best Company, Inc., Key Rating Guide.
- D. All bonds shall be countersigned by a Mississippi resident agent with the name and address typed or lettered legibly.
- E. All bonds must be accompanied by an appropriate Power of Attorney.

SECTION 00 62 16 INSURANCE

PART 1 - GENERAL

1.01 INSURANCE

- A. The Contractor is responsible for maintaining the following insurance coverage:
 - 1. Builder's Risk for the Amount of the Contract.
 - 2. Liability Insurance (see Section 00 73 00 Supplementary Conditions).
 - 3. Workmen's Compensation.

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(Itawamba County School District)

SECTION 00 72 00 GENERAL CONDITIONS

PART 1 - GENERAL

1.01 SUMMARY

- A. The General Conditions of the Contract for Construction is AIA Document A201-2017 Edition.
 - 1. See Section 00 73 00 for supplementary conditions.
- B. If a conflict exists between the General Conditions and the Specifications, the Specifications shall rule. Any party discovering a conflict between the Specifications and the General Conditions shall immediately notify the Architect in writing.
- C. A copy of the General Conditions is available at the Architect's office for the Contractor's examination. The General Conditions are incorporated by reference as though fully written herein.
- D. Prospective bidders should read and understand the General Conditions before submitting bids or executing the Agreement.

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SECTION 00 73 00 SUPPLEMENTAL CONDITIONS

PART 1 - GENERAL

1.01 DESCRIPTION

- A. The following Supplemental Conditions modify the "General Conditions of the Contract for Construction," AIA Document A201-2017 Edition. Where a portion of the General Conditions is modified or deleted by the Supplemental Conditions, the unaltered portions of the General Conditions shall remain in effect. In the event of a conflict between the General Conditions of the Contract for Construction and Section 00 73 00, Section 00 73 00 shall control even if the conflicting provisions in the General Conditions of the Contract for Construction is not expressly revised or deleted by reference in Section 00 73 00.
- B. The General Conditions may also be supplemental or amplified elsewhere in the Contract Documents by provisions located in, but not necessarily limited to, Division 1 of the Specifications.

1.02 SUPPLEMENTS

ARTICLE 1 – GENERAL PROVISIONS

1.1 BASIC DEFINITIONS

1.1.1 THE CONTRACT DOCUMENTS

Delete the last sentence in Article 1.1.1 and insert the following:

The Contract Documents shall include Instruction to Bidders, the plans, the specifications, including Division 0 through 48, all Addenda and modifications to the plans and/or specifications, the agreement between Owner and Contractor, the performance and payment bonds, the notice to proceed and any executed Change Orders. Information and documentation pertaining to soil investigation data, laboratory investigation, soil borings and related information included herein are not part of the Contract Documents. In the event of a conflict between the provisions of Division 0 and any other section of the Contract Documents, such other section(s) shall govern.

1.1.2 THE CONTRACT

Add the following to the end of Article 1.1.2:

When there is a conflict between large scale drawings and small scale drawings, the question shall be promptly submitted to the Architect for interpretation, explanation or clarification. One drawing does not take precedent over another. Where the word "similar" appears on the plans, it shall not be interpreted to mean "identical" and shall require the Contractor to coordinate the actual conditions and dimensions of the location where "similar" conditions are shown to occur.

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1.1.9 MISCELLANEOUS DEFINITIONS

Add the following:

The term "products" as used in Supplementary Conditions includes materials, systems and equipment.

1.2 CORRELATION AND INTENT OF THE CONTRACT DOCUMENTS

1.2.4 Add the following to Article 1.2.4:

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 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 in the Work, in full accordance with the Contract Documents and reasonably inferable from them as necessary to produce the intended results.

1.2.5 Add the following to Article 1.2.5:

The Contract Documents shall be interpreted collectively, each part complementing the others and consistent with the intent of the Contract Documents. 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 operable conditions ready for use or subsequent construction or operation by the Owner or separate contractors. The omission of words or phrases 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.

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

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.

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.

- 1.7 Delete Article 1.7 in its entirety
- 1.8 Delete Article 1.8 in its entirety

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<u>ARTICLE 2 – OWNER</u>

- 2.2 INFORMATION AND SERVICES REQUIRED BY THE OWNER
- 2.2.1 Add the following to Article 2.2.1:

If the Project is a private project, not funded by public funds, then...

- 2.2.2 Delete Article 2.2.2 in its entirety
- 2.3 INFORMATION AND SERVICES REQUIRED BY THE OWNER
- 2.3.1 Delete Article 2.3.1 in its entirety
- 2.3.2 Add the following at the end of Article 2.3.2:

NOTE: the term "Architect", "Engineer" or "Design Professional" as used in the Contract Documents refers to PryorMorrow PC

- 2.3.4 Delete Article 2.3.4 in its entirety
- 2.3.6 Delete Article 2.3.6 in its entirety and insert the following:

The Contractor will be furnished free of charge a digital copy of the plans and specifications, including all addenda. Printed sets will be furnished at the cost of reproductions, postage and handling.

- 2.4 OWNER'S RIGHT TO STOP THE WORK
- 2.4 Delete Article 2.4 in its entirety and insert the following:

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

The rights and the remedies under this Article 2.4 are in addition to and do not in any respect limit any other rights of the Owner, including its termination rights under article 14.

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<u>ARTICLE 3 – CONTRACTOR</u>

3.1 GENERAL

3.1.1 Add the following at the end of article 3.1.1:

The relationship of Contractor to Owner shall be that of independent contractor, and nothing in the Contract Documents is intended to nor should it be construed as creating any other relationship, expressed or implied, between Owner and Contractor.

3.2 REVIEW OF CONTRACT DOCUMENTS AND FIELD CONDITIONS BY CONTRACTOR

3.2.5 Add the following Article 3.2.5:

The Owner is entitled to deduct from the Contractor's pay applications for amounts paid to the Architect for evaluating and responding to the Contractor's request for information that are not prepared in accordance with the Contract Documents or where the requested information is available to the Contractor from a careful study and comparison of the Contract Documents, field conditions, other Owner-provided information, Contractor-prepared coordination drawings, or prior Project correspondence or documentation.

3.4 LABOR AND MATERIALS

3.4.2 Add the following to the end of Article 3.4.2:

Some Sections of the specifications may not allow substitutions of materials, products or equipment. Where substitutions of products in place of those specified only under the conditions set forth in Section 01 25 13 of the specifications.

By making request for substitutions, the Contractor:

- .1 Represents that the Contractor has personally investigated the proposed substitute product and determined that it is equal or superior in all respects to that specified;
- .2 Represents that the Contractor will provide the same warranty for the substitution that the Contractor would for that specified;
- .3 Certifies that the cost data presented is complete and includes all related cost under this Contract except the Architect's redesign cost, and waives all claims for additional cost related to the substitution which subsequently becomes apparent; and
- .4 Shall coordinate the installation of the accepted substitute, making such changes as may be required for the Work to be complete in all respects at its cost.

All substitutions shall be submitted within 30 days of the Notice to Proceed, as per Section 01 25 13

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3.4.5 Add the following Article 3.4.5:

Contractor represents that it has independently investigated, considered and understands the labor conditions in the area surrounding the Project and acknowledge that such conditions may impact the Contractor's cost and/or time of performance of the Contract. Therefore, Contractor further represents that the Contract Price is based upon Contractor's independent investigations into such labor conditions and that the Contract time is reasonable and the date of Substantial Completion is obtainable. As a result, Contractor assumes the risk of increased cost, if any, incurred by it arising out of or related to such labor conditions and acknowledges that Contractor and its surety will reimburse Owner for any additional costs the Owner incurs arising out of or related to such labor condition.

- 3.7 PERMITS, FEES, NOTICES AND COMPLIANCE WITH LAWS
- 3.7.1 Delete Article 3.7.1 in its entirety and insert the following:

The Contractor shall secure and pay for the building permit and all other permits, fees, licenses, inspections and all other approvals and charges necessary for proper execution and completion of the Work.

- 3.7.3 Delete the words "knowing it to be" from Article 3.7.3
- 3.9 SUPERINTENDENT
- 3.9.1 Add the following to the end of Article 3.9.1

The Contractor shall also employ a competent project manager who shall be primarily responsible for the Contractor's home office activities in connection with the Contract.

The Owner shall have the right, which shall be exercised in a reasonable fashion, to approve the project manager and/or superintendent employed by the Contractor, either before or during the progress of construction.

The superintendent and project manager for the project shall be designated by the Contractor at the pre-construction conference. After Owner's approval of such project manager and superintendent, they shall not be replaced by the Contractor without the Owner's prior written consent, which consent is required unless the Contractor submits proof satisfactory to the Owner that the superintendent and/or project manager should be terminated by the Contractor for cause.

3.10 CONTRACTOR'S CONSTRUCTION AND SUBMITTAL SCHEDULES

3.10.1 Add "but, in any event, no less than submission of a revised schedule with each monthly application for payment pursuant to Section 9.3" between "intervals" and "as" in the fourth sentence.

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3.10.3 Delete Article 3.10.3 in its entirety and insert the following:

Time being of the essence, the Contractor shall perform the Work in accordance with the most recent schedule submitted to and approved by the Owner and Architect.

- 3.12 SHOP DRAWINGS, PRODUCT DATA AND SAMPLES
- 3.12.6 Add the following to the end of Article 3.12.6:

In reviewing Shop Drawings, Product Data, Samples and similar submittals the Architect shall be entitled to rely upon the Contractor's representation that such information is correct and accurate.

3.12.8 Add the following to the end of Article 3.12.8:

Unless such written notice has been given, the Architect's approval of a Shop Drawing, Product Data, Sample or similar submittal shall not constitute approval of any changes not requested on the prior submittal.

3.12.9 Add the following to the end of Article 3.12.9:

The Architect's review of the Contractor's submittals will be limited to examination of an initial submittal and one (1) resubmittal. The Architect's review of additional submittals will be made only with the consent of the Owner after notification by the Architect. The Owner shall be entitled to deduct from the Contract Sum amounts paid to the Architect for evaluation of such additional submittals.

3.12.10.1 Delete the second sentence entirely and replace with the following:

The performance and design criteria specified by the Architect in the Contract Documents shall be prepared in accordance with the applicable standard of care.

- 3.18 INDEMNIFICATION
- 3.18.1 Add the word "defend" before the word "indemnify" in the first line, add the words "or nonperformance" after the word "performance" in the third line and delete the phrase which begins "provided that such claim, damage, loss or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself)," to the end of the sentence.

ARTICLE 4 – ARCHITECT

- 4.2 ADMINISTRATION OF THE CONTRACT
- 4.2.10 Delete Article 4.2.10 in its entirety

ARTICLE 5 – SUBCONTRACTORS

- 5.2 AWARD OF SUBCONTRACTS AND OTHER CONTRACTS FOR PORTIONS OF THE WORK
- 5.2.1 Delete the phrase "Unless otherwise stated in the Contract Documents, the Contractor, as soon as practicable after award of the Contract" from the first sentence of Article 5.2.1 and insert the following in lieu thereof:

"The Contractor, with its first Application for Payment and as a condition to the Owner's obligation to make payments to Contractor under Article 9 of the General Conditions as supplemented herein.

5.2.5 Add the following:

The Contractor's unauthorized substitutions of any subcontractor, supplier, person or entity previously identified by Contractor in accordance with Article 5.2.1 shall entitle the Owner to reject the work, materials or product furnished and require removal and replacement at no additional cost to the Owner.

ARTICLE 6 – CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS

- 6.1 OWNERS RIGHT TO PERFORM CONSTRUCTION AND TO AWARD SEPARATE CONTRACTS
- 6.1.1 Delete Articles 6.1.1 in its entirety and insert the following:

The term "Separate Contractor(s)" shall mean other contractors retained by the Owner under separate agreements. The Owner reserves the right to perform construction or operations related to the Project with the Owner's own forces and to award separate contracts either in connection with other portions of the Project or other construction or operation on the site. In such event, the Contractor shall coordinate its activities with those of the Owner and of separate contractors so as to facilitate the general progress of all work being performed by all parties. Cooperation will be required in the arrangement for the storage of materials, and in detailed execution of the Work.

The Contractor, including his subcontractors, shall keep informed of the progress and the detailed work of the Owner or separate contractors and shall immediately notify the Architect of lack of progress or delays by separate contractors which are affecting Contractor's Work. Failure of Contractor to keep informed of the progress of the work of the Owner or other contractors and/or failure of Contractor to give notice of lack of progress or delays by the Owner or separate contractors shall be deemed to be acceptance by Contractor of the status of progress by other contractors for the proper coordination and completion of Contractor's Work. If, through acts of neglect on the part of the Contractor, the Owner or any separate contractors or subcontractor shall suffer loss or damage or assert any claims of whatever nature against the Owner, the Contractor shall defend, indemnify and hold harmless the Owner from any such claims or alleged damages, and the Contractor shall resolve such alleged damages or claims directly with the separate contractors or subcontractors.

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- 6.1.2 Delete Articles 6.1.2 in its entirety
- 6.1.3 Delete Articles 6.1.3 in its entirety
- 6.1.4 Delete Articles 6.1.4 in its entirety
- 6.2 MUTUAL RESPONSIBILITY
- 6.2.3 Delete Article 6.2.3 in its entirety

ARTICLE 7 – CHANGES TO THE WORK

- 7.1 GENERAL
- 7.1.1 Add "Written" in front of "Change Order" on the second line.
- 7.1.2 Add in the last line between "Work" and "may" the words "not affecting time or money"
- 7.1.3 Add the following to the end of article 7.1.3:

Except as permitted in Article 7.3, a change in the Contract Time shall only be accomplished by written Change Order. Therefore, the Contractor acknowledges that it is not entitled to a change in the Contract Sum or the Contract Time in the absence of a written Change Order on the basis of the course of conduct or dealings between the parties and/or the Owner's express or implied acceptance of alterations or additions to the Work and/or the Owner has been unjustly enriched by the Contractor's Work or any other basis otherwise allowed by law or the facts and Contractor agrees that any such extra or changed work was performed by it as volunteer.

- 7.2 CHANGE ORDERS
- 7.2.2 Add the following to Article 7.2.2:

Contractor's execution of a Change Order constitutes a final settlement to the contract Sum and construction schedule and the Contract Time for all matters relating to or arising out of the change in the Work that is subject of the Change Order including, but not limited to, all direct and indirect cost associated with such change, all extended direct job site and home office overhead expenses and any and all delay and impact cost for the change, whether alone or in combination with other changes, including any impact, ripple or cumulative effect resulting there from, if any.

7.2.3 Add the following to Article 7.2.3:

Adjustments to the Contract Sum by Change Order shall be based upon one of the methods set forth in Article 7.3.3.1, 7.3.3.2, 7.3.3.3 or 7.3.3.4, as appropriate. A reasonable allowance for the combined overhead and profit included in the Change Order shall be based upon the schedule set forth in Article 7.3.11, as supplemented.

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7.2.4 Add the following to Article 7.2.4:

In order to facilitate consideration of Change Order requests, all such request, except those involving an mount less than \$500 must be accompanied by a complete itemization of cost, including labor, materials and subcontractor cost which shall likewise be itemized. Changes for more than \$500 will not be approved without such itemization.

7.3 CONSTRUCTION CHANGE DIRECTIVE

- 7.3.5 Add "Owner or" between "the" and "Contractor" in both places they appear in this Article.
- 7.3.8 Delete the first sentence and insert the following:

The amount of credit to be given by the Contractor to the Owner for a deletion or change which results in a net decrease in the Contract Sum shall be the actual net cost plus reasonable allowances for the combined overhead and profit based upon the schedule set forth in Article 7.3.11.

7.3.11 Add the following to Article 7.3.11:

The allowance for overhead and profit combined, including all taxes, permits, insurance, bond, job superintendent, job and home office expenses, extended direct job and home office overhead, and any and all delay, impact, inefficiency, disruption and ripple effect to be included in the total cost to the Owner is limited to fifteen (15%) percent for adds and zero (0% percent) for deducts of the total of the actual cost of materials, labor and subcontracts. All subcontractors shall acquiesce to the same requirements when participating in a Change Order.

Cost to which overhead and profit is to be applied shall be determined in accordance with Article 7.3.4.

ARTICLE 8 – TIME

8.2 PROGRESS AND COMPLETION

8.2.1 Add the following to the end of the second sentence of Article 8.2.1:

...and that the Contractor is fully capable of properly completing the Work within the Contract Time.

8.3 DELAYS AND EXTENSIONS OF TIME

8.3.1 Add the following to the end of Article 8.3.1:

However, to the fullest extent permitted by law, and notwithstanding any other provisions in the Contract Documents, the Owner and its agents and employees, and the Architect shall not be liable for any damages for delay for direct or indirect costs, extended home office overhead, idle or inefficient labor or equipment, cost escalations, or monetary claims of any nature arising from or attributable to delay by any cause whatsoever, the

Contractor's sole and exclusive remedy for delay by any cause whatsoever is an extension of the Contract Time but no increase in the Contract Sum. Adverse weather shall not be grounds for time extensions unless the number of days exceeds the days provided in Section 01 29 10, and directly affects the overall completion of the Work as reflected in the critical path of the Contractor's updated and accepted construction schedule.

8.3.3 Add the following to the end of Article 8.3.3:

No delay, interferences, hindrance or disruption, from whatever source or cause, in the progress of the Contractor's Work shall be a basis for an extension of time and/or additional compensation, unless the delay, interference, hindrance or disruption (1) is without the fault and not the responsibility of the Contractor, its subcontractors and/or suppliers and (2) directly affects the overall completion of the Work as reflected on the critical path of the Contractor's updated and accepted construction schedules. The Contractor expressly agrees that the Owner shall have the benefit of any float in the construction schedule and that delays to construction activities, which do not affect the overall completion of the Work, do not entitle the Contractor to any extension in the Contract Time and/or increase the Contract Sum.

8.3.4 Add the following to the end of Article 8.3.4:

All claims by the Contractor for an increase in the Contract Time must follow the procedures set forth in Article 15.1.2, 15.1.3, 15.1.5 and 15.1.6, including the requirements that the Contractor give written notice of any claim within twenty-one (21) days after occurrence of the event giving rise to such claim or within twenty-one (21) days after the Contractor first recognizes the conditions giving rise to the claim, whichever is earlier.

8.3.5 Add the following to the end of Article 8.3.5:

If the Contractor submits a schedule indicating or otherwise expressing an intent to complete the Work prior to the date of substantial completion, the Owner shall have no liability to the Contractor for any failure by the Contractor to complete the Work prior to the expiration of the Contract Time.

ARTICLE 9 – PAYMENTS AND COMPLETION

9.3 APPLICATIONS FOR PAYMENTS

9.3.1 Add the following to the end of Article 9.3.1:

The form of Application for Payment will be the current edition of the AIA Document G702, Application for Certification for Payment, supported with AIA Document G703, Continuation Sheet.

9.3.1.3 Add the following to Article 9.3.1.3:

In any contract awarded by the State of Mississippi or any agency, unit or department of the State of Mississippi, or by any political subdivision thereof, the amount of retainage that may be withheld is governed by Mississippi law.

In all other contracts, the Owner will retain, until the Work is one hundred (100%) percent complete, five (5%) percent of the amount due the Contractor on account of progress payments. No reduction in retainage will be made until final payment is made except that when the original Contract amount is in an amount equal to or greater than \$750,000.00, then whenever such Work is fifty (50%) percent complete and on schedule and satisfactory, in the opinion of the Architect and the Owner, fifty (50%) percent of the retainage may be returned to the Contractor and two and one half (2 1/2%) percent will be retained on all subsequent progress payments. The Owner may subsequently increase the retainage if the Contractor's manner of completion of the Work and/or its progress do not remain satisfactory to the Architect and/or Owner or if the Surety withholds its consent to payment for other good and sufficient reasons.

When submitting request for reduction in retainage, the Contractor shall include, with the application, a Consent of Surety to Reduction of Retainage, and a Power of Attorney.

9.3.2 Add the following to the end of the first sentence in Article 9.3.2:

...upon submission by the Contractor of an application for payment for such materials and/or equipment, supported by invoice(s) for such materials and/or documentation required by Section 00 73 00, Article 9.3.2.2, subparts .4.

9.3.2.1 Add the following to Article 9.3.2.1:

Payment for materials stored at some location other than the Project site, may be approved by the Architect and the Owner after the Contractor has submitted the following items:

- .1 An acceptable Lease Agreement between the Contractor or one of its subcontractors or suppliers and the owner of the land, or building, where the material is stored.
- .2 Consent of Surety or other acceptable bond to cover the materials stored off-site.
- .3 All Perils Insurance coverage for the full value of the materials stored off-site.
- .4 A Bill of Sale from the Manufacturer to the Contractor for the stored materials.
- .5 A complete list of inventory of materials manufactured, stored and delivered to the storage site and of materials removed from the storage site and delivered to the Project.
- .6 A review by the Architect of the materials stored off-site prior to release of payment. The Contractor shall pay the Architect at the standard hourly rates of the Architect plus mileage as allowed by the IRS for the Architect to visit and

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verify off-site stored materials. This time and mileage begins and ends at the Architect's office.

- .7 Proof of payment of stored materials verified by the supplier must be submitted to the Architect within thirty (30) days of the application for Payment on which payment for said materials was made. If proof of payment is not submitted within thirty (30) days, then payment for said materials will be deducted from the next application for payment and withheld until proof of payment is received.
- 9.3.2.2 Add the following to Article 9.3.2.2:

If approved for payment by the Architect, then payment for stored materials will be made for the invoice amount, overhead and profit will be limited to a total of ten (10%) percent of the invoice amount. Any remaining balance for this item on the Schedule of Values will be paid to the Contractor upon incorporation of the materials into the Project. Payment for stored materials shall not exceed the amount indicated in the Schedule of Values less retainage.

- 9.3.3 Add the following to the first sentence, between "Application for Payment" and "will" in Article 9.3.3:
 - , whether incorporated in the Project or not,
- 9.5 DECISIONS TO WITHOLD CERTIFICATION
- 9.5.1.7 Delete the word "repeated."
- 9.5.1.8 Add the following to Article 9.5.1.8:

The letter from the Contractor which is required by Article 15.1.5.2 has not been received.

- 9.6 PROGRESS PAYMENTS
- 9.6.1 Delete Article 9.6.1 in its entirety and insert the following:

Subject to the conditions of the Contract, the Owner shall make payment to the Contractor in the amount certified within thirty (30) days after receipt of the Certificate for Payment from the Architect. Payment shall not be considered late until thirty (30) days after Owner's receipt of the approved Certificate for Payment from the Architect.

9.6.1.1 Contractor's Application for Payment shall be submitted on or before the 25th day of each month. Any application not submitted on or before this date may not be processed or approved until the following month.

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9.6.7 Delete the word "Unless" from the first sentence in Article 9.6.7 and insert the phrase "Whether or not"

Add the following to the end of Article 9.6.7:

The amount retained by the Contractor from each payment to each Subcontractor and material supplier shall not exceed the percentage retained by the Owner from the Contractor for the Subcontractor's Work.

- 9.7 FAILURE OF PAYMENT
- 9.7 Delete the words "or awarded by binding dispute resolution" in the first sentence in Article 9.7
- 9.8 SUBSTANTIAL COMPLETION
- 9.8.1 Delete Article 9.8.1 in its entirety and insert the following:

Substantial Completion for purposes of this Contract occurs only upon Contractor's compliance with the following conditions precedent:

(a) the Contractor furnishes Contractor's completed punch list, (b) the Contractor furnishes all life safety systems subcontractors inspection report, (c) the Contractor furnishes all other required documentation by other specification sections, (d) the Architect certifies that the work is sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work for its intended purpose, (e) the Owner, Architect, Fire Marshal and/or Building Inspector witness a life safety systems test, (f) the Fire Marshal and/or Building Inspector provides the Contractor with a Certificate of Occupancy and (g) The Contractor furnishes the Guarantee of Work set forth herein below.

The Guarantee of Work shall be submitted as a separate document signed by the Contractor and Contractor's Surety and shall state the following:

Contractor and Contractor's Surety

hereby guarantees that all Work performed on the Project is free from defective and/or nonconforming materials and workmanship and that for a period of one (1) year from the date of final completion or such longer period of time as may be called for in the Contract Documents for such portions of the Work, Contractor or its Surety will repair and/or replace any defective and/or nonconforming materials and workmanship in accordance with the requirements of the Contract Documents.

9.8.2.1 Add the following to Article 9.8.2.1:

The Contractor shall be responsible for the costs of inspections made by the Architect including any and all other related expenses incurred by the Architect for providing services for the Project required by failure of the Contractor to achieve final

acceptance/completion of the Project within thirty (30) days after the first occurrence of the below described events:

- 1. Specified date of Substantial Completion; or
- 2. Actual date of Substantial Completion.

The cost of the Architect's additional services shall be deducted by the Owner from the Contractor's final application for payment to pay the Architect for additional services required by the Contractor's failure to achieve final completion of the Project within the thirty (3) day period described above.

9.8.4 Delete the last sentence of Article 9.8.4 and insert the following:

Warranties required by the Contract Documents shall commence on the date of final acceptance/completion unless otherwise provide din the Contract Documents.

9.8.5 Add the following to the end of Article 9.8.5:

Contractor's execution of the Certificate of Substantial Completion constitutes
Contractor's representation that the items on the list accompanying the Certificate can
and will be completed by Contractor and his subcontractors within thirty (30) days of
Contractor's execution of the Certificate. Based upon this representation by the
Contractor and upon the acknowledgment of the Architect that the listed items remaining
can be completed within thirty (30) days, the Owner agrees to execute the Certificate of
Substantial Completion. If Contractor fails to complete the items on the list within thirty
(30) days of Contractor's execution of the Certificate, then the Owner, as its option and
without prejudice to any other rights or remedies it may have under this Contract or
otherwise and without notice to Contractor or Surety, may proceed to have same
completed and to deduct the reasonable costs thereof from the amounts then due or
thereafter to become due to the Contractor.

9.8.6 Add the following Article 9.8.6

The costs for inspections requested by the Contractor and made by the architect which are not required by Article 4, 9.8, 9.10 or 12 of the General Conditions and any other inspection required by Article 12 other than the year-end inspection itself, will be the responsibility of the Contractor and will be deducted by the Owner from the application for Payment submitted after the Owner's receipt of the Architect's statement for its costs of additional inspections. These costs are not the result of Contractor's failure to timely complete the Contract within the specified time and, therefore, such costs are in addition to and not part of any liquidated damages calculations, if any.

9.8.7 Add the following Article 9.8.7

Upon the Owner's acceptance of the Work as substantially complete and upon Contractor's compliance with all conditions precedent to substantial completion as stated in Section 00 73 00, Article 9.8.1 and upon application by the Contractor, the Owner will pay to the Contractor all retainage held by the Owner less an amount equal to the greater of (a) two (2%) percent of the Contract Sum, or (b) two hundred (200%) of the estimated

cost of the Work remaining to be performed by the Contractor in accordance with the Architect's determination. Final payment, including all retainage, shall be made at the time and in the manner provided for final payment in accordance with the provisions of Article 9.10 and the additional conditions precedent to final acceptance / payment set forth in Section 00 73 00, Article 9.8.5.

9.9 PARTIAL OCCUPANCY OR USE

9.9.1.2 Add the following to Article 9.9.1.2:

The Owner's occupancy or use of any completed or partially completed portions of the Work shall not affect the Contractor's obligation to complete incomplete items on the list attached to the Certificate of Substantial Completion within the time fixed in the Certificate and does not waive Owner's rights to obtain completion of incomplete items at Contractor's expense upon Contractor's failure to timely complete same.

9.10 FINAL COMPLETION AND FINAL PAYMENT

- 9.10.2 Delete "and" between "payment" and "(5)" and add the following to the end of the first sentence in Article 9.10.2:
 - (6) all closeout documents required by the Contract Documents in a form satisfactory to the architect and Owner, and
 - (7) the manufactures' certificates and/or warranties required by the Contract Documents

9.11 LIQUIDATED DAMAGES

9.11.1 Add the following to Article 9.11.1:

Liquidated Damages. Time being of the essence of this Contract and a matter of material consideration thereof, a reasonable estimate in advance is established to cover losses incurred by the Owner of the Project is not substantially complete on the date set forth in the Contract Documents. The Contractor and his Surety will be liable for and will pay the Owner the sums hereinafter stipulated as fixed and agreed as liquidated damages for each calendar day for delay until the Work is substantially complete. The Contractor and his Surety acknowledge that the Owner's losses caused by the Contractor's delay are not readily ascertainable and that the amount estimated per day for liquidated damages is reasonable and is not a penalty.

See specification <u>Section 00 41 00 – Bid Form</u> for established amount for Liquidated Damages.

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ARTICLE 10 – PROTECTION OF PERSONS AND PROPERTY

- 10.1 SAFETY PRECAUTIONS AND PROGRAMS
- 10.1 Add the following to the end of Article 10.1:

The Architect shall not administer the Contractor's performance of its duties and responsibilities under Article 10 because the initiation, maintenance and supervision of safety precautions and programs is the sole responsibility of the Contractor as means, methods, techniques, sequences and procedures of construction and, therefore, is not part of the Contractor's scope of Work which is to be administered by the Architect.

<u>ARTICLE 11 – INSURANCE AND BONDS</u>

- 11.4 LOSS OF USE, BUSINESS INTERUPTIONS, AND DELAY IN COMPLETE INSURANCE
- 11.4 Delete Article 11.4 in its entirety

ARTICLE 12 – UNCOVERING AND CORRECTION OF WORK

- 12.1 UNCOVERING OF WORK
- 12.1.2 Delete the second sentence of Article 12.1.2 entirely and replace with:

"If such Work is in accordance with the Contract Documents, cost of uncovering and replacement shall, by appropriate Change Order, be at the Owner's expense.

- 12.2 CORRECTION OF WORK
- 12.2.2 AFTER SUBSTANTIAL COMPLETION
- 12.2.2.1 Add the following to the end of Article 12.2.2.1:

Prior to the end of the one-year period, the Architect may schedule a warranty inspection which shall be attended by the Architect, the Owner, the Contractor and all major subcontractors. During the inspection, the parties shall identify all defective and/or nonconforming items and fix time within which all defective and/or nonconforming items shall be repaired and/or replaced.

12.2.2.1.1 Add the following Article 12.2.2.1.1:

Within the one-year period provided for in the Guarantee of Work required by Article 9.8.1, if repairs or replacement are requested by the Owner in connection with the Work which, in the opinion of the Owner, are rendered necessary as a result of the use of materials, equipment or workmanship which are inferior, defective or not in accordance with the Contract Documents, the Contractor and/or its Surety shall promptly, upon receipt of notice from and without expense to the Owner, place in satisfactory condition in every particular, all such Work, correct all defects therein and make good all damages to the building, site, equipment or contents thereof; and make good any work or materials or the equipment and contents of said buildings or site disturbed in fulfilling any such

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guarantee. If, after notice or within the time agreed upon by all parties at the warranty inspection, the Contractor and/or its Surety fail to proceed promptly to comply with the terms of the guarantee, the Owner may have the defects corrected in accordance with Article 2.4 and the Contractor and his Surety shall be liable for all expenses incurred. All special guarantees applicable to definite parts of the Work stipulated in the Contract Documents shall be subject to the terms of this paragraph during the first year of the life of such special guarantee.

<u>ARTICLE 13 – MISCELLANEOUS PROVISIONS</u>

- 13.5 INTEREST
- 13.5 Delete Article 13.5 in its entirety and insert the following:

Payments due and unpaid under the Contract Documents shall bear interest as provided by applicable Mississippi law.

- 13.6 ATTORNEYS' FEES AND EXPENSES
- 13.6 Add the following Article 13.6 to private projects not funded in whole or in part by public monies:

The prevailing party in any dispute between the parties arising out of or related to this Agreement or the breach thereof, shall be entitled to reasonable attorney's and expert witness(es) fees and expenses incurred in pursuing or defending any claim.

ARTICLE 14 – TERMINATION OR SUSPENSION OF THE CONTRACT

- 14.1 TERMINATION BY THE CONTRACTOR
- 14.1.1.4 Delete Article 14.1.1.4 in its entirety
- 14.2 TERMINATION BY THE OWNER FOR CAUSE
- 14.2.1.1 Delete the word "repeatedly" from Article 14.2.1.1.
- 14.2.1.3 Delete the word "repeatedly" from Article 14.2.1.3.
- 14.2.1.5 Add the following Articles 14.2.1.5:

Fails to achieve Substantial Completion of the Project as described in Section 00 73 00, Article 9.8.5, within the time stated therein;

14.2.1.6 Add the following Article 14.2.1.6:

Fails to meet any deadline required by the Contract. Contractor acknowledges that time is of the essence of this Contract and that all deadlines required by the Contract are critical to timely completion of the Contract. Therefore, Contractor agrees that its failure to meet any deadline constitutes a substantial and material breach of this Contract, entitling the Owner to terminate the Contract.

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- 14.2.2 Delete the word "certification" in the first sentence and insert the word "advice" and delete the phrase "Initial Decision Maker" and insert the word "Architect" in Article 14.2.2.
- 14.2.4 Delete the phrase "Initial Decision Maker" and insert the word "Architect" in article 14.2.4.
- 14.2.5 Add the following Article 14.2.5:

If the Owner terminates the Contract for cause, and its determined for any reason that the Contractor was not actually in default under the Contract at the time of termination, the Contractor shall be entitled to recover from the Owner the same amount as the Contractor would be entitled to receive under a termination for convenience as provided by Article 14.4. The foregoing shall constitute the Contractor's sole and exclusive remedy for termination of the Contract. In no event shall the Contractor be entitled to special, consequential, or exemplary damages, nor shall the Contractor be entitled to anticipated profits resulting from termination of this Contract.

- 14.4 TERMINATION BY THE OWNER FOR CONVENIENCE
- 14.4.3 Add after the end of the last sentence "The Contractor shall not be entitled to receive any payment for either overhead or profit on work not performed" to Article 14.4.3.

ARTICLE 15 – CLAIMS AND DISPUTES

- 15.1.2 Delete the phrase "in accordance with the requirements of the final dispute resolution method selected within the Agreement" from Article 15.1.2
- 15.1.6 CLAIMS FOR ADDITIONAL TIME
- 15.1.6.2 Add the following to the end of Article 15.1.6.2:

Adverse weather shall not be grounds for extensions unless the number of rain days exceed the days provided in Section 01 29 10, of the Project Specifications and directly affects the overall completion of the work as reflected in the critical path of the Contractor's updated and accepted construction schedules.

The Contractor must submit each month with his Application for Payment a separate letter stating that he is requesting an extension of time for abnormal adverse weather or that he has no claim for an extension for that period of time. Payment is not due on the Application for Payment until the letter is received. Complete justification, including weather reports, daily reports, correspondence and any other supporting data must be provided for each day for which a request for time extension is made. A letter or statement that the Contractor was delayed is not as adequate justification. The receipt of this request and data by the Architect will not be considered as Owner or Architect approval of a time extension in any way.

15.1.6.3 Add the following Article 15.1.3.3:

Claims for increase in the Contract Time shall set forth in detail the facts and circumstances which support such Claim, including but not limited to, the cause of such delay, the date such delay began to affect the critical path, the date such delay ceased to affect the critical path and the number of days of additional time requested. The Contractor shall not be entitled to an increase in the Contract Time for delays which did not affect the critical path or to the extent there were concurrent non-excusable delays. The Contractor may be requested to provide additional documentation to substantiate its Claim, including but not limited to, schedules that indicate all activities affected by such delay.

15.1.7 Delete the first sentence in article 15.1.7 and replace with the following:

The Contractor and Owner waive claims against each other, Architect and Consultants for consequential damages arising out of or relating to this Contract.

- 15.2 INTITIAL DECISION
- 15.2.4 Add "within thirty (3) days" to the end of article 15.2.4
- 15.3 MEDIATION
- 15.3.1 Delete the phrase "may be subject to mediation as a condition precedent to binding dispute resolution" and insert the phrase "may by subject to mediation upon mutual agreement of the Owner and Contractor" to Article 15.3.1.
- 15.3.3 Delete Article 15.3.3 in its entirety
- 15.4 ARBITRATION
- 15.4.1 Delete the words "parties have" in the first sentence and insert the words "Owner has" and delete the phrase "unless the parties mutually agree" and insert the phrase "unless the Owner chooses" to Article 15.4.1.
- 15.4.4 CONSOLIDATION
- 15.4.4 Delete Article 15.4.4 (including subparts .1 .3) in its entirety
- 15.4.4.1 Add the following Article 15.4.4.1:

The Owner, at its sole discretion, may consolidate any arbitration, if any, conducted under this Agreement with any other arbitration to which it is a party where the Owner determines that the arbitrations to be consolidated substantially involve common questions of law or fact and the Owner, at its sole discretion, may include by joinder persons r entities substantially involved in a common question of law or fact whose presence is required if complete relief is to be accorded in arbitration.

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ADDENDUM TO AIA Document A101 – 2017 Exhibit A Insurance and Bonds

ARTICLE A.2 OWNER'S INSURANCE

A.2.2 Liability Insurance

Delete this provision entirely and replace with: "The Contractor will pay for and maintain such insurance as will protect the Owner and Architect from their contingent liability to others for damages because of bodily injury, including death, which may arise from operations under this Contract and other liability for damages which the Contractor is required to insure under any provision of this Contract. Certificate of this insurance shall be filed with the Owner and Architect and will be the same limits set forth in this Exhibit A, Article A.3.2.2."

- A.2.3.1 Delete the phrase "Unless this obligation is placed on the Contractor pursuant to Section A.3.3.2.1, the Owner" from the first line and replace with "The Contractor". Delete the word "Owner's" from the end of the fourth line and replace with "Contractor's". Delete the phrase "Substantial Completion and thereafter as provided in Section A.2.3.1.3, unless otherwise provided in the Contract Documents or otherwise agreed in writing by the parties to this Agreement" from the seventh and eighth lines and replace with "final payment has been made as provided in Article 9.10 of the AIA A201-2017 or until no person or entity other than the Owner has an insurable interest in the property required by this Section A.2.3 to be covered, whichever is later."
- A.2.3.1.3 Delete the phrase "Unless the parties agree otherwise, upon Substantial Completion, the Owner" from the first line and replace with "The Contractor".

A.2.3.1.4 **Deductibles and Self-Insured Retentions.**

Delete this provision entirely and replace with: "If the property insurance requires minimum deductibles, the Contractor shall pay the deductible and all other costs not covered because of such deductibles. If the Contractor or insurer increases the required minimum deductibles above the amounts so identified or if the Contractor elects to purchase this insurance with voluntary deductible amounts, the Contractor shall be responsible for payment of the additional costs not covered because of such increased or voluntary deductibles."

- A.2.3.1.5 Add this new provision as follows: "The insurance required by this Section A.2.3.1 shall provide coverage for physical damage to property while it is in storage and in transit to the construction site on an 'all-risks' completed value form."
- A.2.3.1.6 Add this new provision as follows: "The insurance required by this Section A.2.3.1 shall provide coverage for property owned by the Contractor and used on the Project, including scaffolding and other equipment."

A.2.3.3 Insurance for Existing Structures

Delete the word "Owner" from the end of the first line and replace with "Contractor". Delete the word "Owner" from the last sentence and replace with "Contractor".

A.3.1.1 Certificates of Insurance.

Add the words "and Architect" in the seventh line between "Owner" and "as". Add the following to the end of the last sentence:

"and the Contractor's certificate of insurance must state that the Owner and Architect are additional insureds under the referenced CGL policy and that all of Contractor's contractual liabilities, including but not limited to its indemnity obligations, are covered by such CGL policy.

Any language contained on the certificate of insurance form or elsewhere to the contrary is deemed stricken.

The certificate of insurance must also state that all of Contractor's contractual liabilities, including but not limited to its indemnity obligations, are covered. Any terms and conditions contained in the certificate of insurance which are contrary to the Contractor's contractual obligations are hereby stricken from the certificate."

A.3.1.4 Add this new provision as follows: "Furnish one copy of the certificate herein required for each copy of the Agreement, specifically setting forth evidence of all coverage required. Furnish to the Owner and Architect, copies of any endorsements that are subsequently issued amending coverage or limits. If the coverages are provided on a claims-made basis, the policy date or retroactive date shall predate the Contract and the termination date of the policy, or the applicable extended reporting period shall be no earlier than the termination date of coverages required to be maintained after final payment."

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Insurance and Bonds

This Insurance and Bonds Exhibit is part of the Agreement, between the Owner and the Contractor, dated the day of in the year (In words, indicate day, month and year.)

for the following **PROJECT**: (Name and location or address)

THE OWNER:

(Name, legal status and address)

THE CONTRACTOR:

(Name, legal status and address)

TABLE OF ARTICLES

A.1 GENERAL

A.2 OWNER'S INSURANCE

A.3 CONTRACTOR'S INSURANCE AND BONDS

A.4 SPECIAL TERMS AND CONDITIONS

ARTICLE A.1 GENERAL

The Owner and Contractor shall purchase and maintain insurance, and provide bonds, as set forth in this Exhibit. As used in this Exhibit, the term General Conditions refers to AIA Document A201TM—2017, General Conditions of the Contract for Construction.

ARTICLE A.2 OWNER'S INSURANCE

§ A.2.1 General

Prior to commencement of the Work, the Owner shall secure the insurance, and provide evidence of the coverage, required under this Article A.2 and, upon the Contractor's request, provide a copy of the property insurance policy or policies required by Section A.2.3. The copy of the policy or policies provided shall contain all applicable conditions, definitions, exclusions, and endorsements.

§ A.2.2 Liability Insurance

The Owner shall be responsible for purchasing and maintaining the Owner's usual general liability insurance.

ADDITIONS AND DELETIONS:

The author of this document has added information needed for its completion. The author may also have revised the text of the original AIA standard form. An Additions and Deletions Report that notes added information as well as revisions to the standard form text is available from the author and should be reviewed. A vertical line in the left margin of this document indicates where the author has added necessary information and where the author has added to or deleted from the original AIA text.

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

This document is intended to be used in conjunction with AIA Document A201™_2017, General Conditions for Construction. Article 11 of A201™_2017 contains additional insurance provisions.

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§ A.2.3 Required Property Insurance

§ A.2.3.1 Unless this obligation is placed on the Contractor pursuant to Section A.3.3.2.1, the Owner shall purchase and maintain, from an insurance company or insurance companies lawfully authorized to issue insurance in the jurisdiction where the Project is located, property insurance written on a builder's risk "all-risks" completed value or equivalent policy form and sufficient to cover the total value of the entire Project on a replacement cost basis. The Owner's property insurance coverage shall be no less than the amount of the initial Contract Sum, plus the value of subsequent Modifications and labor performed and materials or equipment supplied by others. The property insurance shall be maintained until Substantial Completion and thereafter as provided in Section A.2.3.1.3, unless otherwise provided in the Contract Documents or otherwise agreed in writing by the parties to this Agreement. This insurance shall include the interests of the Owner, Contractor, Subcontractors, and Sub-subcontractors in the Project as insureds. This insurance shall include the interests of mortgagees as loss payees.

§ A.2.3.1.1 Causes of Loss. The insurance required by this Section A.2.3.1 shall provide coverage for direct physical loss or damage, and shall not exclude the risks of fire, explosion, theft, vandalism, malicious mischief, collapse, earthquake, flood, or windstorm. The insurance shall also provide coverage for ensuing loss or resulting damage from error, omission, or deficiency in construction methods, design, specifications, workmanship, or materials. Sublimits, if any, are as follows:

(Indicate below the cause of loss and any applicable sub-limit.)

Causes of Loss

Sub-Limit

§ A.2.3.1.2 Specific Required Coverages. The insurance required by this Section A.2.3.1 shall provide coverage for loss or damage to falsework and other temporary structures, and to building systems from testing and startup. The insurance shall also cover debris removal, including demolition occasioned by enforcement of any applicable legal requirements, and reasonable compensation for the Architect's and Contractor's services and expenses required as a result of such insured loss, including claim preparation expenses. Sub-limits, if any, are as follows: (Indicate below type of coverage and any applicable sub-limit for specific required coverages.)

Coverage

Sub-Limit

- § A.2.3.1.3 Unless the parties agree otherwise, upon Substantial Completion, the Owner shall continue the insurance required by Section A.2.3.1 or, if necessary, replace the insurance policy required under Section A.2.3.1 with property insurance written for the total value of the Project that shall remain in effect until expiration of the period for correction of the Work set forth in Section 12.2.2 of the General Conditions.
- § A.2.3.1.4 Deductibles and Self-Insured Retentions. If the insurance required by this Section A.2.3 is subject to deductibles or self-insured retentions, the Owner shall be responsible for all loss not covered because of such deductibles or retentions.
- § A.2.3.2 Occupancy or Use Prior to Substantial Completion. The Owner's occupancy or use of any completed or partially completed portion of the Work prior to Substantial Completion shall not commence until the insurance company or companies providing the insurance under Section A.2.3.1 have consented in writing to the continuance of coverage. The Owner and the Contractor shall take no action with respect to partial occupancy or use that would cause cancellation, lapse, or reduction of insurance, unless they agree otherwise in writing.

§ A.2.3.3 Insurance for Existing Structures

If the Work involves remodeling an existing structure or constructing an addition to an existing structure, the Owner shall purchase and maintain, until the expiration of the period for correction of Work as set forth in Section 12.2.2 of the General Conditions, "all-risks" property insurance, on a replacement cost basis, protecting the existing structure against direct physical loss or damage from the causes of loss identified in Section A.2.3.1, notwithstanding the undertaking of the Work. The Owner shall be responsible for all co-insurance penalties.

§ A.2.4 Optional Extended Property Insurance.

The Owner shall purchase and maintain the insurance selected and described below. (Select the types of insurance the Owner is required to purchase and maintain by placing an X in the box(es) next to

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the description(s) of selected insurance. For each type of insurance selected, indicate applicable limits of coverage or other conditions in the fill point below the selected item.) [] § A.2.4.1 Loss of Use, Business Interruption, and Delay in Completion Insurance, to reimburse the Owner for loss of use of the Owner's property, or the inability to conduct normal operations due to a covered cause of loss. [] § A.2.4.2 Ordinance or Law Insurance, for the reasonable and necessary costs to satisfy the minimum requirements of the enforcement of any law or ordinance regulating the demolition, construction, repair, replacement or use of the Project. [] § A.2.4.3 Expediting Cost Insurance, for the reasonable and necessary costs for the temporary repair of damage to insured property, and to expedite the permanent repair or replacement of the damaged property. [] § A.2.4.4 Extra Expense Insurance, to provide reimbursement of the reasonable and necessary excess costs incurred during the period of restoration or repair of the damaged property that are over and above the total costs that would normally have been incurred during the same period of time had no loss or damage occurred. [] § A.2.4.5 Civil Authority Insurance, for losses or costs arising from an order of a civil authority prohibiting access to the Project, provided such order is the direct result of physical damage covered under the required property insurance. [] § A.2.4.6 Ingress/Egress Insurance, for loss due to the necessary interruption of the insured's business due to physical prevention of ingress to, or egress from, the Project as a direct result of physical damage. [] § A.2.4.7 Soft Costs Insurance, to reimburse the Owner for costs due to the delay of completion of the Work, arising out of physical loss or damage covered by the required property insurance: including construction loan fees; leasing and marketing expenses; additional fees, including those of architects, engineers, consultants, attorneys and accountants, needed for the completion of the construction, repairs, or reconstruction; and carrying costs such as property taxes, building permits, additional interest on loans, realty taxes, and insurance premiums over and above normal expenses. § A.2.5 Other Optional Insurance. The Owner shall purchase and maintain the insurance selected below. (Select the types of insurance the Owner is required to purchase and maintain by placing an X in the box(es) next to the description(s) of selected insurance.) [] § A.2.5.1 Cyber Security Insurance for loss to the Owner due to data security and privacy breach, including costs of investigating a potential or actual breach of confidential or private information. (Indicate applicable limits of coverage or other conditions in the fill point below.) AIA Document A101™ – 2017 Exhibit A. Copyright © 2017 by The American Institute of Architects. All rights reserved. WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law. This document was produced by AIA software at 15:45:00 on 04/06/2018 under Order No. 8531833571 which expires on 11/21/2018, and is not for resale.

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[] § A.2.5.2 Other Insurance

(List below any other insurance coverage to be provided by the Owner and any applicable limits.)

Coverage

Limits

ARTICLE A.3 CONTRACTOR'S INSURANCE AND BONDS

§ A.3.1 General

§ A.3.1.1 Certificates of Insurance. The Contractor shall provide certificates of insurance acceptable to the Owner evidencing compliance with the requirements in this Article A.3 at the following times: (1) prior to commencement of the Work; (2) upon renewal or replacement of each required policy of insurance; and (3) upon the Owner's written request. An additional certificate evidencing continuation of commercial liability coverage, including coverage for completed operations, shall be submitted with the final Application for Payment and thereafter upon renewal or replacement of such coverage until the expiration of the periods required by Section A.3.2.1 and Section A.3.3.1. The certificates will show the Owner as an additional insured on the Contractor's Commercial General Liability and excess or umbrella liability policy or policies.

§ A.3.1.2 Deductibles and Self-Insured Retentions. The Contractor shall disclose to the Owner any deductible or selfinsured retentions applicable to any insurance required to be provided by the Contractor.

§ A.3.1.3 Additional Insured Obligations. To the fullest extent permitted by law, the Contractor shall cause the commercial general liability coverage to include (1) the Owner, the Architect, and the Architect's consultants as additional insureds for claims caused in whole or in part by the Contractor's negligent acts or omissions during the Contractor's operations; and (2) the Owner as an additional insured for claims caused in whole or in part by the Contractor's negligent acts or omissions for which loss occurs during completed operations. The additional insured coverage shall be primary and non-contributory to any of the Owner's general liability insurance policies and shall apply to both ongoing and completed operations. To the extent commercially available, the additional insured coverage shall be no less than that provided by Insurance Services Office, Inc. (ISO) forms CG 20 10 07 04, CG 20 37 07 04, and, with respect to the Architect and the Architect's consultants, CG 20 32 07 04.

§ A.3.2 Contractor's Required Insurance Coverage

§ A.3.2.1 The Contractor shall purchase and maintain the following types and limits of insurance from an insurance company or insurance companies lawfully authorized to issue insurance in the jurisdiction where the Project is located. The Contractor shall maintain the required insurance until the expiration of the period for correction of Work as set forth in Section 12.2.2 of the General Conditions, unless a different duration is stated below: (If the Contractor is required to maintain insurance for a duration other than the expiration of the period for correction of Work, state the duration.)

§ A.3.2.2 Commercial General Liability

§ A.3.2.2.1 Commercial General Liability insurance for the Project written on an occurrence form with policy limits of not less than Five Hundred Thousand Dollars (\$ 500000) each occurrence, One Million Dollars (\$ 1000000) general aggregate, and One Million Dollars (\$ 1000000) aggregate for products-completed operations hazard, providing coverage for claims including

- .1 damages because of bodily injury, sickness or disease, including occupational sickness or disease, and death of any person;
- personal injury and advertising injury;
- damages because of physical damage to or destruction of tangible property, including the loss of use of such property;
- bodily injury or property damage arising out of completed operations; and
- the Contractor's indemnity obligations under Section 3.18 of the General Conditions.

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§ A.3.2.2 The Contractor's Commercial General Liability policy under this Section A.3.2.2 shall not contain an exclusion or restriction of coverage for the following:

- .1 Claims by one insured against another insured, if the exclusion or restriction is based solely on the fact that the claimant is an insured, and there would otherwise be coverage for the claim.
- .2 Claims for property damage to the Contractor's Work arising out of the products-completed operations hazard where the damaged Work or the Work out of which the damage arises was performed by a Subcontractor
- .3 Claims for bodily injury other than to employees of the insured.
- .4 Claims for indemnity under Section 3.18 of the General Conditions arising out of injury to employees of the insured.
- .5 Claims or loss excluded under a prior work endorsement or other similar exclusionary language.
- .6 Claims or loss due to physical damage under a prior injury endorsement or similar exclusionary language.
- .7 Claims related to residential, multi-family, or other habitational projects, if the Work is to be performed on such a project.
- .8 Claims related to roofing, if the Work involves roofing.
- .9 Claims related to exterior insulation finish systems (EIFS), synthetic stucco or similar exterior coatings or surfaces, if the Work involves such coatings or surfaces.
- .10 Claims related to earth subsidence or movement, where the Work involves such hazards.
- .11 Claims related to explosion, collapse and underground hazards, where the Work involves such hazards.
- § A.3.2.3 Automobile Liability covering vehicles owned, and non-owned vehicles used, by the Contractor, with policy limits of not less than Five Hundred Thousand Dollars (\$ 500000) per accident, for bodily injury, death of any person, and property damage arising out of the ownership, maintenance and use of those motor vehicles along with any other statutorily required automobile coverage.
- § A.3.2.4 The Contractor may achieve the required limits and coverage for Commercial General Liability and Automobile Liability through a combination of primary and excess or umbrella liability insurance, provided such primary and excess or umbrella insurance policies result in the same or greater coverage as the coverages required under Section A.3.2.2 and A.3.2.3, and in no event shall any excess or umbrella liability insurance provide narrower coverage than the primary policy. The excess policy shall not require the exhaustion of the underlying limits only through the actual payment by the underlying insurers.
- § A.3.2.5 Workers' Compensation at statutory limits.
- § A.3.2.6 Employers' Liability with policy limits not less than One Hundred Thousand Dollars (\$ 100000) each accident, Five Hundred Thousand Dollars (\$ 500000) each employee, and (\$) policy limit.
- § A.3.2.7 Jones Act, and the Longshore & Harbor Workers' Compensation Act, as required, if the Work involves hazards arising from work on or near navigable waterways, including vessels and docks
- § A.3.2.8 If the Contractor is required to furnish professional services as part of the Work, the Contractor shall procure Professional Liability insurance covering performance of the professional services, with policy limits of not less than (\$) per claim and (\$) in the aggregate.
- § A.3.2.9 If the Work involves the transport, dissemination, use, or release of pollutants, the Contractor shall procure Pollution Liability insurance, with policy limits of not less than (\$) per claim and (\$) in the aggregate.
- **§ A.3.2.10** Coverage under Sections A.3.2.8 and A.3.2.9 may be procured through a Combined Professional Liability and Pollution Liability insurance policy, with combined policy limits of not less than (\$) per claim and (\$) in the aggregate.
- § A.3.2.11 Insurance for maritime liability risks associated with the operation of a vessel, if the Work requires such activities, with policy limits of not less than (\$) per claim and (\$) in the aggregate.

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Addition at Career and Technical Center (Itawamba County School District)

§ A.3.2.12 Insurance for the use or operation of manned or unmanned aircraft, if the Work requires such activities, with policy limits of not less than (\$) per claim and (\$) in the aggregate. § A.3.3 Contractor's Other Insurance Coverage § A.3.3.1 Insurance selected and described in this Section A.3.3 shall be purchased from an insurance company or insurance companies lawfully authorized to issue insurance in the jurisdiction where the Project is located. The Contractor shall maintain the required insurance until the expiration of the period for correction of Work as set forth in Section 12.2.2 of the General Conditions, unless a different duration is stated below: (If the Contractor is required to maintain any of the types of insurance selected below for a duration other than the expiration of the period for correction of Work, state the duration.) § A.3.3.2 The Contractor shall purchase and maintain the following types and limits of insurance in accordance with Section A.3.3.1. (Select the types of insurance the Contractor is required to purchase and maintain by placing an X in the box(es) next to the description(s) of selected insurance. Where policy limits are provided, include the policy limit in the appropriate fill point.) [] § A.3.3.2.1 Property insurance of the same type and scope satisfying the requirements identified in Section A.2.3, which, if selected in this section A.3.3.2.1, relieves the Owner of the responsibility to purchase and maintain such insurance except insurance required by Section A.2.3.1.3 and Section A.2.3.3. The Contractor shall comply with all obligations of the Owner under Section A.2.3 except to the extent provided below. The Contractor shall disclose to the Owner the amount of any deductible, and the Owner shall be responsible for losses within the deductible. Upon request, the Contractor shall provide the Owner with a copy of the property insurance policy or policies required. The Owner shall adjust and settle the loss with the insurer and be the trustee of the proceeds of the property insurance in accordance with Article 11 of the General Conditions unless otherwise set forth below: (Where the Contractor's obligation to provide property insurance differs from the Owner's obligations as described under Section A.2.3, indicate such differences in the space below. Additionally, if a party other than the Owner will be responsible for adjusting and settling a loss with the insurer and acting as the trustee of the proceeds of property insurance in accordance with Article 11 of the General Conditions, indicate the responsible party below.) [] § A.3.3.2.2 Railroad Protective Liability Insurance, with policy limits of not less than (\$) per claim and (\$) in the aggregate, for Work within fifty (50) feet of railroad property. [] § A.3.3.2.3 Asbestos Abatement Liability Insurance, with policy limits of not less than (\$) per claim and (\$) in the aggregate, for liability arising from the encapsulation, removal, handling, storage, transportation, and disposal of asbestos-containing materials. [] § A.3.3.2.4 Insurance for physical damage to property while it is in storage and in transit to the construction site on an "all-risks" completed value form. [] § A.3.3.2.5 Property insurance on an "all-risks" completed value form, covering property owned by the Contractor and used on the Project, including scaffolding and other equipment. [X] § A.3.3.2.6 Other Insurance (List below any other insurance coverage to be provided by the Contractor and any applicable limits.) Coverage Limits Owner / Contractor Protective Liability 1,000,000.00

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Contract Sum

Init.

Builders Risk

Addition at Career and Technical Center (Itawamba County School District)

§ A.3.4 Performance Bond and Payment Bond
The Contractor shall provide surety bonds, from a company or companies lawfully authorized to issue surety bonds in the jurisdiction where the Project is located, as follows: (Specify type and penal sum of bonds.)

Penal Sum (\$0.00) Type Payment Bond Contract Sum Performance Bond Contract Sum

Payment and Performance Bonds shall be AIA Document A312™, Payment Bond and Performance Bond, or contain provisions identical to AIA Document A312TM, current as of the date of this Agreement.

ARTICLE A.4 SPECIAL TERMS AND CONDITIONS

Special terms and conditions that modify this Insurance and Bonds Exhibit, if any, are as follows:

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User Notes: (3B9ADA1C)

SECTION 00 91 13 ADDENDA

PART 1 - GENERAL

1.01 SUMMARY

- A. Addenda: Any addenda to the drawings or specifications issued before or during the time of bidding shall be included in the proposal and become a part of the Contract.
- B. Indicate receipt of addenda on the proposal form.

SECTION 00 94 00 RECORD MODIFICATIONS

PART 1 - GENERAL

1.01 SUMMARY

A. Changes to the Contract will be handled through Change Order, AIA Document G701.

Addition at Career and Technical Center (Itawamba County School District)

SECTION 01 11 00 SUMMARY OF WORK

PART 1 - GENERAL

1.01 CONTRACT DOCUMENTS

- A. The Contract Documents for providing the Work of the Project include the following:
 - 1. Architect's Drawings dated June 28, 2024.
 - 2. Project Manual (including Specifications) dated June 28, 2024.

1.02 WORK TO BE EXECUTED UNDER THIS CONTRACT

- A. The Project is a new freestanding facility located on the existing campus of Itawamba County School District's Career and Technical Center.
- B. The work shall include all labor, materials, equipment, services, and related activities and procedures necessary to the complete construction including the buildings, site work, mechanical, plumbing, electrical, and other improvements as shown on the Drawings and required in the Specifications (Project Manual).

1.03 WORK TO BE EXECUTED BY THE OWNER UNDER SEPARATE CONTRACT

- A. The Owner reserves the right to award contracts for additional work by others during the course of this Project. The Contractor and all its subcontractors shall cooperate fully with all such parties in scheduling and performing any additional work as may be required by the Owner.
- B. Landscaping by the Owner. Landscape grading, topsoil, sod, and seeding by the General Contractor.
- C. Interior loose furnishings shall be provided and installed under a separate contract.
- D. The Owner shall purchase and install telephone equipment. The Contractor is responsible for a complete system of conduit, pull cords, and outlet boxes with covers. The electrical contractor is responsible for furnishing and installing underground conduit for service entry to the building.
- E. Network computer wiring and equipment shall be by others. The Contractor is responsible for a complete system of conduit, pull cords and outlet boxes with covers. The electrical contractor is responsible for furnishing and installing underground conduit for service entry to the building.

Addition at Career and Technical Center (Itawamba County School District)

SECTION 01 14 00 WORK RESTRICTIONS

PART 1 - GENERAL

1.01 CONTRACTOR'S USE OF PREMISES

- A. The Contractor shall limit his use of the premises for work as described in the drawings and specifications.
- B. The Contractor shall assume full responsibility for the protection and safekeeping of products under this Contract stored on the site.
- C. The school campus will remain occupied during much of the construction period. Coordinate the work of this project to minimize disruptions to the Owner.
- D. State law prohibits the use of tobacco products on any public school property. The use of tobacco products on site will not be permitted throughout the duration of the project.
- E. State law prohibits the possession or use of alcohol or illegal drugs on public school property and is considered improper conduct, resulting in the removal of worker and the possibility of filing charges against the worker.
- F. Deliveries are prohibited to occur between 7:15am until 8:00am and then in the afternoon from 2:00pm until 2:45pm. Construction activities shall not impede school traffic during those times noted above. The Contractor shall anticipate active traffic during most of the time allocated for construction.

Addition at Career and Technical Center (Itawamba County School District)

SECTION 01 18 04 PROJECT UTILITY SOURCES (FULTON)

PART 1 - GENERAL

1.01 SCOPE

- A. Provide and install temporary and permanent utilities for the project.
- B. Coordinate specific requirements with utility providers.

1.02 FEES

- A. The Contractor is responsible for all costs associated with providing temporary and permanent utility services including costs charged by the utility providers for their involvement.
- B. All tap and meter fees shall be paid by the Contractor.
- C. Other fees will be required for utility service to the project. The Contractor shall pay all fees and costs. Contact each utility prior to bid.

1.03 TEMPORARY UTILITIES

A. The Contractor shall make all arrangements and pay all costs for temporary utilities including temporary sanitary facilities, telephone, electricity, gas, and water.

1.04 PERMANENT UTILITIES

A. The Contractor shall make all arrangements and pay all costs for permanent utilities including sanitary sewer, electricity, water, gas, telephone, communications, and TV cable service.

1.05 UTILITY CONTACTS

A. Bidders shall contact the following for coordination and to ascertain costs of electrical, water, gas, and sewer services prior to bid:

1. Electrical: Bobby Neely (Tombigbee EPA) P.O. Box 369

Fulton, Mississippi 38843-0369

Phone: (662) 862-3146

2. Water & Sewer: Dan Pate

(City of Fulton) 213 West Wiygul Street

Fulton, Mississippi 38843 Phone: (662) 862-9004

Addition at Career and Technical Center (Itawamba County School District)

3. Gas: Dan Pate

(City of Fulton) 213 West Wiygul Street

Fulton, Mississippi 38843 Phone: (662) 862-9004

4. Telephone: Eddie Hardin

(Fulton Telephone Co.) 402 West Beene Street

Fulton, Mississippi 38843-1134

Phone: (662) 862-2191

Addition at Career and Technical Center (Itawamba County School District)

SECTION 01 21 00 ALLOWANCES

(LATENT CONDITIONS AND PRODUCTS)

PART 1 - GENERAL

1.01 CASH ALLOWANCES: LATENT CONDITIONS

A. Amount:

1. <u>Allowance No. 1</u>: latent conditions allowance in the amount of \$35,000.00 to be included in the contract sum.

B. Products:

- 1. Defects exposed to view under normal pre-bid observation conditions are not eligible for replacement under this allowance.
- 2. Products that are specifically designated to be removed or replaced elsewhere in the specifications or that are indicated on the drawings are not eligible under this allowance.
- 3. Replacement products shall be in conformance with the respective technical specifications for the type material replaced. If there is no specification for the product, it shall match the existing original product. If the original product cannot be obtained, the contractor shall submit an appropriate substitute product for the Architect's review and approval.

C. Procedure:

- 1. The Contractor shall present a list of proposed unit prices for concealed materials that may be defective and subject to removal. The Architect shall approve prices which are fair and reasonable. Proposed prices shall include itemized material and labor/installation costs. All overhead, profit, sales or other taxes, bonds, and insurance shall be included in the contractor's original bid and shall not be deducted from the latent conditions allowance.
- 2. The Contractor shall notify the Architect at least 24-hours prior to schedule the uncovering of work so the Architect may be present.
- 3. The Contractor shall notify the Architect whenever he uncovers existing work that would prohibit proper construction if left in place as any part of the substrate.
- 4. The Architect shall review the work and verify the conditions claimed. He is authorized to prepare a signed, written Construction Change Directive itemizing the specific type, location, and quantity of material that should be replaced and a fair and reasonable price.

Addition at Career and Technical Center (Itawamba County School District)

- 5. The Contractor shall perform the work described in the Construction Change Directive in accordance with the respective technical specification for the material involved and all conditions of this Contract.
- 6. The Architect is not authorized to expend funds by Construction Change Directive in excess of the amount specified under the allowance. Any work required in excess of this amount must be done by a separate written Change Order which must be approved prior to execution of the work.
- 7. The Contractor may elect to proceed with replacement of minor defective incidental work without notifying the Architect or going through the Construction Change Directive approval process if there will be no costs charged to the allowance or the Owner.
- 8. Any materials replaced or works performed prior to obtaining the Architect's Construction Change Directive are not chargeable under this allowance.

1.02 CASH ALLOWANCES: PRODUCTS

- A. Costs included in allowances:
 - 1. Actual cost of product or item to the Contractor substantiated by invoice (not manufacturer-suggested retail), less any applicable trade discounts.
 - 2. Invoices for materials covered under allowances shall be delivered directly to the Architect as provided from material suppliers. Adjustments to the contract sum will be made according to the actual invoices delivered to the Architect.
- B. Contractor's costs included in the contract sum (original bid):
 - 1. Contractor's costs for transportation to the site, unloading and handling on the site
 - 2. Protection of materials from elements and damage.
 - 3. All labor, installation costs, sales or other taxes, overhead, profit, bonds, insurance, incidentals and other expenses, as required for the complete installation, shall be included in the contractor's original bid and shall not be deducted from the product allowance.

C. Schedule of allowances:

1. <u>Allowance No. 2</u>: \$350.00 per cylinder per lockable door in the building to purchase Best cylinders and cores keyed to the Owner's specifications and to have the permanent cores installed by Best representatives. For this project, assume thirty-five (35) cylinders or a total allowance of \$12,250.00. This amount will be adjusted up or down after the final numbers are determined via the change order process.

Note: The labor to install cylinders in locksets and panic devices is covered by the Base Bid.

Addition at Career and Technical Center (Itawamba County School District)

2. <u>Allowance No. 3:</u> Contractor shall provide 100 <u>cubic yards</u> in the Base Bid for the over-excavation and backfill of soft sacrificial soils required to be mitigated.

1.03 RECORDS

- A. The contractor shall maintain a record of all expenditures authorized and approved by the Architect's Construction Change Directives under each allowance and submit a written report of expenditures and allowance balance at the Architect's and/or Owner's request.
- B. The Contractor shall include all allowances on the schedule of values per the amount scheduled.
- C. Amounts due on allowances shall not be paid until product/item is installed or stored on site per the contract requirements.
- D. At project closeout, should the actual costs incurred be more or less than the specified amount of any allowance, the contract sum will be adjusted by a Change Order equal to the amount of the difference.

1.04 SCHEDULE OF ALLOWANCES:

- A. <u>Allowance No. 1</u>: Latent conditions allowance in the amount of \$35,000.00 to be included in the contract sum.
- B. <u>Allowance No. 2</u>: \$350.00 per cylinder per lockable door in the building to purchase Best cylinders and cores keyed to the Owner's specifications and to have the permanent cores installed by Best representatives. For this project, assume thirty-five (35) cylinders or a total allowance of \$12,250.00. This amount will be adjusted up or down after the final numbers are determined via the change order process.
- C. <u>Allowance No. 3:</u> Contractor shall provide 100 <u>cubic yards</u> in the Base Bid for the over-excavation and backfill of soft sacrificial soils required to be mitigated

Addition at Career and Technical Center (Itawamba County School District)

SECTION 01 22 00 UNIT PRICES

PART 1 - GENERAL

1.01 PROCEDURES

- A. Purpose of unit prices:
 - 1. To enable the Owner to consider alternative amounts of construction.
 - 2. To allow the possibility of adding to the Scope of Work of the Project in such a manner that the Owner receives the Project most beneficial to the Owner for the available funds.
- B. Acceptance or rejection of any unit price items is at the sole discretion of the Owner.
- C. Accepted unit price items shall become a part of the Owner-Contractor Agreement.
- D. Unit prices shall include all taxes, overhead and profit. No additional fees shall be added or deducted by change order for utilization of a unit price item.

1.02 SCHEDULE OF UNIT PRICES

A. <u>Unit Price No. 1</u>: Contractor shall provide a unit price for the over-excavation and backfill of soft sacrificial soils required to be mitigated. This should be a cubic yard cost as an additive or deductive cost associated with the Base Bid.

Addition at Career and Technical Center (Itawamba County School District)

SECTION 01 25 13

PRODUCT SUBSTITUTION PROCEDURES

PART 1 - GENERAL

1.01 SUBSTITUTION PROCEDURES

- A. Products of other manufacturers equal to those specified herein will be considered for substitution. Refer to the General Conditions for additional requirements.
- B. <u>Substitutions will not be considered during the bid phase or any other time prior to the award of the Contract.</u>
- C. Not later than thirty (30) days from the contract date, the Contractor shall provide a list showing the name of the manufacturer proposed to be used for each of the products identified in the Project Manual and, where applicable, the name of the installing subcontractor.
- D. The Architect will promptly reply in writing to the Contractor stating whether the Owner or the Architect, after due investigation, has reasonable objection to any such proposal.
- E. Within thirty (30) days after the Contract has been executed, the Owner and the Architect will consider a formal request for the substitutions of products in place of those specified. The General Contractor is responsible for providing product data and product references to substantiate that substitutions are equal to products specified. By making requests for substitutions, the Contractor represents the following:
 - 1. That he or she has personally investigated the proposed substitute product and determined that it is equal or superior in all respects to the specified product.
 - 2. That he or she will provide the same warranty for the substitutions as that required for the specified product.
 - 3. That the cost data is complete and includes all related costs under this Contract and that any claims for additional costs and/or time in connection with the substitution are hereby waived.
 - 4. That he or she will coordinate the installation of the accepted substitute, making such changes as may be required for the work to be complete in all respects.

Addition at Career and Technical Center (Itawamba County School District)

SECTION 01 29 00 PAYMENT PROCEDURES

PART 1 - GENERAL

1.01 APPLICATION FOR PAYMENT

- A. Submit Application for Payment to the Architect:
 - 1. Submit applications on AIA Document G702.
 - 2. Submit one (1) electronic application for payment each month.
 - 3. Break down project costs by division and section in CSI format. Provide a sample for approval ten (10) days prior to submittal of first application.
 - 4. The Contractor shall submit monthly certification to the Architect indicating payments to subcontractors on prior payment requests. Use Form 01 29 00-A provided herein.
- B. The Contractor shall deliver with the executed contract a schedule of anticipated payments for the work. This schedule will assist the Owner in financial planning for the construction phase of the project.
- C. The Contractor shall submit each month with the Application for Payment a separate letter either requesting an extension of time or stating that no extension is needed for that period of time. If such letter is not received with the Application for Payment, no extension of time will be considered for the pay period. Complete justification, including weather reports, correspondence, etc., must be included for each day's request for extension. A Contractor's letter or statement will not be considered as adequate justification. The receipt of this request and data by the Owner will not be considered as Owner approval in any way.
- D. Refer to specification section 00 73 00 Supplementary Conditions for retainage requirements. Retainage may be reduced on public projects (as defined by Miss. Code Ann. §31-3-1) in accordance with the provisions of Miss. Code Ann. §31-5-33. On private projects, retainage will not be reduced prior to final payment.

1.02 MISSISSIPPI SALES TAX

- A. Payments for Mississippi sales tax may be made by either of the following methods:
 - 1. Lump sum payment: Prior to payment by the Owner, the Contractor must furnish receipt as proof of tax payment.
 - 2. Monthly sales tax payment: Prior to payment of sales tax on a monthly basis, the Contractor must furnish proof of a valid Mississippi MPC number for the project.

FORM 01 29 00-A

AFFIDAVIT CERTIFYING PAYMENT TO ALL SUBCONTRACTORS

I acknowledge that, pursuant to Miss. Code Ann. 31-5-25 and H.B. 1562, Laws of 2002, I am required to submit monthly certification indicating payments to subcontractors on prior payments requests. I, the undersigned Contractor, do hereby certify that I have paid the following amounts to subcontractors for work which has been performed and incorporated into previous Applications for Payment which were issued, and payment received from the Owner on the project listed below. I understand that this document must be submitted on a monthly basis after the submittal, approval, and payment of Application for Payment No. 1.

PROJECT NUMBER: 2023111

PRA	IFCT	NAME	Addition	at Career and	I Technical	Cente

Subcontractor	Amount
Subcontractor	Amount
(Attach additional list of subcontractors and	amounts if necessary.)
Contractor's Name and Title:	
Contractor's Certificate of Responsibility N	umber:
Contractor's Signature:	Date:
STATE OF MISSISSIPPI	
COUNTY OF	
SWORN AND SUBSCRIBED BEFORE M day of, 20	E, the undersigned notary public, this the
My Commission Expires:	NOTARY PUBLIC

END OF FORM

© 2024 PryorMorrow PC Form 01 29 00-A-1

Addition at Career and Technical Center (Itawamba County School District)

SECTION 01 29 10 WEATHER DELAYS

PART 1 - GENERAL

1.01 EXTENSION OF CONTRACT TIME

A. An extension of time on the basis of weather may be granted only for the number of Weather Delay Days in excess of the number of days listed as the Standard Baseline for that month.

1.02 STANDARD BASELINE FOR AVERAGE CLIMATIC RANGE

- A. Standard Baseline is defined as the normal number of calendar days for each month during which construction activity exposed to weather conditions is expected to be prevented and suspended by cause of adverse weather. Suspension of construction activity for the number of days each month as listed in the Standard Baseline shall be included in the Work schedule and is not eligible for extension of Contract Time.
- B. Standard Baseline is as follows:

-7 Days January February - 6 Days - 7 Days March April -5 Days Mav - 6 Days June - 6 Days -9 Days July -7 Days August September -6 Days October -4 Days -5 Days November December -7 Days

1.03 ADVERSE WEATHER AND WEATHER DELAY DAYS

- A. Adverse Weather is defined as the occurrence of one or more of the following conditions within a twenty-four (24) hour day that prevents critical path construction activity exposed to weather conditions:
 - 1. Precipitation (rain, snow, or ice) in excess of one-tenth inch (0.10") liquid measure.
 - 2. Temperatures that do not rise above that required for the day's construction activity if such temperature requirement is specified or accepted as standard industry practice.
- B. Adverse Weather may include, if appropriate, "dry-out" or "mud" days resulting from precipitation days that occur beyond the standard baseline and only if there is a hindrance

to critical path work and Contractor has taken all reasonable accommodations to avoid such hindrance.

- C. A Weather Delay Day may only be counted if adverse weather prevents work on the critical path.
- D. Contractor shall take into account that certain construction activities are more affected by adverse weather and seasonal conditions than other activities, and that "dry-out" or "mud" days are not eligible to be counted as Weather Delay Day until the standard baseline is exceeded.

Addition at Career and Technical Center (Itawamba County School District)

SECTION 01 31 00

PROJECT MANAGEMENT AND COORDINATION

PART 1 - GENERAL

1.01 PROJECT SUPERVISION

A. The Contractor shall employ a competent supervisor and necessary assistants who shall be in attendance at the project site at all times during the performance of the work. The project supervisor shall not be moved to another project or otherwise fail to be in attendance at the project site until the project is substantially complete with all punch list items corrected or until the Architect and the Owner approve of the supervisor's absence from the project site.

1.02 PROJECT MEETINGS

- A. A pre-construction conference will be held prior to initiation of the work. A representative from the Contractor and each subcontractor shall attend.
- B. Monthly project meetings shall be held during the construction process. The General Contractor shall have a representative at all project meetings. All subcontractors shall be present.

1.03 PRE-INSTALLATION CONFERENCES OR INSPECTIONS

- A. Conduct a conference at the project site before each construction activity that requires coordination with other construction. Examples:
 - 1. Cast-in-place concrete (the Contractor shall notify the Architect and the independent testing laboratory twenty-four (24) hours in advance of any pour)
 - 2. Gypsum board (closing in uninspected work. Do not cover up or enclose work until it has been properly and completely inspected and reviewed. Should any of the work be covered up or enclosed prior to verification, uncover the work as required for inspection. Make all repairs and replacements with such materials and workmanship as are necessary at no additional cost to the Owner)
 - 3. Masonry (provide a 4'-0" x 4'-0" sample of complete wall system using all materials for Architect's approval on site prior to erection of masonry walls)
- B. The installer and representatives of manufacturers and fabricators involved in or affected by the installation and its coordination or integration with other materials and installations shall attend the meeting. Coordinate with the Architect for scheduled meeting dates.
- C. Review the progress of other construction activities and preparations for the particular activity under consideration at each pre-installation conference.

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SECTION 01 31 19.16 MOBILIZATION AND DEMOBILIZATION

PART 1 - GENERAL

1.01 SCOPE

- A. Mobilization/Demobilization consists of moving in, including preparatory work and operations and moving out, including all dismantling and clean-up work and operations performed by the Contractor.
- B. Mobilization: Includes movement of all labor, equipment, supplies and incidentals to the project site; establishment of facilities necessary for work on the project; and other work and operations which must be performed or costs not directly attributable to other pay items, exclusive of bidding costs, which must be incurred by the Contractor before beginning and during the early stages of production work on the project site.
- C. Demobilization: Includes movement of all labor, equipment, supplies and incidentals from the project site; dismantling and removal of temporary facilities; clean-up of the project site and all work areas; and other work and operations which must be performed or costs not directly attributable to other pay items which must be incurred by the Contractor after completion of certain items of work and all other work on the Contract has been completed.

1.02 MEASUREMENT

A. The percentage of the lump sum amount for this Item will be measured in accordance with the mobilization/demobilization schedule submitted by the Contractor and approved by the Architect within the following limitations:

% of Total Contract Earned	% of Maximum Lump Sum This Item Allowed
10%	40%
25%	60%
80%	90%

- B. When all work under this Contract is completed by the Contractor and accepted by the Architect, one hundred percent (100%) of the Lump Sum Amount will be allowed.
- C. Total Contract earned will be equal to certified estimates approved by the Architect exclusive of the Mobilization-Demobilization Lump Sum and Materials Stored Amounts.

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1.03 PAYMENT

A. Mobilization will be paid for at the Contract Lump Sum Price in accordance with the provisions included under <u>Measurement</u>. This price shall be full compensation for all mobilization and demobilization in accordance with the Contract Documents.

Payment will be made under:

Item 01 31 19.16-A Mobilization/Demobilization per Lump Sum

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SECTION 01 32 00

CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 - GENERAL

1.01 PROJECT RECORD DOCUMENTS

- A. The Contractor shall maintain at the site for the Owner one (1) record copy of the following for general use (maintain these documents in a clean, dry, legible condition; <u>do not use documents stored at the weatherproof meeting building or trailer in the field):</u>
 - 1. Contract Drawings.
 - 2. Specifications.
 - 3. Addenda: One (1) copy of each addendum shall remain intact and unaltered. Another copy of each addendum shall be cut and taped onto the corresponding page of the plans or specifications. The first Application for Payment will not be approved until this is complete.
 - 4. Change Orders: The Contractor is responsible for maintaining a complete Change Order log and other modifications to the Contract.
 - 5. Submittals: The Contractor is responsible for maintaining a set of reviewed shop drawings, product data. and samples.
 - 6. Test Reports: Field test records shall be the responsibility of the Contractor to maintain and log.
 - 7. Requests for Information (RFI's): The Contractor is responsible for maintaining a concise and complete RFI log.
 - a. The Contractor shall present the RFI log, including all pending RFI's, at each monthly meeting.
 - b. The Contractor is responsible for recording all responses that address and/or resolve RFI's.
 - 8. Project Meeting Notes: Project meetings shall be held monthly during the construction process. The Contractor shall have a representative at all project meetings.
 - a. The Contractor shall administer monthly meetings and prepare minutes for distribution to the Architect and the Owner.
- B. The Contractor shall maintain two (2) copies of contract drawings, specifications, and shop drawings for future record. These documents are referred to as "As-Builts."
 - 1. Mark all modifications in red.

Addition at Career and Technical Center (Itawamba County School District)

- 2. Keep record documents current. Update as-built drawings on a daily basis. Do not permanently conceal any work until required information has been recorded.
- 3. Drawings: Legibly mark to record actual construction.
 - a. The horizontal and vertical location of underground utilities and appurtenances referenced to permanent surface improvements.
 - b. Location of internal utilities and appurtenances concealed in construction referenced to visible and accessible features of structure.
 - c. Field changes in dimension and detail.
 - d. Changes made by Change Order(s) or Construction Change Directive(s).
- 4. Project Manual and Addenda: Legibly mark up each section to record manufacturer, trade name, catalog number, and supplier of each product and item of equipment actually installed.
- 5. Shop Drawings: Maintain as record documents. Legibly mark to record any changes made after review.
- 6. Two (2) copies of "As-Builts" are required prior to closeout.

1.02 WORK SCHEDULE

- A. Coordinate the project schedule and operations with the Owner's requests. Follow the construction schedule as outlined in the Contract Documents.
- B. The Contractor shall at all times conduct his operations as to ensure the least inconvenience to the Owner.
- C. The Contractor, promptly after being awarded the contract, shall prepare, and submit for the Owner's and the Architect's information a detailed Contractor's Construction Schedule for the work. The schedule shall be in bar chart form with a separate line for each significant activity. Review this schedule in form and content and revise to meet the approval of the Architect and the Owner. The schedule shall not exceed time limits established by the Contract Documents.
- D. The Contractor must submit each month with his Application for Payment an updated construction schedule.
- E. If the construction work at any time is delayed or falls behind the schedule as established by the Contractor's Construction Schedule, the Contractor shall promptly submit a Plan of Recovery which outlines in detail the methods and means required to ensure that the project is brought back on schedule. The Contractor's Plan of Recovery shall address manpower, materials, and coordination efforts as required to successfully implement the Contractor's Construction Schedule. The Contractor's Plan of Recovery shall be submitted to the Owner and the Architect for approval not more than five (5) calendar days from the date of the Architect's letter requesting said Plan of Recovery.

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F. The Contractor shall execute Daily Job Reports which address weather conditions, status of indoor/outdoor work, phase of construction, crew sizes/capacity, and subcontractor's work progress. The Contractor's Daily Job Reports shall be submitted to the Architect prior to each Application for Payment.

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SECTION 01 33 00 SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.01 SUBMITTALS

- A. The Contractor shall determine and verify all field measurements, field construction criteria, manufacturer's catalog numbers, and conformance of submittal data with the requirements of the Contract Documents. The Contractor shall verify that the item as submitted is coordinated with other work of the project. The Architect will not review shop drawings unless they bear the Contractor's verification of review and approval.
- B. The Contractor shall furnish the Architect with shop drawings, product data, and samples as outlined in the Architect's submittal requirements. The Architect will furnish the Contractor with submittal requirements at the pre-construction conference.
- C. Furnish the Architect with a minimum of one (1) electronic copy of shop drawings and submittals (individual specification sections may require additional copies).
- D. The Contractor shall retain one (1) copy of each submittal on the project site at all times.
- E. All materials that require a color selection shall be submitted (together) before any color selections are made.
- F. The Architect's review is only for general conformance with the design concept and the information given in the Construction Documents. Corrections or comments made on the shop drawings during this review do not relieve the Contractor from compliance with the requirements of the plans and specifications. Review of a specific item shall not include review of an assembly of which the item is a component. The Contractor is responsible for dimensions to be confirmed and correlated at the job site, information that pertains solely to the fabrication processes or to the means, methods, techniques, sequences, and procedures of construction, and coordination of the **work** with that of all other trades and performing all **work** in a safe and satisfactory manner.

1.02 RELATED SECTIONS

A. Section 00 73 00 – Supplementary Conditions (3.12.9)

1.03 COLOR SELECTION

- A. All submittals that require a color selection shall be submitted together.
- B. The following items require a color selection:
 - 1. Section 04 05 13 Masonry Mortaring
 - 2. Section 04 21 00 Brick Masonry
 - 3. Section 04 22 00 Concrete Unit Masonry

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- 4. Section 06 41 16 Plastic Laminate Clad Architectural Cabinets
- 5. Section 08 14 16 Flush Wood Doors
- 6. Section 08 33 23 Overhead Coiling Doors
- 7. Section 08 41 00 Aluminum Framed Entrances and Storefronts
- 8. Section 09 30 13 Tiling
- 9. Section 09 65 13.13 Resilient Base
- 10. Section 09 65 20 Luxury Vinyl Tile Flooring (LVT)
- 11. Section 09 67 00 Resinous Flooring
- 12. Section 09 91 00 Painting
- 13. Section 10 11 16 Marker Boards
- 14. Section 10 11 23 Tack Boards
- 15. Section 10 14 13 Interior Signage
- 16. Section 10 17 00 Solid Plastic Toilet Compartments
- 17. Section 10 51 13 Metal Lockers
- 18. Section 10 57 23 Closet and Utility Shelving
- 19. Section 10 73 00 Protective Covers
- 20. Section 11 23 00 Commercial Laundry Equipment
- 21. Section 12 36 61.13 Solid Surfacing Countertops
- 22. Section 12 90 13 Salon Furnishings
- 23. Section 13 34 19 Metal Building Systems
- 24. Section 33 44 15 Downspout Boots

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SECTION 01 41 00 REGULATORY REQUIREMENTS

PART 1 - GENERAL

1.01 CODES AND STANDARDS

- A. Strictly comply with the latest edition of the 2018 International Building Code and other applicable local, municipal, state, and federal codes.
- B. All permits and inspections required for the execution of the work shall be provided by the Contractor at no additional cost to the Owner.
- C. Obtain certificates of approval, acceptance, and compliance with regulations of agencies having jurisdiction. Work shall not be deemed complete until such certificates have been delivered to the Owner.
- D. The Contractor shall submit a construction notice of intent and obtain appropriate permit(s) to discharge storm water into state waters in accordance with the Mississippi Department of Environmental Quality Storm Water Pollution Control Program. The Contractor shall also be responsible for permit compliance, plan development, implementation, maintenance, inspections, and reporting as required by the Mississippi Department of Environmental Quality.

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SECTION 01 52 00 CONSTRUCTION FACILITIES

PART 1 - GENERAL

1.01 JOB SITE OFFICE

- A. The Contractor shall provide a weatherproof meeting building or trailer to house the Contract Documents and records.
 - 1. This facility shall be complete with lighting, heat, and telephone.
 - 2. This facility shall be available to the Owner, the Architect, and their representatives during working hours.
- B. The Contractor is required to provide the superintendent the means necessary to communicate via telephone and the internet to send and receive information as required, such as email correspondence, photographs, and all other correspondence related to construction.

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SECTION 01 56 26

TEMPORARY FENCING (CHAIN LINK)

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes

1. Provide and install temporary chain link construction fences at primary limit of work as shown on drawings, per Sheet C100 (noted as temporary construction fencing).

B. Related Sections

1. Section 01 52 00 – Construction Facilities

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Wire Gauge and Mesh: 11.5-gauge, 2-3/8" mesh.
- B. Intermediate Posts: 1-5/8" o.d. steel tubing, 12'-0" o.c. max. 18-gauge at 1.74 lbs./ft.
- C. Rails: 1-3/8" o.d. steel tubing in longest possible lengths with couplings. 18-gauge.
- D. Terminal Posts: 2-3/8" o.d. steel tubing. 18-gauge.
- E. Post Tops: Weathertight closure caps.
 - 1. Permit passage of top rail.
 - 2. Provide means for attaching top rails at each condition encountered.
- F. Accessories: Stretcher bars, 12.5-gauge tension wire, wire ties at 12" o.c., and other items as required to provide a complete and finished system.
- G. Fence Finish: All components shall be pre-galvanized unless otherwise noted.
- H. Fence Height: 6'-0". Hold bottom of fence 6" above finished grade to facilitate maintenance.
- I. Provide and install concrete footings at gate posts and terminal posts only.

2.02 GATES

A. Metal and finish to match framework. Provide horizontal and vertical members to ensure proper gate operation and for attachment of fabric, hardware, and accessories. Space frame members not more than 8' apart. 1-5/8" o.d. 18-gauge tubing.

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- B. Assemble gate frames by welding or with special fittings and rivets for rigid connections. Use same fabric as for fence unless otherwise indicated. Install fabric with stretcher bars at vertical edges. Attach stretchers to gate frame at not more than 15" o.c. Attach hardware to provide security against removal or breakage. Install diagonal cross-bracing consisting of 3/8" diameter adjustable length truss rods on gates to ensure frame rigidity without sag or twist. Maximum 1" clearance at top of curb.
- C. Gate Hardware: Furnish the following hardware and accessories for each gate:
 - 1. Hinges: Size and material to suit gate size, non-lift-off type, offset to permit 105-degree gate opening. Provide 1-1/2 pair of hinges for each leaf over 6' nominal height.
 - 2. Latch: Forked type or plunger-bar type to permit operation from either side of gate, with padlock eye as integral part of latch.

2.03 MISCELLANEOUS

- A. Accessories: Stretcher bars, 12.5-gauge tension wire, wire ties at 12" o.c., and other items as required to provide a complete and finished system.
- B. Fence Finish: All components shall be pre-galvanized unless otherwise noted.
- C. Padlock Hasps: Provide and install padlock hasps at all gates. Provide copy of key to the Owner for emergency site access.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Confirm locations and avoid underground utilities.
- B. Comply with recommended procedures and instructions of the fencing manufacturer. Provide secure, aligned installation.

3.02 REMOVAL

A. Remove temporary fencing upon substantial completion of the project. Remove all posts and footings. Fill post holes and grade smooth.

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SECTION 01 58 00 PROJECT IDENTIFICATION

PART 1 - GENERAL

1.01 PROJECT SIGN

- A. The General Contractor shall erect adequate supports and maintain one (1) neatly constructed and painted 3/4" thick plywood sign approximately 4 FEET x 8 FEET. The Architect will provide colors, lettering, layout, and location of the sign.
- B. No other signs shall be displayed on the job site without permission of the Architect. The display of sign advertisements is strictly prohibited.

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SECTION 01 73 00 EXECUTION

PART 1 - GENERAL

1.01 CUTTING AND PATCHING

- A. Execute cutting, fitting, and patching to complete the work and to:
 - 1. Fit the several parts together, to integrate with other work.
 - 2. Uncover work to install ill-timed work.
 - 3. Remove and replace defective work.
 - 4. Remove and replace work not conforming to the Contract Documents.
 - 5. Install specified work in existing construction.
 - 6. Provide openings for penetrations of mechanical and electrical work.
- B. Do not cut or alter work of another Contractor without permission.
- C. Take special care to insure that penetrations of rated walls and ceilings are not oversized.
- D. Costs caused by ill-timed or defective work or work not conforming to the Contract Documents shall be borne by the party responsible for the ill-timed, defective, or non-conforming work.
- E. Exercise care not to damage existing buildings, paving, and landscaping scheduled to remain. Repair or replace items damaged during the construction process.

1.02 EXECUTION

- A. Inspect existing conditions of work, including elements subject to movement or damage during cutting and patching.
- B. Provide shoring, bracing, and support, as required, to maintain the structural integrity of the building. Provide protection for other portions of work and protection from the elements.
- C. Execute cutting and demolition by methods which prevent damage to other work and which will provide surfaces to receive installation of repairs and new work.
- D. Restore work which has been cut or removed; install new products to provide completed work in accordance with the requirements of the Contract Documents.
- E. Refinish entire surfaces, as necessary, to provide an even finish. Refinish continuous surfaces to the nearest intersection. Refinish assemblies in their entirety.

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1.03 MOISTURE CONTROL

- A. The Contractor shall have a working moisture meter on site at all times.
- B. Wet materials shall not be installed.

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SECTION 01 74 00

CLEANING AND WASTE MANAGEMENT

PART 1 - GENERAL

1.01 FINAL CLEANING

- A. Buildings and other improvements:
 - 1. In addition to removal of debris and cleaning of specified materials in other sections, clean interior exposed-to-view surfaces.
 - 2. Remove temporary protection and labels not required to remain.
 - 3. Clean finishes free of dust, stains, films, and other foreign substances.
 - 4. Clean transparent and glossy materials to a polished condition; remove foreign substances. Polish reflective surfaces to a clear shine.
 - 5. Clean, wax, and polish resilient and hard-surface floors as specified. Use a professional cleaner.
 - 6. Clean surfaces of equipment; remove excess lubrication.
 - 7. Clean plumbing fixtures to a sanitary condition.
 - 8. Clean permanent filters of ventilating equipment, replace disposable filters, clean ducts, blowers, and coils.
 - 9. Clean light fixtures and lamps.
 - 10. Remove waste, foreign matter, and debris from roofs, drainage systems, and site area.
 - 11. Clean and polish hardware to a glossy finish.

B. Site:

- 1. Remove waste, debris, and surplus materials from the site. Clean grounds, remove stains, spills, and foreign substances from paved areas and sweep clean.
- 2. Sweep and remove stains from all new paving and walks.

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SECTION 01 75 00 STARTING AND ADJUSTING

PART 1 - GENERAL

1.01 STARTING SYSTEMS

- A. Coordinate the schedule for the start-up of various equipment and systems:
 - 1. HVAC
 - 2. Fire Sprinkler system
- B. Execute start-up under supervision of the responsible Contractor's personnel in accordance with the manufacturer's instructions.
- C. Demonstrate operation and maintenance of products to the Owner's personnel prior to the date of substantial completion.
- D. Utilize operation and maintenance manuals as the basis for instruction. Review contents of manuals with the Owner's personnel in detail to explain all aspects of operation and maintenance.
- E. Submit a written report that equipment or system has been properly installed and is functioning and list persons in attendance at the demonstration.

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SECTION 01 78 00 CLOSEOUT SUBMITTALS

PART 1 - GENERAL

1.01 SPARE PARTS, MAINTENANCE MATERIALS, AND MANUALS

- A. Provide products, spare parts, and maintenance materials in the quantities specified in each section in addition to that used for construction of the work. Coordinate with the Owner, deliver to the project site, and obtain receipt prior to final payment.
- B. Provide complete list with addresses and telephone numbers of subcontractors and work performed on the project. Bind said list with submittals, warranties, and instruction data relating to the project.

1.02 PROJECT CLOSEOUT

- A. Include closeout submittals as a line item on the schedule of values.
 - 1. Payment for this line item will not be made until closeout submittals are completed and approved.
 - 2. This line item shall be \$5,000.00.
- B. The Contractor shall furnish to the Architect copies by email of the following with submission of the final Application for Payment:

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	Item Description	<u>Initiator</u>	Qty	Date Completed
		C=Contractor		
1	C + + 2 W '# P + + C F' 1	A=Architect		
1.	Contractor's Written Request for Final Inspection	С	2	
2.	Results of Owner's Inspection (Punch List)	A	2	
3.	Contractor's Written Statement: Punch List Completed	С	2	
4.	Copies of Change Orders	A	2	
5.	Copies of Construction Change Directive	A	2	
6.	Utility Payments Settled	С	2	
7.	Professional's Statement: All Allowances Settled	A	2	
8.	Assessment of Liquidated Damages (if applicable)	A	2	
9.	Substantial Completion Form (AIA G704)	A	2	
10.	Professional's Recommendation of Acceptance	A	2	
11.	Request for Final Payment (AIA G702)	C	2	
12.	Twenty-four (24) color photographic prints of final project indicating details and general appearance	С	2	
13	Consent of Surety to Final Payment (AIA G707)	С	2	
	Contractor's Affidavit of Release of Liens (AIA G706A)	C	2	
15.	Contractor's Affidavit of Payment of Debts and Claims (AIA G706)	С	2	
16.	Guarantee of Work: Letter (confirm provisions as outlined in Section 01 78 36 – Warranty)	С	2	
17.	Special Guarantees Applicable to Definite Parts of the Work	С	2	
18.	Contractor's Certification of Non-Use of Asbestos-Containing Building Materials	С	2	
19.	Architect's Certification of Non-Specification of Asbestos-Containing Building Materials	A	2	
20.	Names and Addresses of Subcontractors	С	2	
21.	Product Data Sheets and Maintenance, Operating, and Procedural Manuals (for example: metal, roof and flashing systems, mechanical systems, electrical systems, etc.)	С	2	
22.	Project Record Documents (As-Builts)	С	2	
	Letter of Acceptance from Owner for Receipt of All As-Built Drawings	A	2	
24.	Recommend Publication of Final Settlement	A	2	

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SECTION 01 78 36 WARRANTY

PART 1 - GENERAL

1.01 WARRANTY

- A. All work performed under this Contract shall be free from defects in workmanship and materials for a period of one (1) year from the date of substantial completion of the project or the portion thereof designated in the Certificate of Substantial Completion. The date of commencement of warranties for items on the list of items to be completed or corrected and attached to the Certificate of Substantial Completion will be the date of final payment.
- B. Some work performed under this Contract shall have a warranty period that exceeds one (1) year; refer to specific specification sections.
- C. During the warranty period, labor, materials, and services required to repair defects and damages shall be the responsibility of the Contractor.
- D. Light bulbs are excluded from the one-year warranty period.
- E. Contractor's warranty statement:
 - 1. The Contractor and the Contractor's Surety hereby guarantee that all work performed on the project is free from defective and/or nonconforming materials and workmanship and that, for a period of one (1) year from the date of final completion or such longer period of time as may be called for in the Contract Documents for such portions of the work, the Contractor or its Surety will repair and/or replace any defective and/or nonconforming materials and workmanship in accordance with the requirements of the Contract Documents.
 - 2. All warranties or guarantees with respect to all appliances, machinery, and equipment installed in the work by the Contractor or any subcontractor, supplier, and manufacturer are hereby assigned to the Owner, and the Owner is hereby subrogated to all of the same.

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SECTION 03 11 00 CONCRETE FORMING

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes

- 1. Formwork for cast-in-place concrete, with shoring, bracing, and anchorage.
- 2. Openings for other work.
- 3. Form accessories.
- 4. Stripping of forms.

B. Related Sections

- 1. Section 03 20 00 Concrete Reinforcing
- 2. Section 03 30 00 Cast-In-Place Concrete (building only)
- 3. Section 03 30 05 Cast-In-Place Concrete (paving only)

1.02 REFERENCES

- A. ACI 301 Specifications for Structural Concrete for Buildings.
- B. ACI 347 Recommended Practice for Concrete Formwork.
- C. PS 1 Construction and Industrial Plywood.

1.03 SCOPE OF WORK

A. Design, engineer, and construct formwork, shoring, and bracing to meet design and code requirements so that resultant concrete conforms to required shapes, lines, and dimensions.

1.04 QUALITY ASSURANCE

- A. The design and engineering of the formwork, as well as its construction, shall be the responsibility of the General Contractor and in accordance with ACI 301 and ACI 347.
- B. Design formwork for loads, lateral pressures, and allowable stresses outlined in Section 102 and 103 of ACI 347 Recommended Practices for Concrete Formwork and wind loads so specified by the governing building code.
- C. Forms shall conform to the shapes, lines, and dimensions of the members as called for on the plans and shall be constructed as to ensure that the concrete surfaces will conform to the tolerances of ACI 347, Section 203.1.

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PART 2 - PRODUCTS

2.01 MATERIALS

- A. Plywood: PS-1, MDO or BB grade, Class 1.
- B. Lumber: Southern Yellow Pine species; #3 S4S grade; with grade stamp clearly visible. Use only on unexposed surfaces.
- C. Formwork for round columns and cylindrical sections shall be equal to Sonotube.

2.02 ACCESSORIES

- A. Form Release Agent: Colorless materials which will not stain concrete, absorb moisture, or impair natural bonding or color characteristics of coating intended for use on concrete.
- B. Nails, spikes, lag bolts, through bolts, anchorages: Sized as required; of strength and character to maintain formwork in place while concrete is placed.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify lines, levels, and measurements before proceeding with formwork.

3.02 PREPARATION

- A. Hand-trim sides and bottoms of earth form; remove loose dirt prior to placing concrete.
- B. Minimize form joints. Symmetrically align joints and make watertight to prevent leakage of mortar.
- C. Arrange and assemble formwork to permit stripping so that concrete is not damaged during its removal.
- D. Coat contact surfaces of forms with a form-coating compound before reinforcement is placed.
- E. Thin form-coating compounds only with thinning agent of type, and in amount, and under conditions of form-coating compound manufacturer's directions. Do not allow excess form-coating material to accumulate in forms or to come into contact with concrete surfaces against which fresh concrete will be placed. Apply in compliance with manufacturer's instructions.

3.03 ERECTION

- A. Design, erect, support, brace, and maintain formwork to support vertical and lateral loads that might be applied until such loads can be supported by concrete structure.
- B. Design formwork to be readily removable without impact, shock, or damage to cast-inplace concrete surface and adjacent materials.

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- C. Construct forms to sizes, shapes, lines, and dimensions shown. Construct forms to obtain accurate alignment, locations, grades, level and plumb work in finished structures. Provide for openings, offsets, sinkages, blocking, screeds, bulkheads, anchorages and inserts, and other features required in work. Use selected materials to obtain required finishes. Solidly butt joints and provide back-up joints to prevent leakage of cement paste.
- D. Fabricate forms for easy removal without hammering or prying against concrete surfaces.
- E. Do not displace or damage moisture barriers or waterproofing.

3.04 APPLICATION

- A. Apply form release agent on formwork in accordance with manufacturer's instructions. Apply prior to placing reinforcing steel, anchoring devices, and embedded items.
- B. Soak contact surfaces of untreated forms with clean water. Keep surfaces wet prior to placing concrete.

3.05 INSERTS AND EMBEDDED PARTS

- A. Provide formed openings where required for work embedded in or passing through concrete.
- B. Install accessories in accordance with manufacturer's instructions, level and plumb. Ensure items are not disturbed during concrete placement.
- C. Set and build into work anchorage devices and other embedded items required for other work that is attached to, or supported by, cast-in-place concrete.
- D. Set edge forms or bulkheads and intermediate screed strips for slabs to obtain required elevations and contours in finished slab surface. Take care to recess slabs at brick porches.

3.06 CLEANING

- A. Clean forms to remove foreign matter as erection proceeds.
- B. During cold weather, remove ice and snow from forms. Do not use de-icing salts.
- C. Cleaning and Tightening: Thoroughly clean forms and adjacent surfaces to receive concrete. Remove wood, chips, sawdust, dirt, or other debris just before concrete is placed.

3.07 SHORE AND SUPPORTS

- A. Comply with ACI 347 for shoring and reshoring and as herein specified.
- B. Remove shores and reshore in a planned sequence to avoid damage to partially cured concrete. Locate and provide adequate reshoring to safely support work without excessive stress or deflection.

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C. Keep reshores in place a minimum of 15 days after placing upper tier, and longer if required, until concrete has attained its required 28-day strength and heavy loads due to construction operations have been removed.

3.08 FORM REMOVAL

- A. Do not remove forms and bracing until concrete has sufficient strength to support its own weight, and construction and design loads which may be imposed upon it.
- B. Reshore structural members due to design requirements or construction conditions to permit successive construction.
- C. Do not damage concrete surfaces during form removal.
- D. Formwork not supporting weight of concrete may be removed after cumulatively curing at not less than 50 degrees F for 24 hours after placing concrete, provided concrete is sufficiently hard to not be damaged by form removal operations and provided curing and protection operation are maintained.
- E. Formwork supporting weight of concrete may not be removed in less than 14 days and until concrete has attained 70% of the minimum design compressive strength at 28 days. Determine potential compressive strength of in-place concrete by testing field-cured specimens representative of concrete location or members.

3.09 RE-USE OF FORMS

A. Clean and repair surfaces of forms to be re-used in 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 form work.

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SECTION 03 20 00 CONCRETE REINFORCING

PART 1 - GENERAL

1.01 WORK INCLUDED

A. Reinforcing steel bars and welded steel wire fabric for cast-in-place concrete and masonry.

1.02 REFERENCES

- A. ACI 301 Specifications for Structural Concrete for Buildings.
- B. ACI 315 Details and Detailing of Concrete Reinforcement.
- C. ANSI/ASTM A82 Cold Drawn Steel Wire for Concrete Reinforcement.
- D. ANSI/ASTM A185 Welded Steel Wire Fabric for Concrete Reinforcement.
- E. ASTM A615 Deformed and Plain Billet-Steel Bars for Concrete Reinforcement.
- F. CRSI Manual of Practice.
- G. CRSI 63 Recommended Practice for Placing Reinforcing Bars.
- H. CRSI 65 Recommended Practice for Placing Bar Supports, Specifications and Nomenclature.

1.03 QUALITY ASSURANCE

- A. Perform concrete reinforcement work in accordance with CRSI Manual of Standard Practice, and Documents 63 and 65.
- B. Conform to ACI 315.
- C. Acceptable Manufacturers: Regularly engaged in the manufacture of steel bars and welded wire fabric.
- D. Installers Qualifications: Three years experience in the installation of steel bar and welded wire reinforcing.

1.04 DELIVERY, STORAGE AND HANDLING

- A. Deliver reinforcing to project site in bundles marked with metal gages indicating contents of bundle keyed to fabrication schedule.
- B. Handle and store materials to prevent contamination and deterioration.

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PART 2 - PRODUCTS

2.01 MATERIALS

- A. Reinforcing Steel: ASTM A615, 40 and 60 yield grade billet-steel deformed bars, uncoated finish.
 - 1. #3 ties and stirrups shall be Grade 40.
 - 2. All other shall be Grade 60.
- B. Welded Steel Wire Fabric: ANSI/ASTM A185 plain type; in flat rolls; uncoated finish.

2.02 ACCESSORY MATERIALS

A. Tie Wire: Minimum 18 gage annealed type.

2.03 FABRICATION

A. Fabricate in accordance with ACI 315, providing concrete cover specified in Section 03 30 0.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Comply with Concrete Reinforcing Steel Institute's recommended practice for "Placing Reinforcing Bars" for details and methods of reinforcement placement and supports and as herein specified.
- B. Clean reinforcement of loose rust and mill scale, earth, and other materials which reduce or destroy bond with concrete.
- C. Place reinforcement to obtain at least minimum coverage 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

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SECTION 03 30 00 CAST-IN-PLACE CONCRETE (BUILDING ONLY)

PART 1 - GENERAL

1.01 WORK INCLUDED

- A. The Contractor shall furnish all labor, materials, form-work equipment, and services required to complete all the concrete work shown on the drawings and specified herein, including all foundations and slabs.
- B. Cast-in-place slabs.
- C. Cast-in-place concrete footings.

1.02 REFERENCES

- A. ACI 301 Specifications for Structural Concrete for Buildings.
- B. ASTM C33 Concrete Aggregate.
- C. ASTM C94 Ready-Mixed Concrete.
- D. ASTM C150 Portland Cement.
- E. ASTM C260 Air-Entraining Admixtures for Concrete.
- F. ASTM C494 Chemical Admixtures for Concrete.

1.03 OUALITY ASSURANCE

- A. Codes and Standards: Comply with provisions of following codes, specifications and standards, except where more stringent requirements are shown or specified.
 - 1. ACI 318 "Building Code Requirements for Reinforced Concrete."
 - 2. ACI 318 "Manual of Standard Practice for Detailing Reinforced Concrete Structures."
- B. The ready mixed concrete plant shall be certified for conformance with the requirements of the National Ready Mixed Concrete Association.
- C. Slump: ASTM C 143: one test for each concrete load at point of discharge and one test for each set of compressive strength test specimens. The Contractor and the testing service are responsible for taking slump tests and adjusting water volume.
- D. Air Content: ASTM C 173: Volumetric method for normal weight of discharge; and one test for each set of compressive strength test specimens.

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- E. Concrete Temperature: Test hourly when air temperature is 40 degrees F and below, and when 80 degrees F and above; and each time a set of compression test specimens are made.
- F. Compression Test Specimens: ASTM C 31: one set of 4 standard cylinders for each compressive strength test, unless otherwise directed. Mold and store cylinders for laboratory testing.
- G. Compressive Strength Tests: ASTM C31: one set of 4 standard cylinders for each compressive strength test, unless otherwise directed. Mold and store cylinders for laboratory testing.
- H. Test results will be reported in writing to the Architect and Contractor. 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. The 7-day test results shall be considered satisfactory only if they equal 70% of the 28-day design requirement.
- I. Additional Tests: The testing service will make additional tests of in-place concrete when test results indicate specified concrete strength and other characteristics have not been attained in the structure, as directed by Architect. Testing service may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C42, or by methods as directed. Contractor shall pay for all tests conducted, and any other additional testing as may be required when unacceptable concrete is verified.

1.04 TESTS

- A. An independent testing laboratory shall perform the following services.
 - 1. Field and control cylinders shall be cast, cured and tested for each pour. Cylinders to be cast on the job according to C-31 and laboratory tests will follow ASTM C-39. A set of four (4) cylinders or six (6) during winter shall be made per pour when placing concrete for every pour from 0-50 yards and/or increment thereof; all of these cylinders shall be placed in a moist curing room and left therein until tested. Two cylinders shall be tested at seven (7) days and two cylinders at twenty-eight (28) days or as directed. Except as noted above, the sampling, curing and testing of cylinders shall be in accordance with ASTM Designation C172 (sampling) C31 (curing) and C39 (testing). The Architect shall receive a report on the cylinder break results.
- B. Re-testing of rejected materials and installed work shall be done at Contractor's expense.
- C. Test reports shall be furnished to the Contractor, Architect, and Owner for all tests required. Test reports shall be furnished within 72 hours of the pour.
- D. The Contractor shall notify the Architect and the independent testing laboratory twenty-four (24) hours in advance of any pour.

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PART 2 - PRODUCTS

2.01 MATERIALS

- A. Portland Cement: ANSI/ASTM C150, Type I, unless otherwise acceptable to the Architect. Use one brand of cement throughout project, unless otherwise acceptable to Architect.
- B. Fine and Coarse Aggregates: ANSI/ASTM C33. The maximum size shall be 1 inch river rock.
- C. All mixing water shall be clean and free from deleterious amounts of acids, alkalies, or organic materials.
- D. Air-Entraining Admixture: ANSI/ASTM C 260.
- E. Water Reducing Admixture: ANSI/ASTM C 494, Type A, and contain not more than 1% chloride ions.
- F. Water-Reducing, Accelerator Admixture: ASTM C 494, Type C or E. Subject to compliance with requirements, provide one of the following:
 - 1. "Accelguard 80"; Euclid Chemical Co.
 - 2. "Pozzolith 122-HE"; Master Builders.
 - 3. "Polarset"; W. R. Grace.
 - 4. "Sikacrete"; Sika Chemical Co.
- G. Fly Ash: ASTM C618.
- H. Expansion joint material where required shall be 1/2 inch thick asphalt-impregnated premolded fiber conforming to the latest revised Standard Specification for Preformed Expansion Joint Filler for Concrete, ASTM D1752.
- I. Curing compound shall conform to the latest revised Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete, ASTM C309. Take special care to insure that curing compound is compatible with final floor finish. Some finish floors prohibit the use of curing compound; Contractor verify.
- J. Non-Shrink Grout: CRD-C 588, factory pre-mixed grout. Type D Non-Metallic:
 - 1. "Masterflow 713"; Master Builders.
 - 2. "Sonogrout"; Sonneborn-Contech.
 - 3. "Euco-NS"; Euclid Chemical Company.
 - 4. "Five Star Grout"; U.S. Grout Co.

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- 5. "Duragrout"; L & M Cost. Chemical Co.
- K. Curing, Hardener, Sealer: Acrylic base compound equal to Sonneborne's Gray Kure-N-Seal (Gray). Verify with Architect. Use this material for curing and sealing of exposed finish concrete floors as noted in Finish Schedule as Concrete (Sealed)". Some finish floors must be water cured and chemical hardeners and sealers are prohibited. Refer to Division 9.
- L. Absorptive Cover: Burlap cloth made from jute of kenaf, weighing approximately 9 oz. per sq. yd., complying with AASHTO M 182, Class 2.
- M. Moisture-Retaining Cover: Comply with ANSI/ASTM C171.
- N. Liquid Membrane-forming Curing Compound: Liquid type membrane-forming curing compound complying with ANSI/ASTM C 309, Type 1, Class A unless other type acceptable to Architect. Some finish floors must be water-cured and chemical hardeners and sealers are prohibited. Refer to Division 9.
- O. Bonding Compound: Polyvinyl acetate, rewettable type.
- P. Epoxy Adhesive: 100% solids, two component material suitable for use on dry or damp surfaces. Subject to compliance with requirements, provide one of the following:
 - 1. "Thiopoxy"; W. R. Grace.
 - 2. "Sikadur Hi-Mod"; Sika Chemical Co.
 - 3. "Euco Epoxy"; Euclid Chemical Co.

2.02 PROPORTIONING AND DESIGN OF MIXES

- A. Laboratory shall prepare design mixes for each type and strength of concrete by either laboratory trial batch or field experience methods as specified in ACI 301.
- B. Adjustment to Concrete Mixes: Mix design adjustments may be requested by Contractor when characteristics of materials, job conditions, weather, test results, or other circumstances warrant at no additional cost to the Owner and as accepted by Architect. Laboratory tests data for revised mix design and strength results must be submitted to and accepted by Architect before using in work.

C. Admixtures:

- 1. With the Architect's approval, the Contractor may use accelerating admixtures in concrete slabs placed at ambient temperatures below 50 degrees F.
- 2. With the Architect's approval, the Contractor may use air-entraining admixture in exterior exposed concrete, unless otherwise indicated. Add air-entraining admixture at manufacturer's prescribed rate.
- 3. With the Architect's approval, the Contractor may use admixtures for water-reducing and set-control in strict compliance with manufacturer's directions.

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- D. 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".
 - 2. Reinforced Foundation Systems: Not less than 1" and not more than 3".
 - 3. Other Concrete: Not less than 2" and not more than 5".
- E. If fly ash is used, not more than 20% of the cement may be replaced by fly ash. Fly ash may not be used in concrete slabs to receive a float, trowel, or non-slip finish.
- F. Calcium chloride shall not be used.
- G. Cement Factor: Minimum 5-1/2 sacks per cubic yard of concrete.
- H. All concrete for foundations and building slabs shall have a minimum 28 day compressive strength of 3500 psi.
- I. Concrete shall be manufactured and delivered in accordance with the latest revised Standard Specification for Ready-Mixed Concrete, ASTM C94.
- J. Accelerating admixtures may be used in cold weather only when approved by the Architect. Use of admixtures will not relax cold weather placement requirements.

2.03 CONCRETE MIXES

- A. Ready-Mix Concrete: Comply with requirements of ANSI/ASTM C94, and as herein specified.
 - 1. Proportions shall be made by weight and shall be uniformly and accurately controlled and inspected by the testing laboratory employed by the Contractor.
 - 2. During hot weather, or under conditions contributing to rapid setting of concrete, a shorter mixing time than specified in ANSI/ASTM C94, may be required.
 - 3. When air temperature is between 85 and 90 F, reduce mixing and delivery time from 90 minutes to 75 minutes, and when air temperature is above 90 F reduce mixing and delivery time to 60 minutes.
 - 4. In cold weather, concrete operation may be assisted by using hot water or by preheating the aggregates prior to mixing operation or a combination thereof to insure that concrete is maintained at a temperature of 40 degrees or more.

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2.04 ACCESSORIES

A. Moisture Barrier:

a. Refer to specification section 07 23 16 - Below Grade Vapor Barrier (15MIL)

PART 3 - EXECUTION

3.01 INSPECTION

- A. Verify anchors, seats, plates, reinforcement, and other items to be cast into concrete are accurately placed, held securely, and will not cause hardship in placing concrete.
- B. Verify that all electrical conduit and piping that is to be installed underneath concrete is correctly and accurately placed and will not cause hardship in placing concrete.

3.02 LAY-OUT

- A. The Contractor shall lay out all concrete work from the drawings and shall furnish, set and maintain all necessary stakes, benchmarks and batter boards for determining clearly all required lines and levels.
- B. The Contractor shall be responsible for his lay-out and shall correct any errors and verify measurements and elevations.
- C. Dimensions for mechanical unit pads and freezer/cooler pads as shown on Drawings are based on sizes and clearance requirements of the units specified. Verify actual unit sizes and clearances with actual mechanical systems.

3.03 PREPARATION

- A. Prepare previously placed concrete by cleaning with steel brush and applying bonding agent. Apply bonding agent in accordance with manufacturer's instructions.
- B. All brackets, anchors, bolts, inserts, straps and all other items to be installed in concrete shall be built in as the concrete work is executed.

3.04 PREPARATION OF FORM SURFACES

- A. Coat contact surfaces of forms with a form-coating compound before reinforcement is placed.
- B. Thin form-coating compounds only with thinning agent of type, and in amount, and under conditions of form-coating compound manufacturer's directions. Do not allow excess form-coating material to accumulate in forms or to come into contact with concrete surfaces against which fresh concrete will be placed. Apply in compliance with manufacturer's instruction.
- C. Coat steel forms with a non-staining, rust-preventative form oil or otherwise protect against rusting. Rust-stained formwork is not acceptable.

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D. See also Structural Drawings and Notes.

3.05 CONCRETE PLACEMENT

- A. Notify Architect and the independent testing laboratory twenty-four (24) hours in advance of concrete pour.
- B. Ready mixed concrete hauled in truck mixers or truck agitators shall be deposited in place within 90 minutes from the time water is added to the mix. See 2.03 A.3.
- C. Before placing concrete, free standing water, snow, ice or other foreign materials shall be removed from subgrade. All forms shall be thoroughly cleaned, secured in position, and coated with a form-release agent.
- D. Maintain concrete cover around reinforcing as follows:

Item	Coverage
Walls (exposed to Weather or backfill)	2 inch
Footings and Concrete Formed Against the Earth	3 inch
Slabs on Fill	see slab details

- E. Place concrete continuously between predetermined construction and control joints.
- F. Pavement shall be pitched to perimeter areas to remove water. Slabs of buildings shall be pitched to floor drains.
- G. Sidewalks adjacent to building shall be pitched to drain water away from the building.
- H. Separate exterior slabs on fill from vertical surfaces with expansion joint filler. Extend joint filler from bottom of slab to within 1/2 inch of finished slab surface. Seal all expansion joints with sealant.
- I. Excessive honeycomb or embedded debris in concrete is not acceptable. Notify Architect upon discovery.
- J. Preplacement Inspection: Before placing concrete, inspect, and complete formwork installation, reinforcing steel, and items to be embedded or cast-in. Notify other crafts to permit installation of their work; cooperate with other trades in setting such work. Moisten wood forms immediately before placing concrete where form coatings are not used.
- K. Coordinate the installation of joint materials and moisture barriers with placement of forms and reinforcing steel.
- L. General: Comply with ACI 304, and as herein specified.
- M. Deposit concrete continuously or in layers of such thickness that no concrete will be placed on concrete which has hardened sufficiently to cause the formation of seams or planes of weakness. If a section cannot be placed continuously, provide construction

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joints as specified herein. Deposit concrete as nearly as practicable to its final location to avoid segregation.

- N. Placing concrete in forms: Deposit concrete in forms in horizontal layers not deeper than 24" 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.
- O. Consolidate placed concrete by mechanical vibrating equipment supplemented by handspading, rodding or tamping. Use equipment and procedures for consolidation of concrete in accordance with ACI recommended practices.
- P. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations not farther than visible effectiveness of machine. Place vibrators to rapidly penetrate placed layer and at least 6" 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 segregation of mix.
- Q. Placing Concrete Slabs: Deposit and consolidate concrete slabs in a continuous operation, within limits of construction joints, until the placing of a panel or section is completed.
- R. Consolidate concrete during placing operations so that concrete is thoroughly worked around reinforcement and other embedded items and into corners.
- S. Bring slab surfaces to correct level with straight-edge and strikeoff. Use bull floats or darbies to smooth surfaces, free of humps or hollows. Do not disturb slab surfaces prior to beginning finishing operations.
- T. Maintain reinforcing in proper position during concrete placement operations.
- U. Cold Weather Placing: Protect concrete work from physical damage or reduced strength which could be caused by frost, freezing actions, or low temperatures, in compliance with ACI 306 and as herein specified
- V. Do not use calcium chloride, salt and other materials containing antifreeze agents or chemical accelerators.
- W. Hot Weather Placing: When hot weather conditions exist that would seriously impair quality and strength of concrete, place concrete in compliance with ACI 305 except that temperature of concrete at time of placement shall be less than 90 F.
- X. Wet forms thoroughly before placing concrete.

3.06 FINISH OF FORMED SURFACES

A. Rough Form Finish: For formed concrete surfaces not exposed to view.

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- B. Smooth Form Finish: For formed concrete surfaces exposed to view, or that are to be covered with a coating material applied directly to concrete, such as waterproofing, dampproofing, painting or other similar system. This is a cast concrete surface obtained with selected form facing material, arranged orderly and symmetrically with a minimum of seams. Repair and patch defective areas; with fins or other projections to be completely removed and smoothed.
- C. Smooth Rubbed Finish: Provide smooth rubbed finish to schedule concrete surfaces, which have received smooth form finish treatment, not later than one day after form removal. Moisten concrete surfaces and rub with carborundum brick or other abrasive until a uniform color and texture is produced. Do not apply cement grout other than that created by the rubbing process.
- D. Finish floors of interior slabs with a trowel finish unless otherwise designated. Pitch to floor drains 1/4 inch per foot nominal.
- E. Paving and sidewalks shall have a light broom finish.

3.07 MONOLITHIC SLAB FINISHES

- A. Scratch Finish: Apply scratch finish to monolithic slab surfaces that are to receive mortar setting beds for tile, and other bonded applied cementitious material.
- B. Float Finish: Apply float finish to monolithic slab surfaces to receive trowel finish and other finishes as hereinafter specified. Begin floating when surface water has disappeared 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. Check and level surface plane to a tolerance not exceeding 1/4" in 10' when tested with a 10' straight edge. 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 trowel finish to monolithic slab surfaces to be exposed-to-view, and slab surfaces to be covered with resilient flooring, paint, carpet, or other thin-film finish coating system. 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 with a surface plane tolerance not exceeding 1/8" in 10' when tested with a 10' straightedge. Grind smooth surface defects which would telegraph through applied floor covering system.
- D. Liquid Curing, Hardener, Sealer:
 - 1. Liquid curing compound may be used if compatible with final floor finish. The contractor shall verify final floor finish requirements.
 - 2. Apply cure coats to sound and properly finished surface when workman can no longer damage floor by walking. Apply at rate of 200-400 square feet per gallon. Apply second cure coat as recommended by manufacturer.

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- 3. Apply dustproofing and seal coat in accordance with Room Finish Schedule immediately before occupancy of building. Do not apply until all grease and foreign material has been removed from slab as recommended by manufacturer.
- 4. Apply all coats to form a continuous, uniform film by spray, soft-bristle pushbroom, long-nap roller or lambswool applicator. Apply tape along edges to protect walls.

3.08 CONCRETE CURING AND PROTECTION

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures.
- B. 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.
- C. Begin final curing procedures immediately following initial curing and before concrete has dried. Continue final curing for at least 7 days in accordance with ACI 301 procedures. Avoid rapid drying at the end of final curing period.
- D. Curing Methods: Perform curing of concrete by moist curing, by moisture-retaining cover curing, by curing compound, and by combinations thereof, as herein specified.
- E. Liquid curing will be allowed so long as the liquid curing compound is compatible with the final floor finish.
- F. Provide moisture curing by following methods:
 - 1. Keep concrete surface continuously wet by covering with water.
 - 2. Continuous water-fog spray.
 - 3. Covering concrete surface with specified absorptive cover, thoroughly saturating cover with water and keeping continuously wet. Place absorptive cover to provide cover of concrete surfaces and edges, with 4" lap over adjacent absorptive covers.
- G. Provide moisture cover curing as follows:
 - 1. Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width with sides and ends lapped at least 3" and sealed by waterproof tape or adhesive. Immediately repair any holes or tears during curing period using cover material and waterproof tape.
- H. 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 full during period or until forms are removed. If forms are removed, continue curing by methods specified above, as applicable.

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3.09 MISCELLANEOUS CONCRETE ITEMS

- 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 herein, to blend with in-place construction. Provide other miscellaneous concrete filling shown or required to complete work.
- B. All areas under concrete floor slab shall have vapor barrier with joints lapped at least 24". Take care to lay material smooth and even and avoid tearing or puncturing. Seal tightly at all expansion joints and spaces around pipes, conduits, and other penetrations.

3.10 CONCRETE CONTROL JOINTS AT PAVING, SLABS, AND SIDEWALKS

- A. Saw cut or form control joints as soon as possible without raveling the new concrete. Control joints shall extend through curbs adjacent to concrete paving. Review control joint layout with Architect prior to initiating work.
- B. Saw, install masonite strips, pre-molded plastic joints, or tool paving control joints to a minimum depth of one-fourth the slab thickness. Saw control joints 10'-0" cc (maximum spacing) in each direction at concrete paving. Zip-strips or 1/4" masonite may be used in place of sawed joints; take special care to insure that control joints are straight.
- C. Control joints at sidewalks shall be 1" deep and 1/4" wide. Tool 1/4" radius on all exposed edges. Space joints (8'-0" maximum) evenly.
- D. All joints shall be completed before uncontrolled shrinkage cracking occurs. This may be as soon as 4 hours after placement but shall not occur later than 8 hours after placement.

3.11 EXPANSION JOINTS AT CONCRETE CURBS

A. All concrete curbs shall have expansion joints at 50'-0" cc (minimum spacing). Discontinue reinforcing at expansion joints.

3.12 SEALANT AT EXPANSION JOINTS AND OPEN CONTROL JOINTS

- A. Take special care to ensure that joints are clean and free of foreign matter.
- B. Install sealant in strict accordance with manufacturer's written instructions.

3.13 COORDINATION

A. Refer to Mechanical and Electrical plans and Divisions 21, 22, 23, 26, 27 and 28 of specifications for coordination of chase sizes. Take special care to coordinate holes in slabs with mechanical and electrical space requirements.

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SECTION 03 30 05

CAST-IN-PLACE CONCRETE (PAVING ONLY)

PART 1 - GENERAL

1.01 WORK INCLUDED

- A. The Contractor shall furnish all labor, materials, form-work equipment, and services required to complete all the concrete work shown on the drawings and specified herein, including all sidewalks, concrete pavements, and curbs.
- B. Cast-in-place paving.
- C. Cast-in-place concrete curbs and sidewalks.

1.02 REFERENCES

- A. ACI 301 Specifications for Structural Concrete for Buildings.
- B. ASTM C33 Concrete Aggregate.
- C. ASTM C94 Ready-Mixed Concrete.
- D. ASTM C150 Portland Cement.
- E. ASTM C260 Air-Entraining Admixtures for Concrete.
- F. ASTM C494 Chemical Admixtures for Concrete.

1.03 QUALITY ASSURANCE

- A. Codes and Standards: Comply with provisions of following codes, specifications and standards, except where more stringent requirements are shown or specified.
 - 1. ACI 318 "Building Code Requirements for Reinforced Concrete."
 - 2. ACI 318 "Manual of Standard Practice for Detailing Reinforced Concrete Structures."
- B. The ready mixed concrete plant shall be certified for conformance with the requirements of the National Ready Mixed Concrete Association.
- C. Slump: ASTM C 143: one test for each concrete load at point of discharge and one test for each set of compressive strength test specimens. The Contractor and the testing service are responsible for taking slump tests and adjusting water volume.
- D. Air Content: ASTM C 173: Volumetric method for normal weight of discharge; and one test for each set of compressive strength test specimens.

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- E. Concrete Temperature: Test hourly when air temperature is 40 degrees F and below, and when 80 degrees F and above; and each time a set of compression test specimens are made.
- F. Compression Test Specimens: ASTM C 31: one set of 4 standard cylinders for each compressive strength test, unless otherwise directed. Mold and store cylinders for laboratory testing.
- G. Compressive Strength Tests: ASTM C31: one set of 4 standard cylinders for each compressive strength test, unless otherwise directed. Mold and store cylinders for laboratory testing.
- H. Test results will be reported in writing to the Architect and Contractor. 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. The 7-day test results shall be considered satisfactory only if they equal 70% of the 28-day design requirement.
- I. Additional Tests: The testing service will make additional tests of in-place concrete when test results indicate specified concrete strength and other characteristics have not been attained in the structure, as directed by Architect. Testing service may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C42, or by methods as directed. Contractor shall pay for all tests conducted, and any other additional testing as may be required when unacceptable concrete is verified.

1.04 TESTS

- A. Re-testing of rejected materials and installed work shall be done at Contractor's expense.
- B. Test reports shall be furnished to the Contractor, Architect, and Owner for all tests required. Test reports shall be furnished within 72 hours of the pour.
- C. The Contractor shall notify the Architect twenty-four (24) hours in advance of any pour.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Portland Cement: ANSI/ASTM C150, Type I, unless otherwise acceptable to the Architect. Use one brand of cement throughout project, unless otherwise acceptable to Architect.
- B. Fine and Coarse Aggregates: ANSI/ASTM C33. Maximum size shall be 1 inch river rock.
- C. All mixing water shall be clean and free from deleterious amounts of acids, alkalies, or organic materials.

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- D. Air-Entraining Admixture: ANSI/ASTM C 260.
- E. Water Reducing Admixture: ANSI/ASTM C 494, Type A, and contain not more than 1% chloride ions.
- F. Water-Reducing, Accelerator Admixture: ASTM C 494, Type C or E. Subject to compliance with requirements, provide one of the following:
 - 1. "Accelguard 80"; Euclid Chemical Co.
 - 2. "Pozzolith 122-HE"; Master Builders.
 - 3. "Polarset"; W. R. Grace.
 - 4. "Sikacrete"; Sika Chemical Co.
- G. Fly Ash: ASTM C618.
- H. Expansion joint material where required shall be 1/2 inch thick asphalt-impregnated premolded fiber conforming to the latest revised Standard Specification for Preformed Expansion Joint Filler for Concrete, ASTM D1752.
- I. Curing compound shall conform to the latest revised Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete, ASTM C309. Take special care to insure that curing compound is compatible with final floor finish. Some finish floors prohibit the use of curing compound; Contractor verify.
- J. Non-Shrink Grout: CRD-C 588, factory pre-mixed grout. Type D Non-Metallic:
 - 1. "Masterflow 713"; Master Builders.
 - 2. "Sonogrout"; Sonneborn-Contech.
 - 3. "Euco-NS"; Euclid Chemical Company.
 - 4. "Five Star Grout"; U.S. Grout Co.
 - 5. "Duragrout"; L & M Cost. Chemical Co.
- K. Curing, Hardener, Sealer: Acrylic base compound equal to Sonneborne's Kure-N-Seal (Transparent). Use this material for curing and sealing of exposed finish concrete floors as noted in Finish Schedule as Concrete (Sealed)". Some finish floors must be water cured and chemical hardeners and sealers are prohibited. Refer to Division 9.
- L. Absorptive Cover: Burlap cloth made from jute of kenaf, weighing approximately 9 oz. per sq. yd., complying with AASHTO M 182, Class 2.
- M. Moisture-Retaining Cover: Comply with ANSI/ASTM C171.
- N. Liquid Membrane-forming Curing Compound: Liquid type membrane-forming curing compound complying with ANSI/ASTM C 309, Type 1, Class A unless other type

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acceptable to Architect. Some finish floors must be water-cured and chemical hardeners and sealers are prohibited. Refer to Division 9.

- O. Bonding Compound: Polyvinyl acetate, rewettable type.
- P. Epoxy Adhesive: 100% solids, two component material suitable for use on dry or damp surfaces. Subject to compliance with requirements, provide one of the following:
 - 1. "Thiopoxy"; W. R. Grace.
 - 2. "Sikadur Hi-Mod"; Sika Chemical Co.
 - 3. "Euco Epoxy"; Euclid Chemical Co.

2.02 PROPORTIONING AND DESIGN OF MIXES

- A. Laboratory shall prepare design mixes for each type and strength of concrete by either laboratory trial batch or field experience methods as specified in ACI 301.
- B. Adjustment to Concrete Mixes: Mix design adjustments may be requested by Contractor when characteristics of materials, job conditions, weather, test results, or other circumstances warrant at no additional cost to the Owner and as accepted by Architect. Laboratory tests data for revised mix design and strength results must be submitted to and accepted by Architect before using in work.

C. Admixtures:

- 1. With the Architect's approval, the Contractor may use accelerating admixtures in concrete slabs placed at ambient temperatures below 50 degrees F.
- 2. With the Architect's approval, the Contractor may use air-entraining admixture in exterior exposed concrete, unless otherwise indicated. Add air-entraining admixture at manufacturer's prescribed rate.
- 3. With the Architect's approval, the Contractor may use admixtures for water-reducing and set-control in strict compliance with manufacturer's directions.
- D. 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".
 - 2. Reinforced Foundation Systems: Not less than 1" and not more than 3".
 - 3. Other Concrete: Not less than 2" and not more than 5".
- E. If fly ash is used, not more than 10% of the cement may be replaced by fly ash. Fly ash may not be used in concrete slabs to receive a float, trowel, or non-slip finish.
- F. Calcium chloride shall not be used.

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- G. Cement Factor: Minimum 5-1/2 sacks per cubic yard of concrete.
- H. All concrete for paving shall have a minimum 28 day compressive strength of 4,000 psi. and 5% entrained air is required.
- I. Concrete shall be manufactured and delivered in accordance with the latest revised Standard Specification for Ready-Mixed Concrete, ASTM C94.
- J. Accelerating admixtures may be used in cold weather only when approved by the Architect. Use of admixtures will not relax cold weather placement requirements.

2.03 CONCRETE MIXES

- A. Ready-Mix Concrete: Comply with requirements of ANSI/ASTM C94, and as herein specified.
 - 1. Proportions shall be made by weight and shall be uniformly and accurately controlled and inspected by the testing laboratory employed by the Contractor.
 - 2. During hot weather, or under conditions contributing to rapid setting of concrete, a shorter mixing time than specified in ANSI/ASTM C94, may be required.
 - 3. When air temperature is between 85 and 90 F, reduce mixing and delivery time from 90 minutes to 75 minutes, and when air temperature is above 90 F reduce mixing and delivery time to 60 minutes.
 - 4. In cold weather, concrete operation may be assisted by using hot water or by preheating the aggregates prior to mixing operation or a combination thereof to insure that concrete is maintained at a temperature of 40 degrees or more.

2.04 ACCESSORIES

- A. Sealant at Expansion Joints and Open Controlled Joints: Sonolastic Paving Joint Sealant (SL-1) by Sonneborn.
- B. Detectable Warning Tile:
 - 1. Provide and install detectable warning tile adjacent to the entire length of the top edge of all curb cut ramps.
 - 2. Manufacturer: Equal to Armor-Tile cast-in-place detectable warning tile.
 - 3. Size: 12 inches square.
 - 4. Color: Contrasting color per current ADA regulations required.

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PART 3 - EXECUTION

3.01 INSPECTION

- A. Verify anchors, seats, plates, reinforcement, and other items to be cast into concrete are accurately placed, held securely, and will not cause hardship in placing concrete.
- B. Verify that all electrical conduit and piping that is to be installed underneath concrete is correctly and accurately placed and will not cause hardship in placing concrete.

3.02 LAY-OUT

- A. The Contractor shall lay out all concrete work from the drawings and shall furnish, set and maintain all necessary stakes, benchmarks and batter boards for determining clearly all required lines and levels.
- B. The Contractor shall be responsible for his lay-out and shall correct any errors and verify measurements and elevations.
- C. Dimensions for mechanical unit pads and freezer/cooler pads as shown on Drawings are based on sizes and clearance requirements of the units specified. Verify actual unit sizes and clearances with actual mechanical systems.

3.03 PREPARATION

- A. Prepare previously placed concrete by cleaning with steel brush and applying bonding agent. Apply bonding agent in accordance with manufacturer's instructions.
- B. All brackets, anchors, bolts, inserts, straps and all other items to be installed in concrete shall be built in as the concrete work is executed.

3.04 PREPARATION OF FORM SURFACES

- A. Coat contact surfaces of forms with a form-coating compound before reinforcement is placed.
- B. Thin form-coating compounds only with thinning agent of type, and in amount, and under conditions of form-coating compound manufacturer's directions. Do not allow excess form-coating material to accumulate in forms or to come into contact with concrete surfaces against which fresh concrete will be placed. Apply in compliance with manufacturer's instruction.
- C. Coat steel forms with a non-staining, rust-preventative form oil or otherwise protect against rusting. Rust-stained formwork is not acceptable.
- D. See also Structural Drawings and Notes.

3.05 CONCRETE PLACEMENT

A. Notify Architect and the independent testing laboratory twenty-four (24) hours in advance of concrete pour.

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- B. Ready mixed concrete hauled in truck mixers or truck agitators shall be deposited in place within 90 minutes from the time water is added to the mix. See 2.03 A.3.
- C. Before placing concrete, free standing water, snow, ice or other foreign materials shall be removed from subgrade. All forms shall be thoroughly cleaned, secured in position, and coated with a form-release agent.
- D. Maintain concrete cover around reinforcing as follows:

ItemCoveragePavingrefer to drawings

- E. Place concrete continuously between predetermined construction and control joints.
- F. Pavement shall be pitched to perimeter areas to remove water. Slabs of buildings shall be pitched to floor drains.
- G. Sidewalks adjacent to building shall be pitched to drain water away from the building.
- H. Separate exterior slabs on fill from vertical surfaces with expansion joint filler. Extend joint filler from bottom of slab to within 1/2 inch of finished slab surface. Seal all expansion joints with sealant.
- I. Excessive honeycomb or embedded debris in concrete is not acceptable. Notify Architect upon discovery.
- J. Preplacement Inspection: Before placing concrete, inspect, and complete formwork installation, reinforcing steel, and items to be embedded or cast-in. Notify other crafts to permit installation of their work; cooperate with other trades in setting such work. Moisten wood forms immediately before placing concrete where form coatings are not used.
- K. Coordinate the installation of joint materials and moisture barriers with placement of forms and reinforcing steel.
- L. General: Comply with ACI 304, and as herein specified.
- M. Deposit concrete continuously or in layers of such thickness that no concrete will be placed on concrete which has hardened sufficiently to cause the formation of seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as herein specified. Deposit concrete as nearly as practicable to its final location to avoid segregation.
- N. Placing concrete in forms: Deposit concrete in forms in horizontal layers not deeper than 24" 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.

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- O. Consolidate placed concrete by mechanical vibrating equipment supplemented by handspading, rodding or tamping. Use equipment and procedures for consolidation of concrete in accordance with ACI recommended practices.
- P. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations not farther than visible effectiveness of machine. Place vibrators to rapidly penetrate placed layer and at least 6" 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 segregation of mix.
- Q. Placing Concrete Slabs: Deposit and consolidate concrete slabs in a continuous operation, within limits of construction joints, until the placing of a panel or section is completed.
- R. Consolidate concrete during placing operations so that concrete is thoroughly worked around reinforcement and other embedded items and into corners.
- S. Bring slab surfaces to correct level with straight-edge and strikeoff. Use bull floats or darbies to smooth surfaces, free of humps or hollows. Do not disturb slab surfaces prior to beginning finishing operations.
- T. Maintain reinforcing in proper position during concrete placement operations.
- U. Cold Weather Placing: Protect concrete work from physical damage or reduced strength which could be caused by frost, freezing actions, or low temperatures, in compliance with ACI 306 and as herein specified
- V. Do not use calcium chloride, salt and other materials containing antifreeze agents or chemical accelerators.
- W. Hot Weather Placing: When hot weather conditions exist that would seriously impair quality and strength of concrete, place concrete in compliance with ACI 305 except that temperature of concrete at time of placement shall be less than 90 F.
- X. Wet forms thoroughly before placing concrete.

3.06 FINISH OF FORMED SURFACES

- A. Rough Form Finish: For formed concrete surfaces not exposed to view.
- B. Smooth Form Finish: For formed concrete surfaces exposed to view, or that are to be covered with a coating material applied directly to concrete, such as waterproofing, dampproofing, painting or other similar system. This is a cast concrete surface obtained with selected form facing material, arranged orderly and symmetrically with a minimum of seams. Repair and patch defective areas; with fins or other projections to be completely removed and smoothed.

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- C. Smooth Rubbed Finish: Provide smooth rubbed finish to schedule concrete surfaces, which have received smooth form finish treatment, not later than one day after form removal. Moisten concrete surfaces and rub with carborundum brick or other abrasive until a uniform color and texture is produced. Do not apply cement grout other than that created by the rubbing process.
- D. Finish floors of interior slabs with a trowel finish unless otherwise designated. Pitch to floor drains 1/4 inch per foot nominal.
- E. Paving and sidewalks shall have a light broom finish.

3.07 MONOLITHIC SLAB FINISHES

- A. Scratch Finish: Apply scratch finish to monolithic slab surfaces that are to receive mortar setting beds for tile, and other bonded applied cementitious material.
- B. Float Finish: Apply float finish to monolithic slab surfaces to receive trowel finish and other finishes as hereinafter specified. Begin floating when surface water has disappeared 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. Check and level surface plane to a tolerance not exceeding 1/4" in 10' when tested with a 10' straight edge. 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 trowel finish to monolithic slab surfaces to be exposed-to-view, and slab surfaces to be covered with resilient flooring, paint, carpet, or other thin-film finish coating system. 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 with a surface plane tolerance not exceeding 1/8" in 10' when tested with a 10' straightedge. Grind smooth surface defects which would telegraph through applied floor covering system.
- D. Liquid Curing, Hardener, Sealer:
 - 1. Liquid curing compound may be used if compatible with final floor finish. Contractor shall verify final floor finish requirements.
 - 2. Apply cure coats to sound and properly finished surface when workman can no longer damage floor by walking. Apply at rate of 200-400 square feet per gallon. Apply second cure coat as recommended by manufacturer.
 - 3. Apply dustproofing and seal coat in accordance with Room Finish Schedule immediately before occupancy of building. Do not apply until all grease and foreign material has been removed from slab as recommended by manufacturer.
 - 4. Apply all coats to form a continuous, uniform film by spray, soft-bristle pushbroom, long-nap roller or lambswool applicator. Apply tape along edges to protect walls.

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3.08 CONCRETE CURING AND PROTECTION

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures.
- B. 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.
- C. Begin final curing procedures immediately following initial curing and before concrete has dried. Continue final curing for at least 7 days in accordance with ACI 301 procedures. Avoid rapid drying at end of final curing period.
- D. Curing Methods: Perform curing of concrete by moist curing, by moisture-retaining cover curing, by curing compound, and by combinations thereof, as herein specified.
- E. Liquid curing will be allowed so long as the liquid curing compound is compatible with the final floor finish.
- F. Provide moisture curing by following methods:
 - 1. Keep concrete surface continuously wet by covering with water.
 - 2. Continuous water-fog spray.
 - 3. Covering concrete surface with specified absorptive cover, thoroughly saturating cover with water and keeping continuously wet. Place absorptive cover to provide cover of concrete surfaces and edges, with 4" lap over adjacent absorptive covers.
- G. Provide moisture cover curing as follows:
 - 1. Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width with sides and ends lapped at least 3" and sealed by waterproof tape or adhesive. Immediately repair any holes or tears during curing period using cover material and waterproof tape.
- H. 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 full during period or until forms are removed. If forms are removed, continue curing by methods specified above, as applicable.

3.09 MISCELLANEOUS CONCRETE ITEMS

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 herein specified, to blend with in-place construction. Provide other miscellaneous concrete filling shown or required to complete work.

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B. All areas under concrete floor slab shall have vapor barrier with joints lapped at least 24". Take care to lay material smooth and even, and avoid tearing or puncturing. Seal tightly at all expansion joints and spaces around pipes, conduits and other penetrations.

3.10 CONCRETE CONTROL JOINTS AT PAVING, SLABS, AND SIDEWALKS

- A. Saw cut or form control joints as soon as possible without raveling the new concrete. Control joints shall extend through curbs adjacent to concrete paving. Review control joint layout with Architect prior to initiating work.
- B. Saw, install masonite strips, pre-molded plastic joints, or tool paving control joints to a minimum depth of one-fourth the slab thickness. Saw control joints 10'-0" cc (maximum spacing) in each direction at concrete paving. Zip-strips or 1/4" masonite may be used in place of sawed joints; take special care to insure that control joints are straight.
- C. Control joints at sidewalks shall be 1" deep and 1/4" wide. Tool 1/4" radius on all exposed edges. Space joints (8'-0" maximum) evenly.
- D. All joints shall be completed before uncontrolled shrinkage cracking occurs. This may be as soon as 4 hours after placement but shall not occur later than 8 hours after placement.

3.11 EXPANSION JOINTS AT CONCRETE CURBS

A. All concrete curbs shall have expansion joints at 50'-0" cc (minimum spacing). Discontinue reinforcing at expansion joints.

3.12 SEALANT AT EXPANSION JOINTS AND OPEN CONTROL JOINTS

- A. Take special care to insure that joints are clean and free of foreign matter.
- B. Install sealant in strict accordance with manufacturer's written instructions.

3.13 COORDINATION

A. Refer to Mechanical and Electrical plans and applicable Divisions of specifications for coordination. Take special care to coordinate holes in slabs with mechanical and electrical space requirements.

END OF SECTION

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SECTION 03 62 00 NON-SHRINK GROUTING

PART 1 - GENERAL

1.01 WORK INCLUDED

- A. Shrink-resistant grout
- B. Self-leveling sealant at Expansion joints and open control joints.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Non-Shrink Grout: CRD-C 588, factory pre-mixed grout. Type D Non-Metallic:
 - 1. "Masterflow 713"; Master Builders.
 - 2. "Sonogrout"; Sonneborn-Contech.
 - 3. "Euco-NS"; Euclid Chemical Company.
 - 4. "Duragrout"; L & M Cost. Chemical Co.
- B. Sealant at Expansion Joints and Open Control Joints:
 - 1. Sonolastic Paving Joint Sealant (SL-1) by Sonneborn.

PART 3 - EXECUTION

3.01 INSPECTION

- A. Verify that existing conditions are satisfactory and ready to receive grout or sealant.
- B. Take special care to insure that joints are clean and free of foreign matter.

3.02 INSTALLATION

- A. Filling-In: Fill in holes and openings left in structures for passage of work by other trades.
- B. Install sealant in strict accordance with manufacturer's written instructions.

3.03 COORDINATION

A. Refer to Mechanical and Electrical plans and specifications for coordination of chase sizes.

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END OF SECTION

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SECTION 04 05 13 MASONRY MORTARING

PART 1 - GENERAL

1.01 WORK INCLUDED

A. Mortar and grout for masonry.

1.02 RELATED WORK

- A. Section 04 05 19 Masonry Anchorage and Reinforcing
- B. Section 04 21 10 Brick Masonry
- C. Section 04 22 00 Concrete Unit Masonry
- D. Section 08 11 13 Hollow Metal Doors and Frames

1.03 REFERENCES

- A. ASTM C5 Quicklime for Structural Purposes.
- B. ASTM C91 Masonry Cement.
- C. ASTM C94 Ready-Mixed Concrete.
- D. ASTM C144 Aggregate for Masonry Mortar.
- E. ASTM C150 Portland Cement.
- F. ASTM C207 Hydrated Lime for Masonry Purposes.
- G. ASTM C270 Mortar for Unit Masonry.
- H. ASTM C780 Test Methods

1.04 ENVIRONMENTAL REQUIREMENTS

- A. Maintain materials and surrounding air temperature to minimum 50 degrees F. prior to, during, and 48 hours after completion of masonry work.
- B. Comply with the International Masonry All Weather Council, Recommended Practices and Guide Specifications for cold weather masonry construction.

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PART 2 - PRODUCTS

2.01 ACCEPTABLE TILE MANUFACTURERS:

- A. Argos (BASIS of DESIGN)
- B. Holcim
- C. Cemex

2.02 MATERIALS

- A. Premix Mortar: ASTM C387, using gray cement, normal strength.
- B. Grout Aggregate: ASTM C404.
- C. Water: Clean and potable.

2.03 MORTAR COLOR:

- A. At Concrete Masonry Units: Standard Gray Mason Mix Mortar
- B. At Brick Veneer: Savannah Ivory by Argos

2.04 MORTAR MIXES

- A. Mortar for Load-Bearing Walls and Reinforced Masonry, Non-Load-Bearing Walls, Veneers, and Partitions: ASTM C270, Type S using Property Method.
- B. Mortar for Below Grade: ASTM C270, Type M, using Property Method.

2.05 MORTAR MIXING

- A. In accordance with ASTM C270, thoroughly mix mortar ingredients as needed for immediate use
- B. Add color and admixtures in accordance with manufacturer's specifications.
- C. Anti-freeze additives are not allowed.

2.06 GROUT MIXES

- A. Minimum 2500 psi strength at 28 days: 8-10 inches slump; premixed type mixed in accordance with ASTM C476.
- B. Anti-freeze additives are not allowed.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Install mortar and grout in accordance with Section 04 21 00.

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- B. Work grout into cores and cavities to eliminate voids. All joints, head, bed, and collar shall be completely filled. Exception: weep holes.
- C. Do not displace reinforcing steel when placing grout.
- D. Mortar joints at face brick to be tooled concave when thumbprint hard.
- E. Mortar joints at exposed CMU to be tooled concave when thumbprint hard.
- F. Hollow metal frames shall be slushed full with grout where installed in masonry walls.
- G. Keep wall cavities free of mortar droppings and bridges.

END OF SECTION

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SECTION 04 05 19

MASONRY ANCHORAGE AND REINFORCING

PART 1 - GENERAL

1.01 WORK INCLUDED

A. Masonry reinforcement, anchors, and accessories.

1.02 RELATED WORK

- A. Section 01 33 00 Submittal Procedures
- B. Section 04 05 13 Masonry Mortaring
- C. Section 04 21 13 Brick Masonry
- D. Section 04 22 00 Concrete Unit Masonry
- E. Section 05 50 00 Metal Fabrications
- F. Section 07 27 26 Fluid-Applied Membrane Air Barriers

1.03 REFERENCES

- A. Brick Industry of America (B.I.A.)
- B. National Concrete Masonry Association

1.04 SUBMITTALS

A. Provide a mockup as described in the drawings. Refer to Section 01 33 00 – Submittal Procedures for additional information.

PART 2 - PRODUCTS

2.01 REINFORCEMENT AND ANCHORAGE

- A. Brick, Cast Stone, and cavity walls with metal stud back-up.
 - 1. Veneer anchor system:
 - a. Equal to Hohmann & Barnard
 - 1) Anchor Plate: HB-213-2X S.I.S., 12 ga., hot dipped galvanized
 - 2) Pintle: Compressed Leg 2X Hook, 12 ga, hot dipped galvanized
 - 3) Seismic Wire: Continuous 9 ga., hot-dip galvanized, joint reinforcement wire.

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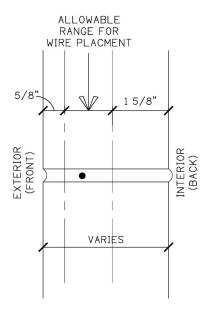
- b. Coating ASTM A153, Class B hot dipped galvanized, 1.50 oz. p.s.f. (all parts)
- c. Anchor Plates to accommodate 2" thick rigid insulation.
- d. Plate pintle sized to accommodate 2" air space. Plate shall accept 9 gauge continuous wire, which shall be installed in each reinforced joint at 16" o.c. vertically. The anchor system shall be sized so that continuous wire shall be installed a minimum of 1 5/8" from the interior (back) side into the masonry unit and allow a minimum of 5/8" coverage at the exterior (front) side of the masonry unit. (Refer to Continuous Seismic Wire Placement, 2.01, E. of this Section)
- e. Attach to stud back up with 2-#12-14 304 Stainless steel screws.
- 2. Coordinate with work performed under Section 07 27 26 Fluid Applied Membrane Air Barriers. Spray all installed back plates with 2 coats of Fluid Applied Membrane Air Barrier. Any back plates installed after the installation of the Fluid Applied Membrane Air Barrier shall be sealed over with liquid flashing as described in Section 07 27 26 Fluid Applied Membrane Air Barriers.
- 3. General Joint Reinforcement: 9 gauge hot dipped galvanized wire, for use as concrete masonry wall reinforcing as manufactured by, Hohmann & Barnard, Inc., Wire-Bond, Southern Construction Products, Inc., or approved equal, 16" o.c. each way.
- B. Exterior masonry cavity wall and interior CMU reinforcement:
 - 1. General Joint Reinforcement: 9-gauge zinc plated wire, for use as concrete masonry wall reinforcing as manufactured by Dur-O-Wall Products, Hohmann & Barnard, Inc., Wire-Bond, Southern Construction Products, Inc., or approved equal, 16" o.c. ea. way.
 - 2. Ladder Type reinforcement:
 - a. Exterior masonry cavity walls:
 - 1) Equal to Lox-All Ladder Reinforcement #270 S.I.S. Ladder by Hohmann & Barnard, Inc.
 - 2) Coating: ASTM A153, Class B hot dipped galvanized, 1.50 oz. p.s.f.
 - 3) 9 gauge side rods x 9 gauge cross rods.
 - 4) Install 16 inches on center vertically.
 - 5) Seismiclips and continuous joint reinforcement wire (9 Gauge), which shall be installed in each reinforced joint at 16" o.c. vertically

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- 6) The anchor system shall be sized so that the continuous wire shall be installed a minimum of 1 5/8" from the interior (back) side into the masonry unit and allow a minimum of 5/8" coverage at the exterior (front) side of the masonry unit. (Refer to Continuous Seismic Wire Placement, 2.01, E. of this Section)
- C. Interior CMU Walls:
 - 1. Equal to #220 Ladder Mesh Reinforcement by Hohmann & Barnard, Inc.
 - 2. Coating: ASTM A153, Class B hot dipped galvanized, 1.50 oz. p.s.f.
 - 3. Wire Size: Standard Weight: 9 gauge side rods x 9 gauge cross rods.
 - 4. Sized for 8" and 12" nominal CMU.
 - 5. Install 16" o.c. vertically.
- D. Weld On Ties As Detailed Refer to Structural and Architectural Details

2.02 CONTINUOUS SEISMIC WIRE

- A. Continuous Seismic Wire Placement: The continuous wire shall be installed a minimum of 1 5/8" from the interior (back) side into the masonry unit and allow a minimum of 5/8" coverage at the exterior (front) side of the masonry unit. As indicated in the figure below.
 - 1. Wire Placement Figure:



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2.03 THROUGH WALL FLASHING

A. Equal to Cop-R-Cote, by Advanced Building Products, Inc.

or

Coated Copper Flashings by Sandell's.

- B. Type: 3 layers, flexible flashing consisting of copper sheet coated on both sides with elastic asphalt compound.
- C. Characteristics: Waterproof, flexible at extreme temperatures, high tensile strength, resistant to mortar acid and alkali action, self-sealing at punctures and allowing minimum thermal cold flow through structure.
- D. Copper sheet: Full, single copper sheet weighing 5 ounces copper per square foot and complying with ASTM B370.
- E. Coating: Plasticized asphalt compound weighing 6 ounces per square foot minimum.
- F. Roll width: 36 inches.
- G. Utilize premanufactured interior corners, exterior corners, and end dams.
- H. Lap seams and seal seams with mastic. Mastic shall be a high-grade, asphalt based cement used in bonding asphalt-coated flashing to construction surfaces. To provide a strong, flexible waterproof barrier with adhesion allowing for expansion and contraction caused by temperature fluctuation or building movement.
- I. Follow manufacturer's installation recommendations.
- J. Coordinate with work performed under Section 07 27 26 Fluid Applied Membrane Air Barriers, in regards to liquid flashing at termination bars, laps and seams.

2.04 OTHER ACCESSORIES

- A. Weeps: Full head joints required. Provide and install Hohmann & Bernard QV-Quadro-Vent or equal.
 - 1. Honeycomb design allowing passage of moisture from cavity to the exterior while restricting ingress of insects and other debris.
 - 2. Allowing passage of moisture up to its 2-1/2" height.
 - 3. Suitable for top wall venting.
 - 4. Polypropylene construction
 - 5. Color: Clear
 - 6. Size: Standard (3/8" thick x 3-3/8" wide x 2-1/2" tall)

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- B. Provide and install "Z" Anchors at corners and intersections of CMU walls for lateral support. Minimum cross section shall be 1/4 inch by 1-1/2 inches with 2 inch bends. Anchor shall be at least 24 inches long and installed at a maximum spacing of 16" o.c. vertically or as noted or detailed on structural drawings. Hot dip galvanized.
- C. Control Joints: Equal to VS Series PVC Control Joint by Hohmann & Barnard, Series 600 by Greenstreak, or 9101 Regular by Southern Construction Products, Inc.
- D. Mortar Net: Equal to Mortar Net, for cavity walls a high density polyethylene drainage system. 2" thick by 10" high. Install continuously at the base of all exterior walls and over all doors, windows, and openings.
- E. Through-wall flashing mastic: Fibrated, trowel grade mastic consisting of asphalt, mineral stabilizers, and interfibe complying with ASTM D2822, Type 1; Cop-R-Tite Flashing Mastic as manufactured by Advanced Building Products, Inc. or equal.
- F. Termination bars equal to Sandell's 1/8" x 1" stainless steel with pre-punched 1/4" dia. holes at 8" o.c.
- G. Stainless steel sub sill pans, end dams, drip edge and thru wall flashing at areas indicated on the drawings: Forged from 20 gauge stainless steel with welded and ground joints. Workmanship shall be smooth with no burrs or protrusions which could penetrate other materials.
- H. Prefinished metal flashing at door and window jambs.
 - 1. 24-gauge
 - 2. Kynar 500 finish
 - 3. Color to match door/window frames.
 - 4. Configurations as shown on drawings
 - 5. Attached to treated wood blocking with required corrosion resistant fasteners compatible with metal flashing.
 - 6. Seal to treated wood blocking with liquid flashing as described in drawings and in Section 07 27 26 Fluid-Applied Membrane Air Barriers. Cover all fasteners for a air-tight barrier.

PART 3 - EXECUTION

3.01 PREPARATION

- A. Schedule a pre-installation conference with Architect and all trades.
- B. Successfully demonstrate the use of all products in mock-up wall.

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3.02 REINFORCEMENT AND ANCHORAGE

- A. Install joint reinforcement at 16 inches o.c. each way.
- B. Place masonry joint reinforcement in first and second horizontal joints above and below openings. Extend 16 inches minimum each side of opening.
- C. Place joint reinforcement continuous in first joint below top of walls.
- D. Lap joint reinforcement ends minimum 6 inches. Extend 16 inches minimum each side of opening.
- E. Place reinforcing bars supported and secured against displacement. Maintain position within ½ inch of true dimension.
- F. Reinforce corners and intersections with pre-formed units of reinforcement at 16" o.c.
- G. Discontinue reinforcement and anchorage at expansion joints and control joints.
- H. Install "Z" Anchors at corners and intersections for lateral support. Minimum cross section of 1/4" inch by 1 1/2" inch with 2 inch bends. Anchor shall be at least 24 inches long and installed at a maximum spacing of 16" o.c. vertically as detailed or noted on structural drawings. Hot dip galvanized. Completely fill cells with mortar above and below strap.

3.03 CONCRETE FILLING AND GROUT (NEW CONSTRUCTION)

- A. Reinforce bond beam, pilasters, cells at doors, windows, and openings.
- B. Support and secure reinforcing bars. Maintain within ½ inch of dimensioned position.
- C. Do not displace reinforcing. Work into cores and cavities to eliminate voids.
- D. At bearing locations, fill side cores with concrete for a minimum 12 inches each side.
- E. Fill cores where "Z" anchors are installed.
- F. Fill cores at reinforced cells at exterior walls.

3.04 THROUGH-WALL FLASHING

- A. Coordinate installation of flashings with erection of masonry walls to ensure material is provided in timely manner for embedment in mortar joints.
- B. Coordinate with work performed under Section 07 27 26 Fluid Applied Membrane Air Barriesr, in regards to liquid flashing at termination bars, laps and seams.
- C. Inspection: Verify masonry surfaces to receive through-wall flashings are smooth, free of loose materials, and properly sloped to provide drainage.

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- D. Verify that adequate weep holes and mortar deflection devices and thru wall flashing drip edges are being installed to provide proper drainage at flashing locations.
- E. Install flashings in accordance with Drawings, approved shop drawings, and manufacture's recommended installation instructions.
 - 1. Use recommended adhesive and sealer.
 - 2. Form end bans at all locations to provide positive drainage to weep holes.
- F. Install copper flashings at all foundation sills, base of exterior walls, window and door sills and heads, through-wall conditions and other locations as detailed on drawings.
- G. Lap joints: Coat contacting surfaces with mastic and lap 6" inches minimum. Roll with hand roller until mastic bead appears at edges.
- H. After installation of flashings (and completion of masonry assemblies), inspect work.
 - 1. Verify flashings have been properly installed at all required locations to prevent water penetration.
 - 2. Verify weep holes have been provided to ensure proper drainage to exterior.
- I. Water test flashings as required by commissioning agency to verify flashing has been properly installed and moisture drains through weep holes. Refer to Division 17 for testing requirements.
- J. Extend flashing all the way through masonry course. Terminate at exterior with a visible drip edge.
- K. Trim exposed flashings flush with masonry surfaces after installation has been reviewed by the architect.

3.05 CONTROL AND EXPANSION JOINTS

- A. Install preformed control joint devices at all interior masonry walls, not to exceed 32'-0" o.c. Sealant and backer rod required.
- B. Locate control joints not to exceed 20'-o.c. or as indicated on exterior elevation drawings in exterior walls through both block and brick. Sealant and back rod required.

END OF SECTION

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SECTION 04 21 00 BRICK MASONRY

PART 1 - GENERAL

- 1.01 FURNISH AND INSTALL THE FOLLOWING:
 - A. Face brick.
- 1.02 RELATED WORK
 - A. Section 04 05 13 Masonry Mortaring
 - B. Section 04 05 19 Masonry Anchorage and Reinforcing
 - C. Section 04 22 00 Concrete Unit Masonry
 - D. Section 05 50 00 Metal Fabrications
- 1.03 ENVIRONMENTAL REQUIREMENTS
 - A. Maintain materials and surrounding air temperature to minimum 50 degrees Fahrenheit, prior to, during, and for 48 hours after completion of masonry work. Comply with the International Masonry Industry All Weather Council, Recommended Practices and Guide Specifications for Cold Weather.
- 1.04 REFERENCES
 - A. BIA (Brick Industry Association)
 - 1. www.bia.org
- 1.05 SUBMITTALS
 - A. Test panels with project CMU and face brick required for Architect's and Owner's approval.
 - B. Provide a 4'-0" x 4'-0" sample of complete wall system using all materials for Architect's approval on site.

PART 2 - PRODUCTS

- 2.01 FACE BRICK
 - A. Equal to 'Velour Oatmeal' brick by Cherokee Brick Company
- 2.02 MORTAR
 - A. Refer to Section 04 05 13 Masonry Mortaring.

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PART 3 - EXECUTION

3.01 PREPARATION

- A. Verify items provided by other Sections of work are properly sized and located. Take special care to coordinate masonry work with requirements of Division 15 and Division 16 of specifications.
- B. Establish lines, levels, and coursing. Protect from disturbance.
- C. Provide temporary bracing during erection of masonry work. Maintain in place until building structure provides permanent bracing.
- D. Review locations where waterproofing is required.

3.02 COURSING

- A. Place masonry to lines and levels indicated.
- B. Maintain masonry courses to uniform width. Make vertical and horizontal joints equal and of uniform thickness.
- C. Lay brick masonry units in running bond. Form tooled concave mortar joints.
- D. Review control joint locations and configurations with Architect prior to initiating the work.

3.03 PLACING AND BONDING

- A. Lay masonry in full bed of mortar, properly jointed with other work. All joints, head, bed, and collar shall be completely filled. Buttering corners of joints and deep or excessive furrowing of mortar joints are not permitted.
- B. Fully bond intersections and external and internal corners.
- C. Do not shift or tap masonry units after mortar has taken initial set. Where adjustment must be made, remove mortar and replace.
- D. Remove excess mortar.
- E. Perform jobsite cutting with proper tools to provide straight, unchipped edges. Take care to prevent breaking masonry unit corners or edges.
- F. Weep holes (full head joint) required at bottom of all masonry walls, above all flashings, shelf, and angles, and lintels at 24" o.c. horizontally.

3.04 TOLERANCES AND AESTHETICS

A. The Contractor must review the work as it progresses and review in areas not more than 100 s.f. per review. If the Contractor has any doubt that the work does not conform to tolerances or aesthetics, he shall stop the work and notify the Architect verbally and in

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writing immediately. The Architect or his authorized representative shall visit the site and review the area(s) in question with the Contractor within forty-eight (48) hours of the Contractor's written notice to the Architect. If the work is non-conforming, the Contractor shall remove all of the non-conforming work and immediately reconstruct the work using all new materials. If the project is delayed due to non-conforming work, the Contractor shall not be granted time extension(s).

- B. Variation from Unit to Adjacent Unit: 3/32 inch maximum.
- C. Variation from Plane of Wall: 1/4 inch in 10 feet: ½ inch in 20 feet or more.
- D. Variation from Plumb: 1/4 inch per story noncumulative.
- E. Variation from Level Coursing: 1/8 inch in 3 feet; 1/4 inch in 10 feet.
- F. Variation of Joint Thickness: 1/8 inch in 3 feet.
- G. Maximum Variation from Cross Sectional Thickness of Walls: Plus or minus 1/4 inch.

3.05 REINFORCEMENT AND ANCHORAGE

A. See Section 04 05 19 – Masonry Anchorage and Reinforcing

3.06 CUTTING AND FITTING

- A. Cut and fit for pipes, conduit and sleeves. Cooperate with other sections of work to provide correct size, shape, and location. Take special care to coordinate work of this section with requirements of Division 15 and Division 16 of specifications.
- B. Obtain approval prior to cutting or fitting any area not indicated or where appearance or strength of masonry work may be impaired.

3.07 CLEANING

- A. Clean soiled surfaces with a non-acidic solution which will not harm masonry or adjacent materials. Consult masonry manufacturer for acceptable cleaners. Consult painting contractor and manufacturer of paint, primer, and elastomeric coatings to ensure that cleaning solutions are compatible with finishes.
- B. Use non-metallic tools in cleaning operations.

3.08 PROTECTION

- A. Provide protection without damaging completed work.
- B. At day's end, cover unfinished walls to prevent moisture infiltration.
- C. Keep masonry units covered and dry to prevent moisture infiltration during storage and construction.

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3.09 LINTELS

- A. Install steel lintels over openings where brick veneer is scheduled.
- B. Provide a minimum of 8 inch bearing on each side of opening.

3.10 CONTROL AND EXPANSION JOINTS

A. See Section 04 05 19 – Masonry Anchorage and Reinforcing

END OF SECTION

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SECTION 04 22 00

CONCRETE UNIT MASONRY

PART 1 - GENERAL

1.01 WORK INCLUDED

A. Concrete masonry units.

1.02 RELATED WORK

- A. Section 04 05 13 Masonry Mortaring
- B. Section 04 05 19 Masonry Anchorage and Reinforcing
- C. Section 04 21 13 Brick Masonry
- D. Section 05 50 00 Metal Fabrications
- E. Section 07 27 26 Fluid-Applied Membrane Air Barriers

1.03 ENVIRONMENTAL REQUIREMENTS

- A. Maintain materials and surrounding air temperature to minimum 50 degrees F. prior to, during, and 48 hours after completion of masonry work. Comply with the International Masonry Industry All Weather Council, Recommended Practices and Guide Specifications for Cold Weather.
- B. ASTM C90 Latest Edition

1.04 REFERENCES

A. National Concrete Masonry Association.

1.05 SUBMITTALS

- A. Test panels with project CMU and face brick required for Architect's and Owner's approval.
- B. Provide a 4'-0" x 4'-0" sample of complete wall system using all materials for Architect's approval on site.

PART 2 - PRODUCTS

2.01 CONCRETE MASONRY UNITS

- A. Concrete masonry units shall be in accordance with the requirements specified herein and the current issues of the following applicable specifications and standards:
 - 1. Load-Bearing Concrete Masonry Units:

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- a. ASTM C90 Latest Edition.
- b. Minimum compressive strength based on net cross-sectional area:
 - 1) Minimum 1700 psi for individual units.
 - 2) Minimum 1900 psi for average of three units.
- 2. Provide fire-rated units as shown on drawings in accordance with 2018 International Building Code requirements.

2.02 CONCRETE MASONRY LINTELS, BOND BEAMS, AND EXTERIOR WALLS

- A. Lintels
 - 1. Per Structural drawings
- B. Bond Beams
 - 1. Per Structural drawings
- C. Exterior Walls:
 - 1. Per Structural drawings
- D. Concrete:
 - 1. 3,500 psi @ 28 days; 8 10 inch slump.
- E. Grout:
 - 1. 2,500 psi @ 28 days; 8 10 inch slump.

PART 3 - EXECUTION

3.01 PREPARATION

- A. Verify items provided by other Sections of work are properly sized and located. Take special care to coordinate masonry work with requirements of Division 15 and Division 16 of specifications.
- B. Establish lines, levels, and coursing. Protect from disturbance.
- C. Provide temporary bracing during erection of masonry work. Maintain in place until building structure provides permanent bracing.
- D. Review locations where waterproofing is required.

3.02 COURSING

A. Place masonry to lines and levels indicated.

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- B. Maintain masonry courses to uniform width. Make vertical and horizontal joints equal and of uniform thickness.
- C. Lay concrete masonry units in running bond. Course one block unit and one mortar joint to equal 8 inches. Form tooled concave mortar joints.
- D. Review control joint locations and configurations with Architect prior to initiating the work.

3.03 PLACING AND BONDING

- A. Lay masonry in full bed of mortar, properly jointed with other work. All joints, head, bed, and collar shall be completely filled. Buttering corners of joints, and deep or excessive furrowing of mortar joints are not permitted.
- B. Fully bond intersections and external and internal corners. Fill cells in CMU supporting "Z" anchors with grout.
- C. Do not shift or tap masonry units after mortar has taken initial set. Where adjustment must be made, remove mortar and replace.
- D. Remove excess mortar.
- E. Perform jobsite cutting with proper tools to provide straight, unchipped edges. Take care to prevent breaking masonry unit corners or edges.
- F. Weep holes (full head joint) required at bottom of all masonry walls, above all flashings, shelf, and angles, and lintels at 24" o.c. horizontally.

3.04 TOLERANCES AND AESTHETICS

- A. The Contractor must review the work as it progresses and review in areas not more than 100 s.f. per review. If the Contractor has any doubt that the work does not conform to tolerances or aesthetics, he shall stop the work and notify the Architect verbally and in writing immediately. The Architect or his authorized representative shall visit the site and review the area(s) in question with the Contractor within forty-eight (48) hours of the Contractor's written notice to the Architect. If the work is non-conforming, the Contractor shall remove all of the non-conforming work and immediately reconstruct the work using all new materials. If the project is delayed due to non-conforming work, the Contractor shall not be granted time extension(s).
- B. Variation from Unit to Adjacent Unit: 3/32 inch maximum.
- C. Variation from Plane of Wall: 1/4 inch in 10 feet and ½ inch in 20 feet or more.
- D. Variation from Plumb: 1/4 inch per story noncumulative.
- E. Variation from Level Coursing: 1/8 inch in 3 feet; 1/4 inch in 10 feet.
- F. Variation of Joint Thickness: 1/8 inch in 3 feet.

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G. Maximum Variation from Cross Sectional Thickness of Walls: Plus or minus 1/4 inch.

3.05 REINFORCEMENT AND ANCHORAGE

A. See Section 04 05 19 – Masonry Anchorage and Reinforcing.

3.06 CUTTING AND FITTING

- A. Cut and fit for pipes, conduit and sleeves. Cooperate with other sections of work to provide correct size, shape, and location. Take special care to coordinate the work of this section with the requirements of Section 15 and Section 16 of specifications.
- B. Obtain approval prior to cutting or fitting any area not indicated or where appearance or strength of masonry work may be impaired.

3.07 CLEANING

- A. Clean soiled surfaces with a non-acidic solution which will not harm masonry or adjacent materials. Consult masonry manufacturer for acceptable cleaners. Consult painting contractor and manufacturer of paint, primer, and elastomeric coatings to ensure that cleaning solutions are compatible with finishes.
- B. Use non-metallic tools in cleaning operations.

3.08 PROTECTION

- A. Provide protection without damaging completed work.
- B. At day's end, cover unfinished walls to prevent moisture infiltration.
- C. Keep masonry units covered and dry to prevent moisture infiltration during storage and construction.

3.09 LINTELS

- A. Install concrete masonry lintels over openings where steel lintels are not required.
- B. Provide a minimum of 8 inch bearing on each side of opening.

3.10 CONTROL AND EXPANSION JOINTS

A. See Section 04 05 19 - Masonry Anchorage and Reinforcing.

END OF SECTION

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SECTION 05 50 00 METAL FABRICATIONS

PART 1 - GENERAL

1.01 WORK INCLUDED

- A. Lintels
- B. Bollards
- C. Angles and braces
- D. Metal grate for floor trench

1.02 RELATED WORK

A. Section 09 91 00 – Painting

1.03 REFERENCES

- A. ASTM A36 and ASTM A992 Structural Steel.
- B. ASTM A53 Hot-Dipped, Zinc-Coated Welded and Seamless Steel Pipe.
- C. AWS D1.1 Structural Welding Code.
- D. FS TT-P-31 Paint, Oil: Iron Oxide, Ready Mix, Red and Brown.

1.04 SHOP DRAWINGS

- A. Submit digital copies of shop drawings.
- B. Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories. Verify field measurements prior to submission of shop drawings to Architect.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Steel Sections: ASTM A36 and ASTM A992.
- B. Bolts, Nuts, and Washers: ASTM A325 Bolts.
- C. Welding Materials: AWS D1.1; type required for materials being welded.
- D. Primer: FS TT-P-31, Red, for shop application and field touch-up.

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2.02 METAL FABRICATIONS

- A. Lintels:
 - 1. Refer to structural drawings
- B. Pipe bollards:
 - 1. Refer to civil drawings
- C. Miscellaneous angles and bracing:
 - 1. As shown on drawings.
- D. Metal grate (for floor trench):
 - 1. Close mesh grating, mill finish (prime and paint)
 - 2. Equal to McNichols Co. model #GW-100, 19-W-4
 - 3. Bearing bar thickness: 3/16"
 - 4. Spacing between bars: 1" maximum
 - 5. Thickness of grate: 1"

PART 3 - FINISH

3.01 PREPARATION

- A. Obtain Architect's approval prior to site cutting or making adjustments not scheduled.
- B. Clean and strip site-primed steel items to bare metal where site welding is scheduled.
- C. Make provisions for erection loads with temporary bracing. Keep work in alignment.
- D. Supply items required to be cased into concrete or embedded in masonry with setting templates to appropriate sections.

3.02 FABRICATION

- A. Verify dimensions on site prior to shop fabrication.
- B. Fabricate items with joints tightly fitted and secured.
- C. Fit and shop assemble in largest practical sections, for delivery to site.
- D. Grind exposed welds flush and smooth with adjacent finished surface. Ease exposed edges to small uniform radius.
- E. Exposed Mechanical Fastenings: Flush countersunk screws or bolts; unobtrusively located; consistent with design of structure, except where specifically noted otherwise.

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- F. Make exposed joints butt tight, flush, and hairline.
- G. Supply components required for anchorage of metal fabrications. Fabricate anchorage and related components of same materials and finish as metal fabrication, except where specifically noted otherwise. Supply sleeves as required for mounting newel posts in concrete.

3.03 INSTALLATION

- A. Install items plumb and level, accurately fitted, free from distortion or defects.
- B. Perform field welding in accordance with AWS D1.1.
- C. After installation, touch up field welds, scratched or damaged surfaces with primer.

3.04 FINISH

- A. Clean surfaces of rust, scale, grease, and foreign matter prior to finishing.
- B. Do not prime surfaces in direct contact bond with concrete or where field welding is required.

END OF SECTION

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SECTION 06 10 00 ROUGH CARPENTRY

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes
 - 1. Wood framing.
 - 2. Blocking.
 - 3. Nailers.

B. Related Sections

- 1. Section 06 41 16 Plastic Laminate Clad Cabinets
- 2. Section 10 57 23 Closet and Utility Shelving

1.02 REFERENCES

- A. MIL-L-1914-C Lumber and Plywood, Fire Retardant Treated.
- B. MIL-V-13518C (1) Wood Preservatives: Tetrachlorophenol and Pentachlorophenol, Surface Sealing Compound.
- C. PS 1 Construction and Industrial Plywood.
- D. PS 20 American Softwood Lumber Standard.
- E. NFPA National Design Specification for Wood Construction.
- F. National Forest Products Association National Design Specification for Wood Construction.

1.03 QUALITY ASSURANCE

A. Rough Carpentry Lumber: Visible grade stamp, of agency certified by National Forest Products Association (NFPA).

1.04 JOB CONDITIONS

A. Contractor must examine the substrates and supporting structure and the conditions under which the carpentry work is to be installed and must notify the Owner of conditions detrimental to the work. Do not proceed with the installation until unsatisfactory conditions have been corrected in a manner acceptable to the installer and the Owner. Initiation of installation indicates acceptance of substrate and existing conditions.

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1.05 COORDINATION

A. Take special care to furnish and install solid wood blocking for secure mounting of all bathroom and restroom accessories, wall cabinets, clothing hang-rod brackets, and other wall-mounted and ceiling-mounted items.

PART 2 - PRODUCTS

2.01 ROUGH CARPENTRY MATERIALS

- A. Structural light framing: No. 2 grade.
- B. Miscellaneous Framing, Nailers, and Blocking: No. 2 grade.
- C. Wood Studs: 2 x 4 and 2 x 6 at 16" o.c., or as designated in the Drawings.
- D. Nails, Spikes, and Staples: Galvanized for exterior locations, high humidity locations, and treated wood; plain finish for other interior locations; size and type to suit application.
- E. Bolts, Nuts, Washers, Lags, Pins, and Screws: Medium carbon steel sized to suit application; galvanized for exterior locations, high humidity locations, and treated wood; plain finish for other interior locations.
- F. Fasteners: Toggle bolt type for anchorage to hollow masonry. Expansion shield and lag bolt type for anchorage to steel. Provide and install all anchors, nails, inserts, blocking, grounds, and other carpentry items. Anchor bolts, nuts, and washers and other anchors to concrete and masonry to be zinc-coated.

2.02 WOOD TREATMENT

- A. Wood Preservative: Copper quaternary preservative or copper azole.
 - 1. Equal to:
 - a. NatureWood by Osmose, Inc., 1016 Everee Inn Road, Griffin, Georgia 30224; telephone: (770) 233-4200; fax: (770) 229-5225.
 - b. Preserve by Viance, LLC, 200 East Woodlawn Road, Suite 350, Charlotte, North Carolina 28217-2303; telephone: (800) 421-8661; fax: (704) 527-8232.
 - c. Wolmanized by Lonza Wood Protection (formerly known as Arch Wood Protection), 5660 New Northside Drive, Suite 1100, Atlanta, Georgia 30328; telephone: (678) 627-2000.
 - 2. Retention Rate: 0.40 pcf.
- B. Fastener and Connectors:
 - 1. All fasteners shall be hot-dipped galvanized meeting ASTM A153.

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- 2. All connectors shall be hot-dipped galvanized meeting ASTM A65 Class G185 Sheet.
- 3. Or better, such as stainless steel 304 or 306.
- C. Horizontal wood members with any part to be placed less than 24" from finished grade or in contact with masonry shall be pressure preservatively treated.
- D. All wood nailing blocks and strips for securing flashing and roofing shall be preservatively treated.

PART 3 - EXECUTION

3.01 FURRING AND STRIPPING

- A. Erect wood stripping and nailing members true to lines and levels. Do not deviate from true alignment more than ½".
- B. Space members at 16" o.c. or as indicated on drawings.
- C. Construct members of continuous pieces of longest possible lengths.

3.02 COORDINATION

A. Ensure that mechanical and electrical items affecting this Section of work are properly placed and complete prior to commencement of installation.

3.03 WOOD BLOCKING

- A. Furnish and install solid wood blocking as required for secure mounting of base and wall cabinets, folding doors/partitions, and fire extinguisher cabinets.
- B. Furnish and install solid wood blocking as required for secure mounting of equipment of Division 21, 22, 23, 26, 27 and Division 28 of specifications.
- C. Furnish and install solid wood blocking as required for secure mounting of all utility shelving standards.
- D. Furnish and install solid wood blocking for toilet compartments. Refer to Section 10 21 13.16 for mounting heights of toilet compartments.
- E. Furnish and install solid wood blocking for restroom accessories. Refer to Section 10 28 16 for mounting heights of restroom accessories.

3.04 PROTECTION

A. Cover all sheathing, decking, and subfloor with 30 pound asphalt-impregnated felt for temporary protection from the elements.

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SECTION 06 41 16

PLASTIC LAMINATE CLAD CABINETS

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes
 - 1. Euro-Style Melamine Cabinets
- B. Related Sections
 - 1. Section 06 10 00 Rough Carpentry
 - 2. Section 12 36 61.13 Solid Surfacing Countertops
 - 3. Section 09 65 13.13 Resilient Base
 - 4. Division 26 Electrical

1.02 SUBMITTALS

- A. Shop Drawings:
 - 1. Submit shop drawings of finish carpentry cabinets and millwork items.
 - 2. Indicate location and dimensions.
 - 3. Contractor shall verify all field dimensions applicable to finish carpentry items, cabinets, and millwork.
- B. Furnish samples of high pressure plastic laminate to Owner for color selection.

1.03 OUALITY ASSURANCE

- A. Fabricate cabinets in accordance with recommendations of Quality Standards of Architectural Woodwork (AWI).
- B. References:
 - 1. PS 1 Construction and Industrial Plywood.
 - 2. PS 20 American Softwood Lumber Standard.
 - 3. PS 51 Hardwood and Decorative Plywood.
 - 4. PS 58 Basic Hardwood.
 - 5. NFPA National Design Specification for Wood Construction.

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6. National Forest Products Association National Design Specification for Wood Construction.

1.04 DELIVERY, STORAGE AND HANDLING

- A. Do not deliver cabinets until site conditions are adequate to receive the work.
- B. Protect items from weather while in transit.
- C. Store cabinets indoors, in ventilated areas with a constant minimum temperature of 60 degrees Fahrenheit and a maximum relative humidity of 25 to 55 percent.

PART 2 - PRODUCTS

2.01 CABINETS

- A. General Requirements
 - 1. Fabricate cabinets and plastic laminate fabrications in strict accordance with AWI specifications for custom grade classification, Euro design.
 - 2. Face frames: 3/4 inch.
 - 3. Ends/Divisions: 5/8 inch.
 - 4. Shelves, tops and bottoms: 3/4 inch.
 - 5. Backs: 1/4 inch.
 - 6. Door faces/drawer fronts: 3/4 inch flush slabs.
 - 7. All shelves shall be adjustable; maximum span: 32 inches.
 - 8. Drawer/cabinet pulls: 3-1/2 inch wire pulls, brushed aluminum
 - 9. Drawer slides: Equal to Metabox system.
 - 10. File drawers: Equal to Metafile system.
 - 11. Cabinet door hinges: Equal to Blum
 - a. 110 degree, self-closing, screw on type.
 - 12. Cabinet locks: Equal to National
 - a. Locations: as shown on Drawings.
 - b. Finish: Satin Chrome 26D
 - c. Keyed: Keyed alike

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B. Finishes:

- 1. Doors, drawer fronts and cabinet exteriors:
 - a. High pressure plastic laminate veneers on plywood:
 - 1) Formica (BASIS of DESIGN)
 - 2) Wilson Art
 - 3) Nevamar
 - b. Adhesive as recommended by plastic laminate manufacturer.
 - c. Color: refer to Sheet A6.2 (Finish Legend)
- 2. Shelves, drawer backs, and cabinet interiors:
 - a. Low pressure laminate on industrial grade particleboard equal to Melamine.
 - b. PVC edge banding required.
 - c. Color:
 - 1) Standard white.
 - d. Adhesive as recommended by plastic laminate manufacturer.
- 3. Cap exposed edges and ends with PVC edging to match finish and pattern of other cabinets.

C. Special Requirements:

- 1. All base cabinets shall be standard 24" depth, unless shown otherwise on Drawings.
- 2. All wall cabinets shall be standard 12" depth, unless shown otherwise on Drawings.
- 3. Rubber cove base (4") required at all base cabinets. Coordinate toe space dimensions with work of Section 09 65 13.13.
- 4. Screw strips at cabinets shall be finished with matching laminate at all exposed surfaces.
- 5. Provide and install finishing grommets for wire passage (telephone and countertop office equipment) at countertops. Coordinate locations with electrical subcontractor.

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PART 3 - EXECUTION

3.01 EXAMINATION

- A. Before installing cabinets, examine substrates, supporting structure, and job-site conditions, and notify the Architect of conditions detrimental to the work.
- B. Do not proceed with the installation until unsatisfactory conditions have been corrected in a manner acceptable to the installer and the Architect.
- C. Ensure that mechanical and electrical items affecting this Section of work are properly placed and complete prior to commencement of installation.
- D. Initiation of installation work indicates acceptance of substrate and existing conditions by the installer.

3.02 PREPARATION

- A. Take special care to furnish and install solid wood blocking at steel stud partitions for secure mounting of all wall cabinets.
- B. Keying requirements at cabinet doors and drawers shall be reviewed and approved by the Owner.

3.03 CONSTRUCTION

- A. Preservative treat surfaces in contact with cementitious materials, including concrete.
- B. Provide cutouts for plumbing fixtures, inserts, appliances, outlet boxes, and other fixtures and fitments.
 - 1. Verify locations and sizes of cutouts from site dimensions and approved submittals.
 - 2. Seal contact surfaces of cutouts.

3.04 INSTALLATION

- A. Set and secure cabinetwork items in place rigid, plumb, and square.
- B. Use purpose-designed fixture attachments for mounted components.
- C. Use threaded steel concealed joint fasteners to align and secure adjoining cabinet units and countertops.
- D. When necessary to cut and fit on site, make material with ample allowance for cutting. Provide trim for scribing and site cutting.
- E. Permanently fix cabinet and counter bases to floor using appropriate angles and anchorages.

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- F. Counter-sink semi-concealed anchorage devices used to wall-mount components and conceal with solid plugs of matching Melamine. Mount flush with surrounding surfaces.
- G. Install and adjust cabinet hardware to correct operation.

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SECTION 07 21 00 BUILDING INSULATION

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes

- 1. Fiberglass sound batt acoustical insulation above lay-in ceilings of all heated/cooled spaces.
- 2. Fiberglass batt thermal insulation at all exterior stud walls.
- 3. Rigid insulation (continuous) at all CMU and masonry veneer walls and exterior stud walls.

NOTE: Refer to Metal Building specification for <u>all</u> insulation at exterior skin (insulation located at both roof and exterior wall)

B. Related Sections

- 1. Section 04 21 13 Brick Masonry
- 2. Section 04 22 00 Concrete Unit Masonry
- 3. Section 06 10 00 Rough Carpentry
- 4. Section 07 27 26 Fluid-Applied Membrane Air Barriers
- 5. Section 09 22 16.13 Non Structural Metal Stud Framing
- 6. Section 09 29 02 Exterior Gypsum Board Sheathing
- 7. Section 13 34 19 Metal Building Systems

1.02 SUBMITTAL REQUIREMENTS

- A. Submit detailed product information that confirms thermal performance characteristics of fiberglass insulation products specified herein.
- B. Insulation must be UL certified to have a flame spread of 25 or less.

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PART 2 - PRODUCTS

2.01 MATERIALS

- A. Ceiling Acoustical Insulation: Fiberglass sound attenuation blankets above all lay-in ceilings (6" thick above ceiling tile).
- B. CMU Cavity Wall Insulation: Equal to Dow Styrofoam, cavity mate 2" thick x 16" x 96". Attach with Grid-Mate polypropylene fasteners and stainless steel screws @ 12" o.c. at metal studs. Tape all joints with Dow Styrofoam brand 3" wide all-purpose tape.
- C. Exterior Wall Thermal Insulation: Fiberglass batt insulation, unfaced, R-11, equal to Owens-Corning at all 3-5/8" exterior stud walls.
- D. Metal Building Insulation: Refer to Section 13 34 19 Metal Building Systems

PART 3 - EXECUTION

3.01 PREPARATION

- A. Verify adjacent materials are dry and ready to receive insulation.
- B. Verify mechanical and electrical services within plenum have been installed and tested.

3.02 INSTALLATION

- A. Install fiberglass insulation in accordance with manufacturer's instructions.
- B. Fit insulation tight in spaces and tight to exterior side of mechanical and electrical services within the plane of insulation. Leave no gaps or voids.
- C. Take special care to insure that plane of insulation is continuous; leave no gaps or voids.
- D. Ensure that dampproofing and rigid insulation are compatible.
- E. Utilize construction adhesive to secure rigid insulation at cavity walls.

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SECTION 07 26 16

BELOW GRADE VAPOR BARRIER

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Multi-layer plastic extrusion vapor barrier/retarder beneath all building slabs, footings, and sides of footings.
- B. Note: This product is shown on drawings as a vapor barrier beneath building slabs.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Plastic extrusion sheet not less than 15 mils thick.
- B. Use a vapor retarder which meets all criteria for Class A per ASTM E1745-97.
- C. Vapor Barrier shall have all the following qualities:
 - 1. Maintian permeance of less than 0.01 Perms [grains/(ft2 · hr · inHg)] as tested in accordance with mandatory conditioning test per ASTM E1745 Section 7.1 (7.1.1.7.1.5).
 - 2. Other performance criteria:
 - a. Strength: ASTM E1745 Class A.
 - b. Thickness: 15 mils minimum
 - 3. Provide third party documentation that all testing was performed on a single production roll per ASTM E1745 Section 8.1
 - 4. Warranty: (a) compliance with the designated ASTM E1745 classification, and (b) no manufacturing defects in the product for, at least, the Life of the Building.
- D. Vapor barrier products:
 - 1. Basis of Design: Stego Wrap Vapor Barrier (15-mil) by Stego Industries LLC., (877) 464-7834 www.stegoindustries.com
 - 2. Vaporguard by Reef Industries, 713-507-4250. www.reefindustries.com
 - 3. Moistop Ultra 15 by Fortifiber, (800) 773-4777. https://www.fortifiber.com/product/moistop-ultra-15/
- E. Products shall be equal to Vapor Block 15 by Raven Industries, Griffolyn Division, or Stego 15 Mil A by Stego Industries.

- 1. Membrane.
- 2. Tape.
- 3. Mastic.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Install vapor barrier in accordance ASTM E1643.
 - 1. Unroll vapor barrier with the longest dimension parallel with the direction of the concrete placement and face laps away from the expected direction of the placement whenever possible.
 - 2. Extend vapor barrier to the perimeter of the slab. If practicable, terminate it at the top of the slab, otherwise (a) at a point acceptable to the structural engineer or (b) where obstructed by impediments, such as dowels, water stops, or any other site condition requiring early termination of the vapor barrier. At the point of termination, seal vapor barrier to the foundation wall, grade beam or slab itself.
 - a. Seal vapor barrier to the entire slab perimeter using manufacturer's textured tape with a surface that creates a mechanical seal to freshly-placed concrete, per manufacturer's instructions.
 - 3. Overlap joints 6 inches and seal with manufacturer's seam tape.
 - 4. Apply seam tape/textured tape/double-sided tape to a clean and dry vapor barrier.
 - 5. Seal all penetrations (including pipes) per manufacturer's instructions.
 - 6. Avoid the use of stakes driven through vapor barrier by utilizing screed and forming systems that will not leave punctures in the vapor barrier.
 - 7. Repair damaged areas with vapor barrier material of similar (or better) permeance, puncture and tensile.

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SECTION 07 27 26 FLUID-APPLIED MEMBRANE AIR BARRIERS

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Materials and installation for fluid-applied membrane to provide an air barrier component and secondary water-resistive barrier/drainage plane for unit masonry and sheathing wall assemblies.

Note: This product is shown on documents as "FLUID-APPLIED AIR/WEATHER BARRIER" on CMU masonry units.

B. The intent of this section is to ensure that the building envelope is sealed and airtight. Continuous barriers shall be installed over all exterior wall back-up systems that are exposed to the wall cavity. Use accessories as required at dissimilar materials to ensure that air/weather barrier forms a continuous coating.

1.02 RELATED SECTIONS

- A. Section 03 33 00 Cast-In-Place Concrete (building only)
- B. Section 04 05 19 Masonry Anchorage and Reinforcing
- C. Section 07 21 00 Building Insulation
- D. Section 07 92 00 Joint Sealant

1.03.1 REFERENCES

A. ASTM Standards

- 1. C 297 Test Method for Tensile Strength of Flat Sandwich Constructions in Flatwise Plane
- 2. D 522 Test Methods for Mandrel Bend Test of Attached Organic Coatings
- 3. D 882 Test Methods for Tensile Properties of Thin Plastic Sheeting
- 4. D 2247 Practice for Testing Water Resistance of Coatings in 100 percent Relative Humidity
- 5. D 3273 Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber
- 6. E 84 Test Method for Surface Burning Characteristics of Building Materials
- 7. E 96 Test Methods for Water Vapor Transmission of Materials

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- 8. E 283 Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen
- 9. E 330 Test Method for Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference
- 10. E 331 Test Method for Water Penetration of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference
- 11. E 1233 Test Method for Water Penetration of Exterior Windows, Curtain Walls, and Doors by Cyclic Static Air Pressure Differential
- 12. E2178

B. Building Code Standards

- 1. SBCCI PST & ESI Evaluation Guide on Floor, Wall, and Roof Systems (Testing for Moisture Protection Barriers), Evaluation Guide 119.
- 2. UBC 26-9, Method of Test for the Evaluation of Flammability Characteristics of Exterior, Nonload-Bearing Wall Assemblies Containing Combustible Components Using the Intermediate-Scale, Multistory Test Apparatus
- 3. ICBO Acceptance Criteria for Exterior Insulation and Finish Systems, AC 24
- 4. CCMC Technical Guide on Air Barriers
- C. Gypsum Association
 - 1. GA-600 Fire Resistance Design Manual
 - 2. GA-253 Recommended Specifications for the Application of Gypsum Sheathing
 - 3. GA-254 Fire Resistant Gypsum Sheathing
- D. American Plywood Association
 - 1. E30 Residential and Commercial Construction Guide
- E. Proprietary Specifications
 - 1. 531544 Georgia-Pacific Corporation, "Dens Glass Gold® Exterior Sheathing"
 - 2. AATCC (American Association of Textile Chemists and Colorists), Test Method 127, Water Resistance: Hydrostatic Pressure Test
- F. American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc. (ASHRAE)

1. 2001 ASHRAE Handbook--Fundamentals

1.04 DESIGN REQUIREMENTS

- A. Deflection Criteria: maximum allowable deflection normal to the plane of the wall: L/240
- B. Wind Load: conform with code requirements.
- C. Moisture Control:
 - 1. Minimize condensation within the assembly.
 - 2. Drain water directly to the exterior where it is unlikely to penetrate components in the wall assembly (windows and doors, for example).
 - 3. Provide flashing to direct water to the exterior in accordance with code requirements, including, above window and door heads, beneath window and door sills, at roof/wall intersections, decks, intersections of lower walls with higher walls, and at the base of the wall.
- D. Air Barrier Continuity: provide continuous air barrier system of compatible air barrier components.
- E. Mechanical Ventilation: maintain pressurization and indoor humidity levels in accordance with recommendations of ASHRAE (see 2001 ASHRAE Handbook—Fundamentals).

1.05 PERFORMANCE REQUIREMENTS

A. PROSOCO R-GUARD[™] Water-Resistive/Air Barrier Performance Data

Test	Method	Criteria	Results
Aging Water Penetration Resistance	AATCC127 (Water Column)	Resist 21.6 in (55 cm) water for 5 hours before and after aging.	No water penetration before and after aging. No water penetration at 332 inches (843cm) head of water before aging.
Structural Loading Water Penetration Testing	ASTM E 1233 ASTM E 331	No water at exterior plane of sheathing (exterior gypsum, Dens-Glass Gold, plywood, OSB) after 10 cycles at 80% design load and 75 minutes water spray at 6.24 psf (299 Pa) pressure differential with water spray rate of 5 gal/ft²-hr (3.4 L/m²-min).	No water penetration before and after aging. No water penetration at 332 inches (843cm) head of water before aging.
Cyclic Pressure Water Penetration Testing	ASTM E 283 ASTM E 331	No water penetration or evidence of elevated moisture levels in plywood sheathing after 10 cycles of conditioning at 299 Pa (6.24 psf) positive and negative pressure followed by 75 minutes water spray at 6.24 psf (299 Pa) pressure differential with water spray rate of 5 gal/ft²-hr (3.4 L/m²-min).	No water penetration before and after aging. No water penetration at 332 inches (843cm) head of water before aging.
Water Penetration R-GUARD™ Spray Wrap (8-in medium wt CMU w/2 coats)	ASTM E 331	No leakage at 137 Pa (2.86 psf) for 15 minutes	No leakage at 137 Pa (2.86 psf) for 15 minutes. No leakage at 300 Pa (6.24 psf) for 120 minutes.
Water Resistance Testing	ASTM D 2247	Absence of deleterious effects after 14-day exposure.	No visible deleterious effects after 14-day exposure.
Resistance to Mold Growth	ASTM D 3273	No mold growth after 28 days.	No mold growth after 28-day exposure.
Freeze/Thaw Resistance	ICBO Method (AC 24)	No visible effects (cracking, checking, delamination, erosion) when viewed at 5x.	No visible deleterious effects when viewed at 5x.
Water Vapor Transmission	ASTM E 96 Method B (Water Method)	Measure.	R-GUARD [™] Fill: 17.3 perms [(994 ng/(Pa s m²)] R-GUARD [™] Spray Wrap: 5.7 perms [(327 ng/(Pa s m²)]
Air Leakage: Wall Assembly with R-GUARD™ Fill and R- GUARD™ Spray Wrap	ASTM E 283 (SBCCI PST & ESI Method)	<0.06 cfm/ft² at 1.57 psf (0.00030 m³/s m² at 75 Pa)	0.0044 cfm/ft ² (0.000022 m ³ /s m ²)

Air Leakage: R-GUARD™ Fill	ASTM E 283 (CCMC Technical Guide Method)	<0.003 cfm/ft² at 1.57 psf (<0.02 L/s m² at 75 Pa)	0.0002 cfm/ft ² (0.0014 L/s m ²)
Air Leakage: R-GUARD™ Spray Wrap (8-in medium wt CMU w/2 coats)	ASTM E 283 (as specified in ASTM E 2178 Section 8.2.8)	<0.004 cfm/ft² air leakage at 1.57 psf <0.02 L/s m² air leakage at 75 Pa	<0.004 cfm/ft² air leakage at 1.57 psf, <0.004 cfm/ft² air leakage at 6.24 psf <0.02 L/s m² air leakage at 75 Pa <0.02 L/s m² air leakage at 300 Pa
Structural Integrity	ASTM E 330	2-in (51mm) water pressure (positive and negative) for one hour.	No loss of structural integrity.
Dry Tensile Strength	ASTM D 882	20 lbs/in (3503 N/m) minimum before and after aging.	R-GUARD™ Fill: 159 pli (27.8 kN/m) before aging. 213 pil (37.3 kN/m) after aging.
Flexibility	ASTM D 522	No cracking or delamination using 1/8-in (3mm) mandrel at 14°F (-10°C) before and after aging.	No cracking or delamination before or after aging.
Tensile Adhesion	ASTM C 297	>15 psi (103 kPa)	Gypsum (ASTM C 79): >30 psi (206 kPa) Gypsum (ASTM C 1177): >30 psi (206 kPa) Exposure 1 OSB: >50 psi (344 kPa) Exterior Plywood: >90 psi (620 kPa)
Surface Burning	ASTM E 84	Flame Spread <25 Smoke developed: <450	Flame Spread: 5 Smoke Developed: 10 NFPA Class A, UBC Class 1 building material
Fire Testing	UBC 26-9, NFPA 285	No increase in fire hazard.	Pass.

1.06 SUBMITTALS

- G. Product Data: Submit manufacturer's product data sheets on all products to be used for project construction. Submit description for protection, surface preparation and application.
- H. Contractor Qualifications: Submit qualifications of Contractor.
- I. Samples for approval as directed by Architect or Owner.

1.07 QUALITY ASSURANCE

- A. Contractor requirements:
 - 1. Knowledgeable in the proper use and handling of PROSOCO products.
 - 2. Employ skilled installers who are experienced and knowledgeable in air and water resistive barrier application, and familiar with the requirements of the specified work.

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- 3. Provide the proper equipment, manpower and supervision on the job site to install the system in compliance with PROSOCO's published specifications.
- B. Project Meeting: Convene a pre-application meeting two weeks before the start of installation of fluid-applied membrane air barrier. Require attendance of parties directly affecting work of this section, including the Contractor, Architect, and PROSOCO representative. Review Mock-Up procedures.
- C. Field Constructed Mock- Up procedures: Prior to overall installation, apply air and water-resistive barrier system to mock-up wall, verify details for overall installation. Demonstrate tie-ins with adjoining construction and other termination conditions.
 - 1. junction with roof system, foundation wall, and typical penetrations and gaps; Illustrating materials interface and seals.
 - 2. Install air and water-resistive barrier mock-ups in the field on assemblies constructed of unit masonry or sheathing. Use the manufacturer's written application instructions.
 - 3. Mock-ups must remain available for inspection, testing and approval throughout the project.

1.08 DELIVERY, STORAGE AND HANDLING.

- A. Deliver materials in their original sealed containers bearing the manufacturer's name and identification of product.
- B. Protect coatings (pail products) from freezing temperatures and temperatures in excess of 90 degrees F (32 degrees C). Store away from direct sunlight.

1.09 PROJECT/SITE CONDITIONS

- A. Maintain ambient and surface temperatures above 40 degrees F (4 degrees C) and below 100-degree F (38 degrees C) during application and drying period, minimum 24 hours after application of air and water-resistive barrier.
- B. Provide supplementary heat for installation in temperatures less than 40 degrees F (4 degrees C) or if surface temperature is likely to fall below 40 degrees F (4 degrees C). (Note: surface temperature is lower than air temperature at night).

1.10 COORDINATION/SCHEDULING

- A. Coordinate installation of foundation waterproofing, roofing membrane, windows, doors, and other wall penetrations to provide a continuous air and water resistive barrier.
- B. Provide protection of rough openings before installing windows, doors, and other penetrations through the wall.
- C. Provide sill flashing for directing water to the exterior before windows and doors are installed.

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- D. Install window and door head flashing immediately after windows and doors are installed.
- E. Install diverter flashings wherever water can enter the assembly for directing water to the exterior.

1.11 QUALITY ASSURANCE

A. Mock-Up: Supply sufficient quantity of material for use in constructing mock-up panel as specified in Section 014339 mock-ups

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Equal to Prosoco, Inc. "R" Guard (BASIS of DESIGN)
- B. Equivalent Design: Manufacturer with products of equivalent design may include, but not limited to:
 - 1. Grace (Perma Barrier)
 - 2. Carlisle
 - 3. Tremco
 - 4. Sandelle

2.02 FLUID-APPLIED MEMBRANE AIR BARRIERS

A. PROSOCO R-GUARD

A fluid applied air and water resistive barrier, available in two alternative systems, that stop air and water leakage through structural sheathing and CMU back-up walls, including seams, cracks, fasteners, window, and door openings.

- 1. <u>System I</u> consist of self-adhesive glass fiber tape, a ready mixed acrylic compound fill, and a ready mixed flexible, acrylic coating to be applied to structural sheathing or CMU back up.
 - A. R-Guard Tape
 4.25 inch (11 cm) and 9.5 inch (24 cm) wide selfadhesive, flexible symmetrical, interlaced glass
 fiber fabric, with alkaline-resistant coating.
 - B. R-Guard Fill

Form: Dark red viscous liquid, mild odor

Specific Gravity: More than 1.0

pH: 7.5 - 10.5

Wt/Gal: ASTM D 2369 – 83 percent

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VOC Content: Less than g/L

Flash Point: More than 200 degrees F (More than 93 degrees C)

Freeze Point: 32 degrees F (0 degrees C)

C. R-Guard Spray Wrap

Form: Light red viscous liquid, mild color

Specific Gravity: More than 1.0

pH: 7.5 – 10.0 Wt/Gal: 12,7 lbs.

Total Solids: ASTM D 2369 – 74 percent

VOC Content: More than g/L

Flash Point: More than 200 degrees F (More than 93 degrees C)

Freeze Point: 32 degrees F (0 degrees C)

- 2. <u>System II</u> consists of reinforced, nonwoven fabric for covering sheathing joints and rough openings, preformed fabric for installation at corners inside rough openings and ready mixed flexible, acrylic coating to be applied to structural sheathing or CMU backup.
 - A. R-Guard Joint Fabric

Nonwoven cloth reinforcement available in 4-inch (10 cm) or 6-inch (15 cm) widths for use on sheathing joints, inside and outside corners and rough openings.

B. R-Guard EZ Corner

Preformed fabric piece used in the corners of rough openings.

C. R-Guard Spray Wrap

Form: Light red viscous liquid, mild color

Specific Gravity: More than 1.0

pH: 7.5 – 10.0 Wt/Gal: 12.7 lbs.

Total Solids: ASTM D 2369 – 74 percent

VOC Content: More than g/L

Flash Point: More than 200 degrees F (More than 93 degrees C)

Freeze Point: 32 degrees F (0 degrees C)

3. R-Guard Transition Membrane

A 6 inch (152 mm) wide self-adhering water resistive air barrier material that functions as alternative protection for rough openings; a secondary seal for sealant joints; or as an air barrier connection material bridging dissimilar materials.

A. Pliable black self-adhering membrane for bridging dissimilar materials. Covering with a coat of R-Guard spray wrap will extend UV exposure window from thirty days to six months.

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PART 3 - EXECUTION

3.01 EXAMINATION

- A. Inspect concrete, concrete masonry surfaces and sheathing to determine suitability for application according to manufacturer's written instructions.
- B. Report deviations from the requirements of project specifications or other conditions that might adversely affect the air and water-resistive barrier installation. Do not start work until deviations are corrected.

3.02 SURFACE PREPARATION

- A. Protect people, vehicles, property, plants and all surfaces not designated to receive treatment from the product, splash and wind drift.
- B. Surfaces must be clean, sufficiently dry and in good repair.
- C Surfaces must be free of frost, damage, and all bond-inhibiting materials, including dirt, efflorescence, form oil and other foreign matter.

Concrete Masonry Units:

- A. Joints should be struck flush with the surface of the CMU.
- B. Remove all loose and friable materials.
- C. Fill small voids and cracks up to 1/8 inch (3 mm) with R-Guard Fill. For voids and cracks greater than 1/8 inch (3 mm) and up to 1/4 inch (6 mm) use a paintable acrylic latex caulk tooled flush.
- D. Consult a structural engineer for larger and moving cracks.

Transition Membrane:

- A. Use Prosoco R-GuardTM Transition Membrane only where a protective covering will be applied
 - within 30 days. Spray wrap may be used to protect membrane to gain the six months maximum exposure.
- B. Transition Membrane is not for use below grade or on surfaces subject to pooling, ponding or water immersion.
- C. Surfaces must be clean, dry, smooth, free of grease, dust, oil and any other surface contamination.
- D. Do not apply over uncured sealants or materials containing plasticizers.

F. Depending on conditions, the substrate may have to be primed for best results.

3.03 EQUIPMENT

- A. Use a seam roller or other blunt tool to firmly adhere R-GuardTM Tape over sheathing joints to the wall. To reduce any potential for damage to the R-GuardTM Tape round sharp corners of tools used for installation.
- B. Stir Fill and Spray Wrap as required to a uniform consistency with a clean, rust free electric drill and paddle.
- C. Apply fill with a trowel, roller or texture sprayer. Texture sprayers should have a max working pressure of 100-120 psi (7-8.3 bar) and a max delivery rating of 2.0-4.0 gpm (7.5-15.1 1pm). Fill is compatible with GRACO TexSprayTM TTX 1500 and GTX 2000 equipment.
- D. Apply R-Guard Spray Wrap with a roller, texture sprayer or airless sprayer capable of providing a minimum output rate of 1-gallon per minute. Use a ¾ inch (19 mm) nap roller when roller applying to GP Dens-Glass Gold, Oriented Strand Board (OSB or CMU backup. Use a ½ inch (13 mm) nap roller when roller applying to plywood or exterior gypsum sheathing. R-Guard Spray Wrap is compatible with Graco ultra Max II airless sprayer 795 with a 27 thousandth's tip
- E. Apply R-Guard MVP with a roller, texture sprayer or airless sprayer capable of providing a minimum output rate of 1-gallon per minute. Use a ½ inch (13 mm) nap roller when roller applying to GP Dense-Glass Gold, exterior gypsum sheathing, oriented strand board (OSB) or plywood. Use a ¾ inch (19 mm) nap roller when roller applying to CMU backup. R-Guard MVP is compatible with Graco Ultra Max II airless sprayer 795 with a 27 thousandth's tip.

3.04 INSTALLATION

- A. System I: Application Instructions
 - 1. Structural Sheathing
 - a. Exterior gypsum sheathing board
 - 1) Apply 4.25-inch R-GUARD Tape over sheathing joints and seams. Fold and apply 9.5-inch R-GUARD Tape to rough openings, inside and outside corners. Use a seam roller or other blunt tool to firmly adhere mesh tape to sheathing.
 - 2) Uniformly cover R-GUARD Tape and about 4 inches of sheathing on either side of the R-GUARD Tape with R-GUARD Fill using a Trowel, roller or texture sprayer. Trowel smooth. Spot over-driven fasteners and surface defects with R-GUARD Fill or paintable caulk. Let dry.

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3) Spray or roller apply R-GUARD Spray Wrap or MVP to the entire surface to a uniform wet mil thickness of 10 mils, including areas covered by RGUARD Tape and R-GUARD Fill. Let dry.

2. CMU Wall Construction

- a. Spray or roller apply sufficient R-GUARD Spray Wrap or MVP to cover and fill the entire surface. Back roll spray applications if necessary. Let dry.
- b. Spray or roller apply a second cost of R-GUARD Spray Wrap or MVP to achieve hide. The finished application must be continuous and free of voids and pinholes. If necessary, back roll spray applications to achieve a void- and pinhole-free surface. Take special care to achieve full coverage around wall ties or surface irregularities.

B. System II: Application Instructions

- 1. Structural Sheathing
 - a. Exterior gypsum sheathing board
 - 1) Liberally apply R-GUARD Spray Wrap or MVP by spray or roller to all vertical and horizontal sheathing joints.
 - 2) Embed R-GUARD Joint Fabric.
 - 3) Apply R-GUARD Spray Wrap or MVP over the R-GUARD Joint Fabric. Spot over-driven fasteners and surface defects with R-GUARD Fill or paintable caulk. Let dry.

2. CMU Wall Construction

- a. Spray or roller apply sufficient R-GUARD Spray Wrap or MVP to cover and fill the surface. Back roll spray applications if necessary. Let dry.
- b. Spray or roller apply a second coat of R-GUARD Spray Wrap or MVP to achieve hide. The finished application must be continuous and free of voids and pinholes. If necessary, back roll spray applications to achieve a void- and pinhole-free surface. Take special care to achieve full coverage around wall ties or surface irregularities.

3. Rough Openings (Sheathing)

a. Using a roller or sprayer apply a liberal coat of R-GUARD Spray Wrap or MVP in the corners of the rough opening to the face of the sheathing and around the corners.

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- b. Place R-GUARD EZCorner on the inside of the rough opening with the tabs oriented so they are on the face of the sheathing. Embed R-GUARD EZCorner in the wet coating. Repeat until all corners have been treated.
- c. After all corners have been installed, apply a liberal coat of R-GUARD Spray Wrap or MVP to the entire rough opening.
- d. Embed R-GUARD Joint Fabric into the wet coating. Overlap R-GUARD EZCorner by at least 2 inches (51 mm) with the R-GUARD Joint Fabric.
- e. Once the entire rough opening has been treated, top coat the fabric with RGUARD Spray Wrap or MVP. Inspect the treated rough opening for pinholes. If found, apply more coating until the pinholes are filled.
- C. R-GUARD Transition Membrane: Application Instructions
 - 1. Apply R-GUARD Transition Membrane at ambient temperatures above 50 degrees F (10 degrees C) whenever possible. When applying in cooler weather, keep R-GUARD Transition Membrane warm and prime the surface with spray adhesive. Warming the material with an electric heat gun may improve bondability.
 - a. Cut R-GUARD Transition Membrane to desired length.
 - b. Remove release film on back.
 - c. PlaceR-GUARD Transition Membrane over surfaces to be covered and press firmly into place. Lap seams minimum 2 inches (51 mm). Shingle lap horizontal seams.

3.05 CURING AND DRYING

- A. Complete drying times vary depending on temperature, humidity, and surface conditions.
- B. Protect from rain or freezing until completely dry. Under normal conditions [70 degrees F (21 degrees C), 50 percent RH]:
 - 1. R-GuardTM Fill dries to the touch and can be over coated in 4 hours.
 - 2. R-GuardTM Spray Wrap dries to touch and can be over coated in 2-4 hours.

3.06 CLEAN UP

A. Clean tools and equipment with water immediately after use. Dried material must be removed mechanically.

3.07 FIELD QUALITY CONTROL

- A. Inspection: Inspect the fluid-applied membrane system installation with the Contractor, Architect, and PROSOCO representative, and compare with mock-up test results approved by the Architect.
- B. Manufacturer's Field Services: Attend a field meeting to verify specified products are used; protection, surface preparation, and installation are in accordance with the manufacturer's written application instructions.

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SECTION 07 92 00 JOINT SEALANTS

PART 1 - GENERAL

1.01 SUMMARY

A. WORK INCLUDED

- 1. Clean and prepare joint surfaces.
- 2. At the building exterior, install backing materials and sealant around louvers, vents, and door and window frames.
- 3. Install caulking at junction of gypsum board and dissimilar materials.
- 4. At control and expansion joints, install backer rod and sealant.
- 5. Sealant at junction of plumbing fixtures and adjacent materials.

B. Related Sections

- 1. Section 04 21 13 Brick Masonry
- 2. Section 04 22 00 Concrete Unit Masonry
- 3. Section 08 11 13 Hollow Metal Doors and Frames
- 4. Section 08 41 00 Aluminum Framed Entrances and Storefronts
- 5. Section 09 52 00 Suspended Gypsum Board Ceiling
- 6. Section 09 29 02 Exterior Gypsum Board Sheathing
- 7. Section 09 91 00 Painting
- 8. Division 21 Fire Suppression
- 9. Division 22 Plumbing
- 10. Division 23 HVAC
- 11. Division 26 Electrical
- 12. Division 27 Communications
- 13. Division 28 Electronic Safety and Security

1.02 WARRANTY

A. Provide a one-year warranty for exterior sealants.

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B. Warranty: Replace sealants which fail because of loss of cohesion or adhesion, or which do not cure.

1.03 SUBMITTALS

A. Submit a digital copy of detailed product data on each sealant. Product data is to include installation instructions, including joint preparation and back-up rod recommendations for specific sealant.

PART 2 - PRODUCTS

2.01 SEALANT MATERIALS

- A. Back-Up Rod: Filler backing shall be polyethylene foam or polyurethane foam, rods or stops as required.
- B. Primers: As recommended by sealant manufacturer.
- C. Sealant for use around exterior window and door frames, vertical expansion joint/control joints:
 - 1. Sealant for metal to masonry porous materials or metals to metals: Equal to Dow Corning 795 neutral cure, one-part silicone sealant.
 - 2. Sealant for masonry-to-masonry, masonry-to-stone, stone-to-stone, GRC: Equal to Dow Corning 790 neutral cure, one-part silicone sealant.
 - 3. Color to match adjacent materials. Submit samples for Architect's approval.
- D. Caulking: Acrylic latex to match color of adjacent materials. Caulking shall be paintable and equal to White Lightning 3060. DAP and Sherwin Williams approved equals.
- E. Sealant at plumbing fixtures: Silicone to match color of fixtures.

PART 3 - EXECUTION

3.01 INSPECTION

- A. Verify that joint dimensions and physical and environmental conditions are acceptable to receive work of this Section.
- B. Beginning of installation means acceptance.

3.02 PREPARATION

- A. Clean, prepare, and size joints in accordance with manufacturer's instructions. Remove any loose materials and other foreign matter which might impair adhesion of sealant.
- B. Verify that joint shaping materials and release tapes are compatible with sealant.
- C. Examine joint dimensions and size materials to achieve required width/depth ratios.

D. Use joint filler to achieve required joint depths, to allow sealants to perform properly.

3.03 INSTALLATION

- A. Perform work in accordance with ASTM C804 for solvent release sealants.
- B. Install sealant in accordance with manufacturer's instructions.
- C. Apply sealant within recommended temperature ranges. Consult manufacturer when sealant cannot be applied within recommended temperature ranges.
- D. Tool joints concave.
- E. Joints more than 3/4" deep and joints where a suitable backstop has not been provided shall be packed with rope to within 1/2" of surface before applying caulking.

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SECTION 08 11 13

HOLLOW METAL DOORS AND FRAMES

PART 1 - GENERAL

1.01 WORK INCLUDED

- A. Hollow metal doors (rated & non-rated), and glass
- B. Hollow metal frames (rated & non-rated), and glass
- C. Coordination of frames for gypsum board and/or masonry walls

1.02 RELATED WORK

- A. Section 04 05 13 Masonry Mortaring
- B. Section 04 21 13 Brick Masonry
- C. Section 04 22 00 Concrete Masonry Units
- D. Section 08 14 16 Flush Wood Doors
- E. Section 08 71 00 Door Hardware
- F. Section 09 91 00 Painting

1.03 QUALITY ASSURANCE

A. Conform to requirements of Underwriters Laboratory for Fire rated doors and frames. See Schedule.

1.04 SUBMITTALS

- A. Submit a digital copy of shop drawings and product data to Architect.
- B. Indicate door elevations, internal reinforcement, closure method.

1.05 COORDINATION

- A. Field verify all opening dimensions and installation conditions prior to ordering steel doors and frames.
- B. Coordinate door/frame preparation with approved finish hardware schedule, wall types, door types, and alternates.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Curries or approved equal.

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2.02 HOLLOW METAL DOORS

- A. Fabricate doors from 16-gauge galvanized steel. Tops and bottoms of all doors to be closed flush, filled and ground smooth. Exterior doors shall be galvanized.
- B. Exterior doors shall be insulated with rigid foam.
- C. Doors and frames shall receive hardware reinforcement at hinges, strikes and for any surface applied items.
- D. Vertical stiffeners of doors shall be welded to the inner side of the surface sheets at 6 inches cc.
- E. Channel stiffeners are required at the top and bottom of doors to insure rigidity. Voids between stiffeners to be insulated for sound deadening.
- F. All doors shall be thoroughly cleaned of shop oils after fabrication, treated for paint adherence and painted one coat of high grade zinc chromate primer, which shall be oven dried.
- G. Full louver exterior doors shall be furnished with insect screens.
- H. All glass in hollow metal doors shall be fire and impact rated
 - 1. Refer to Section 08 81 00 Glass Glazing

2.03 HOLLOW METAL FRAMES

- A. Interior Frames: 16-gauge cold-rolled steel
- B. Exterior Frames: 14-gauge cold-rolled steel, galvanized.
- C. All frames shall be welded.
- D. Furnish with pressure-applied rubber silencers.
- E. All frames shall have 9-gauge steel hinge reinforcement plates and 14-gauge strike reinforcement plates.
- F. Furnish a minimum of six anchors per opening. All frames shall have integral or weldedon sill anchor. Anchors at drywall partitions shall be "z"-clips welded to frames. Tee anchorage devices at masonry walls.
- G. All frames shall be thoroughly cleaned, phosphatized, and finished as standard with one coat of baked-on rust inhibiting gray prime coat.
- H. All glass in hollow metal doors shall be fire and impact rated
 - 1. Refer to Section 08 81 00 Glass Glazing

2.04 PAINT COLOR

A. Refer to Sheet A6.2 (Finish Legend)

PART 3 - EXECUTION

3.01 STORAGE

- A. Stack and store doors properly to protect material from harmful elements and damage while stored at the job site.
- B. Upon delivery, touch-up damaged areas of finish with a rust-inhibitive metal primer.

3.02 INSTALLATION

A. Hang doors plumb and true, with uniform clearances on all sides.

3.03 ADJUSTMENT AND CLEANING

- A. Remove dirt and excess sealants from exposed surfaces.
- B. Touch up marred or abraded surface to match original finish.
- C. Adjust doors for smooth and balanced door movement.

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SECTION 08 14 16 FLUSH WOOD DOORS

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes
 - 1. Solid core, flush wood doors.
 - 2. Fire-rated, solid core, flush wood doors.
- B. Related Sections
 - 1. Section 06 10 00 Rough Carpentry
 - 2. Section 08 11 13 Hollow Metal Doors and Frames
 - 3. Section 08 71 00 Door Hardware
 - 4. Section 08 81 00 Glass Glazing
 - 5. Section 09 91 00 Painting

1.02 REFERENCES

- A. WDMA Window and Door Manufacturers Association: IS 1-A 1997 Industry Standard for Architectural Flush Wood Doors.
- B. NFPA-80 Standards for Fire Doors, latest edition.
- C. NFPA-105 Recommended Practice for Installation for Smoke-Control Door Assemblies, latest edition.
- D. AWI Quality Standards of Architectural Woodwork Institute.

1.03 SUBMITTALS

- A. Shop Drawings and Product Data:
 - 1. Indicate door elevations, general construction, stile and rail enforcement, core composition jointing methods, hardware and louver locations, internal blocking for hardware attachment, and locations of cutouts for glass. Indicate thickness of veneers.
- B. Samples:
 - 1. Submit samples of wood veneer and factory finishing in accordance with WDMA Quality Standards I.S. 1-A, latest edition.

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C. Certification:

1. Submit certification that doors and frames comply with specified fire ratings, and UL listings.

1.04 OUALITY ASSURANCE

- A. Provide wood doors which are identical in materials and construction to units tested in door and frame assemblies with local code standards, and which are labeled and listed for ratings indicated by ITS Warnock Hersey, UL, or other testing and inspection agency acceptable to authorities having jurisdiction.
- B. WDMA: Window and Door Manufacturers Association Quality Standards for grade of door, core, construction, finish, and other requirements.
- C. Temperature Rise Rating: At stairwell enclosures, provide doors that have Temperature Rise Rating of 250 degrees F maximum in 30 minutes of fire exposure.

1.05 DELIVERY, STORAGE AND PROTECTION

- A. Protect doors during transit, storage, and handling to prevent damage, soiling, moisture damage, or deterioration. Store doors flat on a level surface in a dry, well ventilated building.
- B. Doors should not be subject to abnormal heat, extreme dryness, or relative humidity less than 30 percent or more than 60 percent.

1.06 WARRANTY

A. Wood doors shall be warranted for one year from the date of substantial completion.

1.07 COORDINATION

A. Take special care to coordinate door preparation with requirements of approved finish hardware schedule.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Masonite (BASIS OF DESIGN)
- B. Graham Manufacturing
- C. Eggers Industries
- D. Algoma Hardwoods

2.02 MATERIALS

A. AWI Premium Grade, book matched veneers.

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- B. Five-ply construction using three-ply hardwood faces.
- C. Thickness: 1-3/4 Inch.
- D. Facing: Wood veneer cut and species as specified shall conform to WDMA
- E. Hardware: Pre-routed for butts, machined for lockset. Coordinate with requirements for approved finish hardware schedule.
- F. Fire Rating: Refer to Door/Frame Schedule.
- G. Wood Veneer
 - 1. Door face veneers shall meet quality standards conforming to WDMA "A" grade or "AA" grade for transparent or semi-transparent finish. Minimum face veneer thickness: 1/50" at 12% moisture content after finish sanding.
 - 2. Color: refer to Sheet A6.2 (Finish Legend)
 - 3. Cut and assembly: Rotary cut, book match.

H. Adhesives

1. Face to core adhesives shall be Type I or Type II as appropriate for location in building. Adhesives must be classified Type I or Type II per WDMA specification for "Adhesive Bond Test Method." Type I adhesives shall be used for doors in exterior applications. Type II adhesives shall be used for doors in interior applications.

I. Core

- 1. Non-rated and 20 minute doors: Solid particleboard.
- 2. Fire-rated doors: Non-combustible mineral core containing no asbestos.

2.03 ACCESSORIES

- A. Vision Panels shall be metal beveled frames with fire and impact glass as required. Refer to Section 08 81 00 Glass Glazing.
- B. Provide and install louvers, as scheduled. Louvers shall be metal, sight-proof, V-slat.

2.04 FABRICATION

- A. Fabricate wood doors in accordance with requirements of WDMA, Quality Standards.
- B. Fabricate fire rated doors in accordance with requirements of ITS Warnock Hersey, or Underwriters' Laboratories, with metal label on each door.
- C. Provide doors with minimum 1/4 inch thick edge strips, of wood species to match face veneers except as required for fire rating.

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- D. Make cutouts and provide stops for glass and louvers. Install metal door louvers. Seal cutouts prior to installation of moldings.
 - 1. For full light doors, provide cut out from flush wood door, with vertical grain direction.
- E. Bevel lock and hinge edges of single acting doors 3 degrees or 1/8 inch in 2-inches. Radius strike edge of double acting swinging doors as required by hinge manufacturer.
- F. Prepare doors to receive hardware. Refer to Section 08 71 00 Door Hardware.
 - 1. Pre-fit and bevel to net opening size less approximately 1/4 inch in width on single swing doors 3/16 inch in width for paired doors. Provide 1/4 inch clearance above finished floor, unless otherwise indicated on drawings. Provide 1/8 inch clearance at the top of door.
 - 2. Slightly ease vertical edges.
 - 3. Machine cut relief for hinges and machining for handsets. Coordinate with requirements of Sections 08 11 13 and 08 71 02.
- G. On fire rated pairs of doors greater than 20 minutes, supply overlapping astragals or metal edge sets only as required by NFPA or by door manufacturer's fire door authorities. If an astragal is required, to comply with fire rated labeling requirements for pairs of doors, provide door manufacturer's standard tested astragal.

2.05 FACTORY FINISHING

- A. Comply with referenced WDMA specification for "Factory Finishing" for Premium Grade factory finish systems.
- B. Pre-finish wood doors at factory.
- C. Transparent finish

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine installed door frames before hanging doors.
- B. Verify that frames comply with indicated requirements for type, size, location, and swing characteristics and have been installed with plumb jambs and level heads.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 INSTALLATION

A. Handle doors in accordance with recommendation of WDMA, "Care and Installation at Job Site."

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- B. Condition doors to average temperature and humidity in area of installation for not less than 48-hours prior to installation. Store doors per recommendation of WDMA, "Care and Installation at Job Site."
- C. Install doors in a neat and workmanlike manner, free from hammer or tool marks, open joints or slivers.
- D. Install doors in accordance with manufacturer's instructions.
- E. Set doors plumb, level, square, and true. Install work after building humidity is at acceptable level.
- F. Remove and replace all doors that are warped, twisted, bowed, or otherwise damaged. Do not install doors that cannot be properly fitted to frames.
- G. Adjust doors and hardware and other moving or operating parts to function smoothly and correctly.
- H. Ensure that smoke gaskets are in place before the installation of doors.
- I. Prepare doors to receive final hardware in accordance with AWI requirements. Coordinate door preparation with requirements of finish hardware schedule.
- J. Conform to AWI requirements for fit tolerances.
 - 1. Maximum Diagonal Distortion: 1/8 inch measured with straight edge, corner to corner.

3.03 ADJUSTING AND CLEANING

- A. Adjust for smooth and balanced door movement.
- B. Clean all doors, glass, and hardware. Remove all markings.
- C. Refinish or replace doors damaged during installation.

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SECTION 08 31 16 ACCESS PANELS AND FRAMES

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes
 - 1. Provide and install non-rated wall access panels.
- B. Related Sections
 - 1. Section 06 10 00 Rough Carpentry
 - 2. Section 09 22 16.13 Non Structural Metal Stud Framing
 - 3. Section 09 29 01 Interior Gypsum Board
 - 4. Section 09 52 00 Suspended Gypsum Board Ceiling
 - 5. Section 09 91 00 Painting

1.02 SUBMITTALS

A. Submit product data and installation instructions for approval.

1.03 QUALITY ASSURANCE

A. Rated doors and frames shall conform to U.L. requirements.

PART 2 - PRODUCTS

2.01 WALL ACCESS PANEL

- A. Manufacturer:
 - 1. Larsen's Manufacturing Company (BASIS of DESIGN)
 - 2. J.L. Industries
 - 3. Acudur
- B. Product:
 - 1. Larsen's Model No. L-DW.
- C. Materials:
 - 1. Frame: 16-gauge galvanized primed steel.

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- 2. Panel: 20-gauge (minimum) galvanized primed steel.
- 3. Hinge: Concealed and continuous.
- 4. Latch: Flush key with interior release lever. Rated key operated cylinder where required
- 5. Rating: Match requirements of assembly when installing within a rated wall or ceiling.
- 6. Size: 10" x 10"
- 7. Installation: gypsum board attached to metal studs and CMU wall
- 8. Location: refer to drawings. Latch shall be centered at 3'-6" AFF unless noted otherwise
- 9. Quantity: (2) Two
- 10. Pre-selected color: match adjacent wall paint

2.02 FABRICATION

A. Furnish with all parts ready for installation.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Provide solid and secure wood blocking and headers for mounting panel.
- B. Install according to manufacturer's instructions.

3.02 ADJUSTMENT

A. Adjust latch and lock mechanisms to operate smoothly.

3.03 CLEANING AND PAINTING

- A. Clean surface of oil and grease.
- B. Prime and paint to match color of surrounding surface.

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SECTION 08 33 23

OVERHEAD COILING DOORS

PART 1 - GENERAL

1.01 WORK INCLUDED

- A. Furnish and install upward acting overhead coiling door with chain operations.
- B. Refer to drawings and door schedule for locations and dimensions. Field verify all dimensions before ordering doors from Manufacturer.

1.02 SUBMITTALS

A. Submit detailed copies of shop drawings and product literature for Architect's review.

PART 2 - PRODUCTS

2.01 MANUFACTURERS:

- A. Raynor DuraCoil (**BASIS of DESIGN**)
- B. Cookson Door
- C. Cornell
- D. or approved equals

2.02 OPERATION

A. Manual (chain-operated)

2.03 CURTAIN:

- A. Material: Interlocking slats, roll formed from aluminum, 0.05 inch thick.
 - 1. Slat Type: Insulated Flat Slat with back cover.
 - a. Insulation: Polyisocyanurate with R-Value 6.24 and U-Value 01.60.
 - b. Back Covers: Aluminum, 0.04 inch minimum thickness.
- B. Mounting: Face Mounting
- C. Color and Finish: ArmorBriteTM Powdercoat from manufacturer's selection of 187 standard colors as selected by Owner
 - 1. Color: refer to Sheet A6.2 (Finish Legend)
- D. Endlocks: Lateral movement of the slats to be contained by means of zinc-plated malleable endlocks fastened with two zinc-plated steel rivets.

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- E. Bottom Bar and Seal: Two aluminum angles, minimum 1-1/2 inches by 1/8 inch with single-contact type vinyl.
- F. Curtain wear straps: None.

2.04 GUIDES:

- A. All guide assemblies shall be fabricated from three structural steel angles. Guide angles shall be minimum 3" x 2" x 3/16" (76.2mm x 50.8mm x 4.8mm) and fitted with two removable curtain stops each and finished with on coat of rust-inhibitive primer. Wall mounted angles shall be continuous type.
- B. Provide guides finished with powdercoat finish. Color to be selected from manufacturer's selection of 187 standard colors as selected by Owner.
 - 1. Color: refer to Sheet A6.2 (Finish Legend)
- C. Jamb Construction: Steel Jambs with self-tapping fasteners.
- D. Weather Seal: Snap-on vinyl seal

2.05 COUNTERBALANCE:

- A. Headplates: 3/16 inch (4.8 mm) steel plate, attached to wall angle of guide assembly with 1/2 inch (12.7 mm) diameter class 5 case hardened bolts. Inside of drive bracket fitted with sealed ball bearing. Provide head plates with one coat of rust-inhibitive primer
- B. Barrel: Minimum 4-1/2 inches (114.3 mm) O.D. and 0.120 inch (3.1 mm) wall thickness structural steel pipe. Deflection of pipe under full load shall not exceed 0.03 inch (0.8 mm) per foot of span.
- C. Counterbalance: Provide torsion counterbalance mechanism as follows: Torsion Spring: Oil-tempered, helical torsion springs, grease packed and mounted on a continuous steel torsion shaft.

2.06 HOOD:

- A. Steel Round Hood: 24-gauge galvanized steel, painted gray.
- B. Hood Baffle: EPDM rubber seal to inhibit air infiltration through hood cavity.

2.07 HARDWARE

A. Chain operation shall be by means of gray-iron reduction gears and galvanized hand chain. Locking to be accomplished with hand chain lock (padlocks by others).

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2.08 FINISH:

- A. All non-plated components of the door shall receive one coat of rust inhibitive primer and shop finished final coat.
 - 1. Color: refer to Sheet A6.2 (Finish Legend)
- B. Weatherseal (guide): Vinyl extrusion attached to guides at jamb.
- C. Hood baffle and weatherseal: Reinforced neoprene.

PART 3 - EXECUTION

3.01 STORAGE

- A. Store properly to protect materials from harmful elements and damage while stored at the job site.
- B. Upon delivery, touch-up damaged areas of finish. Refer to Manufacturer's recommendations.
- C. Check all materials and components prior to installation for dents and other unacceptable conditions. Initiation of installation indicates acceptance of materials.

3.02 INSTALLATION

A. Install in strict accordance with Manufacturer's instructions.

3.03 ADJUSTMENT AND CLEANING

- A. Remove dirt and excess sealants, glazing compounds and/or grease from exposed surfaces.
- B. Touch-up marred or abraded surface to match original finish. Refer to Manufacturer's recommendations.
- C. Adjust doors for smooth and balanced door movement.

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SECTION 08 41 00

ALUMINUM FRAMED ENTRANCES AND STOREFRONTS

PART 1 - GENERAL

1.01 WORK INCLUDED

- A. New aluminum storefront entrances and doors, dark-bronze anodized finish.
- B. New aluminum framing, dark-bronze anodized finish.
- C. Removable center mullions at designated doors.

1.02 RELATED WORK

- A. Section 07 92 00 Joint Sealant
- B. Section 08 71 00 Door Hardware
- C. Section 08 81 00 Glass Glazing

1.03 WARRANTY

A. Provide five-year manufacturer's warranty on glazing, one-year warranty on parts, material, and installation. Warranty shall include coverage of sealed glass units from seal failure, interpane dusting or misting, and replacement of same.

1.04 SUBMITTALS

A. Shop Drawings:

- 1. Showing construction of all parts, metal thicknesses, and installation and erection details including connections, anchorage, and fastening and sealing methods.
- 2. Sections of typical members, dimensioned elevations, frame sizes, spacing of anchors and fasteners, and details of accessories.
- 3. The Contractor is responsible for all field-dimension coordination.
- 4. Coordinate preparation of frames with approved finish hardware schedule.

PART 2 - PRODUCTS

2.01 ACCEPTABLE PRODUCTS

- A. Kawneer 451 and 451T.
- B. Similar products by Vistawall and EFCO will be considered equal.

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2.02 ALUMINUM STOREFRONT ENTRANCES

- A. Doors shall be wide stile, equal to Kawneer No. 500 Heavywall.
- B. Sidelight and transom framing: Equal to Kawneer Conte flush glaze, No. 451-T.
- C. Aluminum storefront hardware:
 - 1. Hinges: Continuous geared hinges.
 - 2. Exit devices: Equal to Von Duprin, 33/35 Series. Cylinder dogging required.
 - 3. Push/pull devices: Architectural stainless steel (CO-9).
 - 4. Closers: Equal to LCN-4040, surface-mounted, ADA-compliant.
 - 5. Thresholds and weather-stripping required.
 - 6. All hardware except continuous hinges shall be through-bolted.
- D. Removable mullion required at all pairs of doors. Mullion to be provided with keyed release.

2.03 ALUMINUM FRAMING

- A. 2" x 4-1/2" thermally broken at exterior.
 - 1. Door jambs and heads are not required to be thermally broken.
- B. $2'' \times 4-1/2''$ standard at interior.
- C. Head/jamb receptor and sub-sill required at masonry installations.
- D. Glazing: As scheduled.

PART 3 - EXECUTION

3.01 INSPECTION

- A. Assure that window openings conform to dimensions and tolerances shown on plans. All dimensions shall be field-verified prior to fabrication.
- B. Check that surfaces to contact windows are free of debris.
- C. Do not proceed with installation until unsatisfactory conditions are corrected.

3.02 ASSEMBLY

A. Window wall frames shall be accurately joined at corners with unexposed screws in extruded splines, which are an integral part of all horizontal members. All joints shall be sufficiently caulked to achieve a watertight seal.

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B. Where aluminum comes in contact with masonry, concrete, mortar, plaster, or dissimilar material, apply heavy coat of bituminous paint.

3.03 ERECTION

- A. All openings shall be prepared plumb and square by others and the window wall frames shall be of sufficient size to provide the required clearances at head, jambs and sill. Installation and glazing shall be performed by experienced technicians. All units shall be securely anchored and ready for operation. Sub-sill is to be set in two heavy beads of sealant and an interior bead between sub-sill back-let and sill or floor. Sub-sill ends shall be filled with sealant to insure no water penetration to corners.
- B. Furnish and apply sealant that is compatible with window systems to provide a completely watertight installation at all joints. Wipe off excess sealant and leave exposed surfaces and joints clean, uniform, and smooth.

3.04 CLEANING

A. Final cleaning of window frames and glass shall be performed by the General Contractor.

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SECTION 08 71 02 DOOR HARDWARE

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes
 - 1. Hardware for all new interior and exterior doors.
 - 2. Refer to finish hardware and Door and Frame Schedule.
- B. Related Sections
 - 1. Section 01 21 00 Allowances
 - 2. Section 08 11 13 Hollow Metal Doors and Frames
 - 3. Section 08 14 16 Flush Wood Doors
 - 4. Section 08 41 00 Aluminum Framed Storefronts and Entrances

1.02 SUBMITTALS

- A. Submit a digital copy of the following:
 - 1. A schedule indicating type, manufacturer's name, manufacturer's number, location, and finish of each item required.
 - 2. Photographic/graphic cut sheets for every item specified.
 - a. Bind cut sheets in a neat booklet.
 - b. Bind product cut sheets in the order the products are listed in Part 2 of this Section.
 - c. Clearly mark appropriate options or highlight options for Architect's selection.
- B. Submittals failing to meet the above requirements will be rejected until all requirements are met.
- C. In addition to the requirements above, the Contractor may be requested to provide additional technical literature, samples, drawings, and/or performance data to assist in the evaluation of proposed equals.
- D. Secure Owner and Architect's approval before ordering hardware or templates.

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1.03 DELIVERY, STORAGE, AND HANDLING

A. Provide storage and protection for finish hardware when delivered, and install it when ready.

1.04 QUALITY ASSURANCE

- A. Meet requirements and recommendations of applicable portions of standards listed.
 - 1. American Society for Testing and Materials, ASTM
 - 2. Commercial Standards, CS
 - 3. Standard Building Code, SBC
 - 4. Federal Specifications, FS
 - 5. Americans with Disabilities Act, Accessibility Guidelines, ADAAG
- B. The supplier of finish hardware shall strictly comply with the following requirements:
 - 1. Supplier shall have been in the full-time business of selling finish hardware for a minimum of ten (10) consecutive years.
 - 2. Supplier shall employ a full-time certified architectural hardware consultant (A.H.C.)
 - 3. Supplier shall be a member in good standing with D.H.I.
 - 4. Supplier shall be a factory-authorized dealer of approved hardware.
 - 5. Supplier shall be approved by the Owner and Architect.

1.05 GENERAL REQUIREMENTS

- A. Properly tag, index, and file keys as directed, and deliver all keys at completion of the work.
- B. Fire Underwriters' Labels: Provide only hardware having same U.L. Label and fire exposure time rating as doors and frames to which applied. This provision supersedes any hardware schedule provisions to the contrary.
- C. Any revisions of the hardware schedule to conform to the details shall be provided. Items not specifically mentioned but necessary for the completion of the work shall be furnished. It shall be the Contractor's responsibility to furnish hardware, in those places where specific hardware is not mentioned, of a quality equal to that of other openings used for the same general purpose. The cost of any such hardware shall be included in the original bid.

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1.06 KEYING

- A. Key to "Best" systems as directed by Owner.
- B. Furnish four (4) master keys and/or four (4) grand master keys. Furnish two (2) keys per lock otherwise.

1.07 COORDINATION

A. Strictly coordinate machining of wood doors and preparation of hollow metal doors/frames with approved finished hardware schedule.

1.08 FINISHES

A. Generally shall be dull chrome (26D) unless otherwise noted in the schedule.

PART 2 - PRODUCTS

2.01 DOOR HARDWARE

- A. Hinges: Equal to square edged, full mortise Hager BB 1279, 4-1/2" x 4-1/2".
- B. Spring hinges: Equal to square edged, full mortise Hager 1250, 4-1/2" x 4-1/2".
- C. Locksets: Equal to Best 45H, Sargent 8200, Schlage L9000 commercial heavy duty mortise locks:
 - 1. Best removable cores required.
 - a. Cylinders, cores, and core installation are to be purchased from Best under the allowance established in Section 01 21 00.
 - b. Locksets and panic devices shall be supplied less cores.
 - c. Installation and operational adjustments of cylinders in all locksets and panic devices is the responsibility of the Contractor, and the labor for such shall be included in the Base Bid.
 - d. Cylinders and construction cores shall be installed by the Contractor.
 - e. Permanent cores to be installed by Best as directed by the Owner.
 - 2. Function as per hardware schedule.
 - 3. Lever type design (ADA compliant equal to Best #14).
 - 4. Escutcheon equal to Best Type "J."
 - 5. Complete with strike.
- D. Deadbolts: Equal to Best 83T.

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- E. Occupancy Indicator Deadbolts: Equal to Falcon D 871626 with 2³/₄" backset, ADA compliant lever, and external emergency release.
- F. Hospital latches: Equal to Rockwood #596.
- G. Closers: Equal to Sargent 281 Powerglide Series, LCN 4040, Corbin Russwin DC8000 cast iron, standard duty.
 - 1. Through bolt all closers.
- H. Exit Devices: Equal to Von Duprin 99/98, Sargent 8800/8700, Precision Apex 2000, 33/35 Series.
 - 1. Cylinders, cores, and core installation are to be purchased from Best under the allowance established in Section 01 21 00.
 - 2. Through bolt all exit device hardware.
 - 3. Cylinder dogging required with key (hex key is not acceptable).
- I. Flush Bolts: Equal to Rockwood 555.
- J. Surface Bolts: Equal to Rockwood 630.
- K. Hold Open Stops: Equal to Rockwood 461.
- L. Push Plates:
 - 1. Manufacturer: Rockwood, TRIMCO, or equal.
 - 2. Type: Equal to Rockwood 70F x RC, 8" x 16" push plate with rounded corners.
- M. Pull and Pull Plates:
 - 1. Manufacturer: Rockwood, TRIMCO, or equal.
 - 2. Type: Equal to Rockwood 111 x 70C.
- N. Kickplates:
 - 1. Equal to Rockwood or TRIMCO 8" high x width of door minus 2 inches.
 - 2. Thickness: 0.050 inch.
 - 3. Smooth finish.
- O. Doorstops:
 - 1. Manufacturer: Rockwood, TRIMCO, or equal.
 - 2. Type: Equal to Rockwood #440 Series. Provide complete with #449 riser if required for stable installation.

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- P. Doorstops (wall mounted):
 - 1. Manufacturer: Rockwood, TRIMCO, or equal.
 - 2. Type: Equal to Rockwood #406 Series, stainless steel.
- Q. Thresholds and weatherstripping:
 - 1. Thresholds: PEMKO 2005AV or 181AV.
 - 2. Ramped Thresholds: Equal to National Guard Products 952.
 - 3. Weatherstripping: PEMKO 305CR (neoprene).
 - 4. Door Bottom: PEMKO 211AV.
- R. Silencers required at all hollow metal frames.

2.02 DOOR HARDWARE ACCESSORIES

A. Key Cabinet (standard duty): Equal to Model 1010 by Salsbury Industries, Los Angeles, CA, phone 1-800-725-7287. Capacity for 200 keys, 20 gage steel construction, complete with lock and two keys. Verify location with Owner.

2.03 SCHEDULE:

Heading No. 1

- 2 Continuous Hinge
- 2 Exit Devices (with Rim Cylinder)
- 2 Pulls
- 2 Closers
- 1 Keyed Removable Mullion
- 1 ADA Threshold
- 1 Set of Weatherstripping

(NOTE: all hardware under this heading shall be by aluminum storefront manufacturer)

Heading No. 2

- 1-1/2 Pair Hinges
- 1 Lockset (Classroom Function)
- 1 Closer
- 1 Stop (Dome Type)
- 3 Silencers

Heading No. 3

- 1-1/2 Pair Hinges
- 1 Lockset (Office Function)
- 1 Stop (Dome Type)
- 3 Silencers

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Heading No. 4

- 1-1/2 Pair Hinges
- 1 Lockset (Storage Function)
- 1 Stop (Dome Type)
- 3 Silencers

Heading No. 5

- 1-1/2 Pair Hinges
- 1 Lockset (Privacy Function)
- 1 Closer
- 1 Stop (Dome Type)
- 3 Silencers

Heading No. 6

- 1-1/2 Pair Hinges
- 1 Push Plate
- 1 Pull & Pull Plate
- 1 Kick Plate
- 1 Closer
- 1 Stop (Dome Type)
- 3 Silencers

Heading No. 7

- 3 Pair Hinges
- 1 Lockset (Storage Function)
- 1 Head Bolt
- 1 Foot Bolt
- 2 Stop (Dome Type)
- 6 Silencers
- 1 Threshold
- 1 Set of Weatherstripping

Heading No. 8

- 1-1/2 Pair Hinges
- 1 Lockset (Storage Function)
- 1 Closer
- 1 Stop (Dome Type)
- 3 Silencers
- 1 Astragal
- 1 Threshold
- 1 Set of Weatherstripping

Heading No. 9

Door hardware by overhead coiling door manufacturer

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Heading No. 10

1-1/2 Pair Hinges

1 Exit Device

1 Rim Cylinder

1 Closer

1 Threshold

Set Weatherstripping

Heading No. 11

- 3 Pair Hinges
- 1 Lockset (Storage Function)
- 1 Head Bolt
- 1 Foot Bolt
- 2 Stop (Dome Type)
- 6 Silencers

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Provide storage and protection for finish hardware when delivered and install when ready.
- B. Fit all hardware accurately, apply securely, and adjust properly. Leave in good working order, free of defects.
- C. Properly tag, index, and file keys as directed, and deliver all keys at completion of the work.
- D. Apply hardware in accordance with manufacturer's instructions, fit accurately, apply securely and adjust carefully. Use care not to injure work when applying hardware. When necessary, remove and replace doors so they may have all surfaces painted.

3.02 APPLICATION OF HARDWARE

- A. Receive, store and be responsible for all finished hardware. Properly tag, index and file all keys in key cabinet or as directed. Apply hardware in accordance with manufacturer's instructions, fit accurately, apply securely and adjust carefully. Use care not to injure work when applying hardware. When necessary, remove and replace doors so they may have tops and bottoms painted or stained.
- B. The location of hardware in connection with wood doors and metal door bucks shall be as follows unless otherwise shown on the drawings:
 - 1. Center door knobs and levers 38 inches above finished floor.
 - 2. Center door pulls 40 inches above finished floor.
 - 3. Center push plates 45 inches above finished floor.

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- 4. Center cylinder dead bolt locks 52 inches above finished floor.
- 5. Center single push bars 48 inches above finished floor.
- 6. Locate upper edge of top hinges 5 inches below head of frame
- 7. Locate lower edge of bottom hinges 10 inches above finished floor.
- 8. Space center hinges equal distance between top and bottom hinges.

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SECTION 08 81 00 GLASS GLAZING

PART 1 - GENERAL

1.01 WORK INCLUDED

A. Glass and glazing.

1.02 RELATED WORK

- A. Section 07 92 00 Joint Sealant
- B. Section 08 11 13 Hollow Metal Doors and Frames
- C. Section 08 14 16 Flush Wood Doors
- D. Section 08 41 00 Aluminum Framed Entrances and Storefront

1.03 CODES AND STANDARDS

- A. Glass and glazing procedures must comply with requirements of 2018 International Building Code.
- B. Furnish/install tempered glass in locations required by codes.

1.04 WARRANTY

A. Provide five (5) year manufacturer's warranty on glazing, one (1) year on parts, material, and installation. Warranty shall include coverage of sealed glass units from seal failure, interpane dusting or misting, and replacement of same.

PART 2 - PRODUCTS

2.01 GLAZING SCHEDULE

- A. All insulated glazing shall be 1" thick.
 - 1. Exterior pane:
 - a. Exterior pane Surface No. 1 shall be grey tinted.
 - b. Exterior pane Surface No. 2 shall be low e coated (equal to Solarcool with SolarBan 70XL).
 - 2. Interior pane:
 - a. Interior pane Surface No. 3 and Surface No. 4 shall be clear (unless scheduled to be frosted or opaque).
- B. All single glazing shall be 1/4" thick (unless otherwise required by code)

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- C. All exterior glazing shall be grey tinted.
- D. All interior glazing shall be clear (unless scheduled to be frosted or opaque).
- E. All glazing in hollow metal frames, hollow metal doors, and solid wood core doors shall be with fire-rated and impact safety rated Firelite Plus by Technical Glass Products, SuperLite I-XL by SAFTIFIRST or equal as required by 2018 International Building Code.

2.02 GLASS LEGEND

<u>Abbreviation</u>	<u>Type</u>
IGL	Insulated glazing
SG	Single pane glazing
FG	Frosted glazing
OG	Opaque glazing
LG	Laminated glazing

- A. Glass shown on drawings as not tempered shall be tempered if required by code.
- B. All glazing associated with restrooms shall be frosted unless noted otherwise.

PART 3 - EXECUTION

3.01 INSPECTION

- A. Assure that openings conform with dimensions and tolerances shown on plans. All dimensions shall be field verified prior to fabrication.
- B. Check that surfaces to contact windows are free of debris.
- C. Do not proceed with installation until unsatisfactory conditions are corrected.

3.02 INSTALLATION

A. Furnish and apply sealant that are compatible with window systems to provide a completely watertight installation at all joints. Wipe off excess sealant and leave exposed surfaces and joints clean, uniform, and smooth.

3.03 CLEANING

A. Final cleaning of all glass shall be performed by the General Contractor.

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SECTION 09 22 16.13

NON STRUCTURAL METAL STUD FRAMING

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes

1. Top and bottom runners, studs, joists, internal bracing and blocking (interior and exterior).

B. Related Sections

- 1. Section 06 10 00 Rough Carpentry
- 2. Section 09 52 00 Suspended Gypsum Board Ceiling
- 3. Section 09 28 16 Glass-Mat Faced Gypsum Backing Board
- 4. Section 09 29 01 Interior Gypsum Board
- 5. Section 09 29 02 Exterior Gypsum Board Sheathing

1.02 REFERENCES

- A. ASTM C645 Non-Load-Bearing Steel Studs, Runners and Rigid Furring Channels.
- B. ASTM A 446-83 Load-Bearing Steel Studs.
- C. Gypsum Construction Handbook -2^{nd} Edition.
- D. GA 203 Installation of Screw-Type Steel Framing Members to Receive Gypsum Board.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Steel studs shall be channel-type studs, manufacturer's standard gauge painted steel as manufactured by U.S. Gypsum Company, or equal.
- B. Interior studs shall be not less than 20-gauge at 16" o.c. Increase gauge to 18 at door jambs and heads.
- C. Interior corridor walls shall be not less than 18-gauge at 16" o.c. Increase gauge to 16 at door jambs and heads.
- D. Exterior studs shall not be less than 16-gauge at 16" o.c.
- E. Ceiling and soffit systems for gypsum board shall be not less than 18 gauge channels or joists with 7/8" 20-gauge furring channels at 16" o.c.

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- F. Metal Joists: Minimum of 18 gauge at 16" o.c. Align directly over metal studs when bearing on a wall assembly. Minimum of 16-gauge joists required at floor systems.
- G. Floor and ceiling runners shall be of the same materials as studs and shall be designed to secure studs in place.
- H. Approved fasteners shall be devices recommended by stud system manufacturer in current printed instructions.
- I. Vertical deflection clips required as detailed on Drawings equal to those as manufactured by Signature Industries, the Steel Network: Verticlip SL, SLB, and SLS, Verticlip SLD, and Bridge Clip.

PART 3 - EXECUTION

3.01 ERECTION

- A. Secure top and bottom runners at 24 inches o.c. Align to configuration required.
- B. Install studs vertically at 16 inches o.c. and not more than 2 inches from abutting construction, each side of openings and at corners.
- C. Fit runners under and above openings; secure intermediate studs at spacing of wall studs.
- D. Brace stud framing system and make rigid.
- E. Coordinate erection of studs with installation of service utilities. Align stud web openings.
- F. Coordinate installation of bucks, anchors, blocking, electrical and mechanical work to be placed in or behind stud framing.
- G. Coordinate erection of stud system with requirements of door frame supports or attachments.
- H. Secure solid wood blocking to studs as required.
- I. Where a stud directly abuts an exterior wall, place a no. 15 asphalt felt strip between stud and wall surface.

3.02 TOLERANCES

A. Install members to provide surface plane with maximum variation of 1/8 inch in 10 feet in any direction.

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SECTION 09 28 16

GLASS-MAT FACED GYPSUM BACKING BOARD

PART 1 - GENERAL

1.01 WORK INCLUDED

- A. Fiberglass-mat faced, moisture resistant gypsum backer board.
- B. Accessories, trim and finishing of joint treatments.

1.02 RELATED SECTIONS

- A. Section 06 10 00 Rough Carpentry
- B. Section 07 21 00 Building Insulation
- C. Section 07 92 00 Joint Sealants
- D. Section 09 22 16.13 Non Structural Metal Stud Framing
- E. Section 09 29 01 Interior Gypsum Board
- F. Section 09 30 13 Tiling

1.03 REFERENCES

- A. ASTM C627 Standard Test Method for Evaluating Ceramic Floor Tile Installation Systems Using the Robinson Type Floor Tester.
- B. ASTM C840 Standard Specification for Application and Finishing of Gypsum Board.
- C. ASTM C1002 Standard Specification for Steel Self-Piercing Tapping Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs.
- D. ASTM C1178 Standard Specification for Glass Mat Water-Resistant Gypsum Backing Panel.
- E. ASTM D3273 Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber.
- F. ASTM D6329 Standard Guide for Developing Methodology for Evaluating the Ability of Indoor Materials to Support Microbial Growth Using Static Environmental Chambers.
- G. ASTM E96 Standard Test Methods for Water Vapor Transmission of Materials.
- H. Tile Council of North America, Inc. (TCNA): TCA Handbook for Ceramic Tile Installation, Current Edition.

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1.04 SUBMITTALS

A. Product Data: Manufacturer's specifications and installation instructions for each product specified.

1.05 PROJECT CONDITIONS

A. Contractor must examine the substrates and supporting structure and the conditions under which the items are to be installed and notify the Architect of conditions detrimental to the work. **Do not proceed with the installation until unsatisfactory conditions have** been corrected in a manner acceptable to the installer and the architect.

PART 2 - PRODUCTS

2.01 MANUFACTURER

- A. Basis of Design: Fiberglass-Mat Faced Gypsum Backing Board, 5/8" DensShield Fireguard Tile Backer by Georgia-Pacific Gypsum LLC.
- B. Equivalent Design: Manufacturer with products of equivalent design may include, but are not limited to:
 - 1. National Gypsum Company
 - 2. USG Corporation
 - 3. Certain Teed Gypsum, Inc.

2.02 GLASS MAT GYPSUM TILE BACKER

- A. Fiberglass-Mat Faced Gypsum Backing Board: ASTM C1178, Type X.
 - 1. Thickness: 5/8 inch
 - 2. Width: 4 feet
 - 3. Length: 8 feet
 - 4. Weight: 2.5 lb./sq. ft.
 - 5. Edges: Square
 - 6. Surfacing: Coated fiberglass mat on face, back, and long edges.
 - 7. Mold Resistance (ASTM D3273): Not less than 10, in a test as manufactured.
 - 8. Microbial Resistance (ASTM D6329, EPA 12-week protocol): Will not support microbial growth.
 - 9. Permeance (ASTM E96): Not more than 1.0 perms when tiled.

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2.03 GLASS MAT GYPSUM TILE BACKER JOINT TREATMENT MATERIALS

A. Glass-fiber mesh tape: Alkali-resistant self-adhering glass-fiber tape, minimum two (2) inches wide, 10 by 20 threads/inch.

2.04 ACCESSORIES MATERIALS

- A. Screws: ASTM C1002.
 - 1. Equal to Strong-Point 410 Stainless Steel Self-Drilling Flat Head, Passivated and Waxed

2.05 JOINT TREATMENT

- A. Glass-fiber mesh tape: Alkai-resistant self-adhering glass fiber tape, minimum two (2) inches wide, 10 by 20 threads/inch.
- B. Flexible sealants as required by manufacturer.

2.06 OTHER MATERIALS

- A. Provide materials, not specifically described but required for the complete and proper installation of the work in this section.
- B. Waterproofing membranes: Refer to Section 09310 Ceramic Tile for product type and location of waterproofing membranes.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify that project conditions and substrates are acceptable to the installer to begin installation of work of this section.

3.02 INSTALLATION

A. Install in accordance with ASTM C840, manufacturer's recommendations and TCA Handbook for Ceramic Tile Installation.

3.03 PROTECTION

A. Protect gypsum board installations from damage and deterioration until the date of Substantial Completion.

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SECTION 09 21 01 INTERIOR GYPSUM BOARD

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes
 - 1. Interior Gypsum Board
 - 2. Taped and sanded joint treatment.
- B. Related Sections
 - 1. Section 06 10 00 Rough Carpentry
 - 2. Section 09 22 16.13 Non Structural Metal Stud Framing
 - 3. Section 09 91 00 Painting

1.02 REFERENCES

- A. GA 214-10 Recommended Levels of Gypsum Board Finish
- B. GA 216 Recommended specifications for the application and finishing of Gypsum Board.
- C. GA 252 Recommended specifications for the application of gypsum sheathing.
- D. USG-Gypsum Construction Handbook.

1.03 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Handle materials with care to prevent damage.
- B. Store materials inside under cover, stack flat off floor.
- C. Store adhesives in a dry area; provide protection against freezing at all times.

PART 2 - PRODUCTS

2.01 GYPSUM BOARD

- A. Provide Gypsum board materials in accordance with recommendations of GA 216.
- B. Parperless gypsum board: Equal to DensArmor Plus High-Performance Interior Panel by Georgia Pacific.
- C. Thickness: 5/8", Type X

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2.02 GYPSUM BOARD ACCESSORIES

- A. Provide gypsum board accessories in accordance with GA 216.
- B. Reinforcing tape, joint compound, adhesive, water, fasteners: GA 216.
- C. Corner Beads: Metal.
- D. "F" molding: Gordon FD5810 or equal.
- E. "J" molding: Gordon JD-58 or equal.
- F. "R" reveal molding: Gordon RD5812 or equal.
- G. "T" molding: Gordon TD-58 or equal.
- H. Screws: ASTM C1002:
 - 1. For Metal Studs 20 ga. 25 ga.: Equal to Grabber Bugle Head Streaker Fasteners. Black/Gray Phosphate
 - 2. For Metal Studs 14 20 ga.: Equal to Grabber Bugle Head Drivall Self Drilling. Black/Gray Phosphate

PART 3 - EXECUTION

3.01 GYPSUM BOARD INSTALLATION

- A. Install gypsum board in accordance with recommendations of GA 216.
- B. Provide and install control joints in large continuous areas to prevent cracking.
- C. Erect single layer standard gypsum board in direction most practical and economical, with ends and edges occurring over firm bearing.
- D. Erect single layer fire rated gypsum board vertically, with edges and ends occurring on firm bearing.
- E. Use screws when fastening gypsum board to metal furring or framing.
- F. In locations where gypsum board abuts a dissimilar material, apply J mould to terminate the gypsum board and install caulking at the crack between the gypsum board and dissimilar materials.
- G. Abut gypsum board to floor for a tight joint to avoid gaps between the wall and floor surfaces.
- H. Place corner beads at external corners. Use longest practical lengths. Place edge trim where gypsum board abuts dissimilar materials.

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- I. Tape, fill and sand exposed joints, edges, corners, openings and fixings, to produce surface ready to receive surface finishes. Feather coats onto adjoining surfaces so that camber is maximum 1/32 inch.
- J. Install wall and ceiling control joints at 30 feet o.c. each way.
- K. Remove and re-do defective work.

3.02 CLOSING IN UNINSPECTED WORK

A. Do not cover up or enclose work until it has been properly and completely inspected and reviewed. Should any of the work be covered up or enclosed prior to verification, uncover the work as required for inspection. Make all repairs and replacements with such materials and workmanship as are necessary at no additional cost to the owner.

3.03 FINISHING

- A. Provide levels of gypsum finish for locations as follows, in accordance with Gypsum Association GA 214-10, "Recommended Levels of Gypsum Board Finish".
 - 1. Level 1: Above lay-in ceilings and concealed areas, except provide higher level of finish as required to comply with fire resistance ratings and acoustical ratings.
 - 2. Level 2: At water-resistant gypsum backing board (ASTM C 630) is used as a substrate for tile, except remove tool marks and ridges. Provide higher level of finish as required to comply with fire resistance ratings and acoustical ratings.
 - 3. Level 3: At gypsum board to receive heavy or medium texture (spray or hand applied) finishes before final painting, or where heavy-grade wallcoverings are to be applied. Provide higher level of finish as required to comply with fire resistance ratings and acoustical ratings. (Paint Primer as required in Specification Section 09 91 00 or USG First Coat Primer)
 - 4. Level 4: At gypsum board to receive flat paints, light textures, or wallcoverings. Provide higher level of finish as required to comply with fire resistance ratings and acoustical ratings. (Paint Primer as required in Specification Section 09 91 00 or USG First Coat Primer)
 - 5. Level 5: At all gypsum board to receive eggshell, gloss, semi-gloss, satin, or enamel paints. Spray-applied primer-surfacer, TUFF-HIDE or watered-down joint compound skim coat over whole surface. Provide higher level of finish as required to comply with fire resistance ratings and acoustical ratings. (In addition to primer-surfacer, a paint primer shall be required as specified in Specification Section 09 91 00.)

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SECTION 09 29 02

EXTERIOR GYPSUM BOARD SHEATHING

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes
 - 1. Fiberglass mat faced, moisture and mold resistant gypsum sheathing.
- B. Related Sections
 - 1. Section 04 05 19 Masonry Anchorage and Reinforcing
 - 2. Section 06 10 00 Rough Carpentry
 - 3. Section 07 21 00 Building Insulation
 - 4. Section 07 27 26 Fluid-Applied Membrane Air Barriers

1.02 REFERENCES

- A. ASTM C473 Standard Test Methods for Physical Testing of Gypsum Panel Products.
- B. ASTM C518 Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus.
- C. ASTM C1002 Standard Specification for Steel Self-Piercing Tapping Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs.
- D. ASTM C1177 Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing.
- E. ASTM C1280 Standard Specification for Application of Gypsum Sheathing.
- F. ASTM D3273 Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber.
- G. ASTM D6329 Standard Guide for Developing Methodology for Evaluating the Ability of Indoor Materials to Support Microbial Growth Using Static Environmental Chambers.
- H. ASTM E72 Standard Test Methods of Conducting Strength Tests of Panels for Building Construction.
- I. ASTM E96 Standard Test Methods for Water Vapor Transmission of Materials.
- J. Gypsum Association (GA): GA-253 Application of Gypsum Sheathing.

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1.03 SUBMITTALS

A. Submit Product Data with manufacturer's specifications and installation instructions for each product specified.

1.04 WARRANTY

- A. Provide products that offer twelve months of coverage against in-place exposure damage (delamination, deterioration and decay).
- B. Manufacturer's Warranty:
 - 1. Five years against manufacturing defects.
 - 2. Ten years against manufacturing defects when used as a substrate in architecturally specified EIFS.

PART 2 - PRODUCTS

2.01 MANUFACTURER

- A. Basis of Design:
 - 1. Fiberglass-Mat Faced Gypsum Sheathing, 5/8" DensGlass Sheathing by Georgia-Pacific Gypsum LLC.
 - 2. Fiberglass-Mat Faced Gypsum Sheathing, Type X for Fire Rated Designs: DensGlass Fireguard Sheathing.
- B. Equivalent Design: Manufacturer with products of equivalent design may include, but are not limited to:
 - 1. National Gypsum Company
 - 2. USG Corporation
 - 3. Certain Teed Gypsum, Inc.

2.02 EXTERIOR GYPSUM SHEATHING:

- A. Exterior Gypsum Sheathing (Non-Rated), Type X:
 - 1. Thickness: 5/8 inch thick
 - 2. Width: 4 feet
 - 3. Length: 8 feet
 - 4. Edges: Square
 - 5. Surfacing: Fiberglass mat on face, back, and long edges

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- 6. Racking Strength (Ultimate, not design value) (ASTM E72): Not less than 540 pounds per square foot, dry.
- 7. Flexural Strength, Parallel (ASTM C473): 80 lbf, parallel.
- 8. Humidified Deflection ASTM C1177): Not more than 2/8 inch.
- 9. Permeance (ASTM E96): 23 perms.
- 10. R-Value (ASTM C518): 0.56.
- 11. Mold Resistance (ASTM D3273): 10, in a test as manufactured.
- 12. Microbial Resistance (ASTM D6329, GREENGUARD 3-week protocol): Will not support microbial growth.
- B. Fire-Rated Fiberglass-Mat Faced Gypsum Sheathing: ASTM C1177, Type X:
 - 1. Thickness: 5/8 inch.
 - 2. Width: 4 feet.
 - 3. Length: 8 feet
 - 4. Weight: 2.5 lb/sq. ft.
 - 5. Edges: Square.
 - 6. Surfacing: Fiberglass mat on face, back, and long edges.
 - 7. Racking Strength (Ultimate, not design value) (ASTM E72): Not less than 654 pounds per square foot, dry.
 - 8. Flexural Strength, Parallel (ASTM C1177): 100 lbf, parallel.
 - 9. Humidified Deflection (ASTM C1177): Not more than 1/8 inch.
 - 10. Permeance (ASTM E96): Not more than 17 perms.
 - 11. R-Value (ASTM C518): 0.67.
 - 12. Mold Resistance (ASTM D3273): 10, in a test as manufactured.
 - 13. Microbial Resistance (ASTM D6329, GREENGUARD 3-week protocol): Will not support microbial growth.

2.03 GYPSUM BOARD ACCESSORIES

- A. Provide gypsum board accessories in accordance with GA 216.
- B. Reinforcing tape, joint compound, adhesive, water, fasteners: GA 216.

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- C. Corner Beads: Metal.
- D. "F" molding: Gordon FD5810 or equal.
- E. "J" molding: Gordon JD-58 or equal.
- F. "R" reveal molding: Gordon RD5812 or equal.
- G. "T" molding: Gordon TD-58 or equal.
- H. Screws: ASTM C1002.
 - 1. Equal to Strong-Point 410 Stainless Steel Self-Drilling Flat Head, Passivated and Waxed

PART 3 - EXECUTION

3.01 EXTERIOR SHEATHING INSTALLATION

- A. Provide exterior sheathing where indicated on drawings. Install sheathing in accordance with manufacturer's instructions and applicable instructions in GA-253 and ASTM C 1280.
- B. Install DensGlass Gold Exterior Sheathing with gold side out.
- C. Use maximum length possible to minimize number of joints.
- D. Metal framing: Attach exterior sheathing to metal framing with self-tapping screws conforming to ASTM C1002 spaced 8" o.c. at perimeter where there are framing supports; and 8" o.c. along intermediate framing in field.
- E. Locate fasteners minimum 3/8" from edges and ends of sheathing panels.
- F. Treatment of joints:
 - 1. The exterior face of exterior gypsum sheathing joints shall be taped with FG tape and troweled with Dow Corning 795 building sealant or equal.
 - 2. Joints and fasteners shall be covered using Dow Corning 795 Building Sealant or equal.

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SECTION 09 30 13

TILING

PART 1 - GENERAL

1.01 WORK INCLUDED

- A. Preparation of substrate for ceramic tile installation.
- B. Furnish and install thin-set ceramic wall and floor tile complete with incidentals.
- C. Furnish and install cement backer board panels and underlayment for the substrate.
- D. Furnish and install marble thresholds at junction of tile floors with dissimilar materials.
- E. Furnish and install membrane underlayment membrane.

1.02 RELATED SECTIONS

- A. Section 03 30 00 Cast-in-Place Concrete (Building Only)
- B. Section 07 92 00 Joint Sealants
- C. Section 09 28 16 Glass-Mat Faced Gypsum Backing Board
- D. Section 09 30 13.01 Tile Accessories

1.03 REFERENCES

- A. American Society for Testing and Materials (ASTM)
- B. American National Standards Institute. (ANSI)
- C. Tile Council of America (TCA) Handbook for Ceramic Tile Installation.

1.04 SUBMITTALS

- A. Submit product literature and samples for Architect's approval.
- B. Submit samples of actual tile for color selection by Owner.

1.05 DELIVERY, STORAGE AND HANDLING

A. Protect adhesives from freezing or overheating in accordance with manufacturer's instructions.

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PART 2 - PRODUCTS

2.01 ACCEPTABLE TILE MANUFACTURERS

- A. American Olean (BASIS of DESIGN)
- B. Crossville
- C. Daltile
- D. Florida Tile

2.02 MATERIALS

- A. Refer to Sheet A6.2 (Finish Legend)
- 2.03 INSTALLATION MATERIALS (THIN-SET METHOD)
 - A. Refer to Section 09 30 13.01 Tile Accessories.
- 2.04 MEMBRANE
 - A. Refer to Section 09 30 13.01 Tile Accessories
- 2.05 ACCESSORIES
 - A. Refer to Section 09 30 13.01 Tile Accessories

PART 3 - EXECUTION

3.01 INSPECTION/PREPARATION

- A. Installer must examine the substrates and conditions upon which the ceramic tile is to be installed and take necessary measures to correct conditions detrimental to the work. Do not proceed with the installation of ceramic tile until unsatisfactory conditions have been corrected. Initiation of tile setting work represent acceptance of substrate.
- B. Review and strictly follow all manufacturer's installation guidelines.

3.02 INSTALLATION

- A. Slope setting beds to drains.
- B. Cut and fit tile tight to protrusions and vertical interruptions. Form corners and bases neatly.
- C. Work tile joints uniform in width, subject to variance in tolerance allowed in tile size. Joints: Watertight, without voids, cracks, excess mortar, or grout.
- D. Allow tile to set for a minimum of 48 hours prior to grouting.
- E. Provide and install marble threshold at junction with dissimilar materials.

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3.03 PROTECTION

A. Prohibit traffic from floor finish for 48 hours after installation.

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SECTION 09 30 13.01 TILING ACCESSORIES

PART 1 - GENERAL

1.01 WORK INCLUDED

- A. Edge protection and transition profiles for floors.
- B. Finishing and edge protection profiles for walls.
- C. Movement joint and cove shaped profiles.
- D. Uncoupling membrane at all tile floors.
- E. Waterproofing membrane at all tile walls.
- F. Floor drain, with integrated bonding flange.
- G. Setting materials: adhesives, mortars, grouts, and sealants.

1.02 RELATED SECTIONS

- A. Section 03 30 00 Cast in Place Concrete (Building Only)
- B. Section 09 30 13 Tiling

1.03 REFERENCES

A. Strictly comply with latest edition of <u>Handbook for Ceramic Tile Installation</u>, by the Tile Council of America.

1.04 DELIVERY, STORAGE AND HANDLING

A. Protect adhesives from freezing or overheating in accordance with manufacturer's instructions.

1.05 SUBMITTALS

- A. Submit manufacture's product data on all materials used.
- B. Submit samples for Architect's approval.

1.06 QUALITY ASSURANCE

- A. Manufacture Qualifications: Company specializing in manufacturing products specified in this section with a minimum ten years' experience.
- B. Installer Qualifications: Company specializing in performing the work of this section with a minimum of five years' experience.

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- C. Source Limitations: Obtain products of uniform quality from a single manufacture.
- D. Preinstallation Conference
 - 1. General Contractor/Construction Manager shall schedule and conduct conference.
 - 2. Require attendance of tile accessories supplier, tile supplier, tile installer, and installers of related work. Review installation procedures and coordination required with related work.
 - 3. Meeting agenda shall include, but not be limited to:
 - a. Surface preparation.
 - b. Tile and installation material compatibility.
 - c. Edge protection, transition, and prefabricated movement joints.
 - d. Waterproofing installation.
 - e. Crack isolation installation.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Store products in manufacture's unopened packaging until ready for installation.
- B. Protect materials from exposure to moisture. Do not deliver until after wet work is complete and dry.
- C. Store materials in a dry, warm, ventilated weathertight location.

1.08 COORDINATION

A. Coordinate work with other operations and installation of floor finish materials to avoid damage to installed materials.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Basis of design Schluter Systems L.P. 194 Pleasant Ridge Road, Plattsburgh, NY 12901-5841. Phone: (800) 472-4588 www.schluter.com
 - 1. Laticrete International, Inc
 - 2. USG Corporation
- B. Approved Equal. See Section 01630 Product Substitution Procedures.

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2.02 EDGE PROTECTION AND TRANSITION PROFILES FOR FLOORS

A. Schluter®-SCHIENE

- 1. Description: L-shaped profile with 1/8" (3.2 mm) wide top section and vertical wall section that together form the visible surface, integrated trapezoid-perforated anchoring leg, and integrated grout joint spacer.
- 2. Anchoring Leg:
 - a. Provide with straight anchoring leg
 - b. Provide with special radius anchoring leg for radius applications
- 3. Material and Finish:
 - a. E Stainless Steel Type 304 = V2A
- 4. Height as required

B. Schluter®-RENO-T

- 1. Description: T-shaped profile with 1/16" (1 mm) thick beveled exposed surface and 11/32" (9 mm) tall integrated vertical anchoring leg.
- 2. Material and Finish:
 - a. E Stainless Steel Type 304 = V2A
- 3. Width:
 - a. 17/32" (14 mm)
 - b. 1" (25 mm)

C. Schluter®-RENO-TK

- 1. Description: profile with sloped exposed surface, 1/4" (6 mm) deep channel below exposed surface, integrated trapezoid-perforated anchoring leg, and integrated grout joint spacer.
- 2. Anchoring Leg:
 - a. Provide with straight anchoring leg
 - b. Provide with special radius anchoring leg for radius applications
- 3. Material and Finish:
 - a. E Stainless Steel Type 304 = V2A
- 4. Height as required

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D. Schluter®-RENO-U

- 1. Description: profile with sloped exposed surface, 5/32" (4 mm) tall leading edge, integrated trapezoid-perforated anchoring leg, and integrated grout joint spacer.
- 2. Material and Finish:
 - a. E Stainless Steel Type 304 = V2A
- 3. Height as required

E. Schluter®-RENO-RAMP

- 1. Description: anodized aluminum profile with textured, sloped exposed surface, tapered leading edge, integrated trapezoid-perforated anchoring leg, and integrated grout joint spacer.
- 2. Material and Finish:
 - a. AE Satin Anodized Aluminum
- 3. Height as required
- 4. Ramp Length: As needed to maintain 1:50 slope

2.03 FINISHING AND EDGE-PROTECTION PROFILES FOR WALLS

A. Schluter®-RONDEC-DB

- 1. Description: bullnose-type profile with symmetrically rounded visible surface with 1/4" (6 mm) radius, integrated trapezoid-perforated anchoring leg, and integrated grout joint spacer.
- 2. Corners:
 - a. Provide with matching inside corners
 - b. Provide with matching outside corners
 - c. Provide with internal connectors
- 3. Material and Finish:
 - a. E Stainless Steel Type 304 = V2A
- 4. Height as required

2.04 MOVEMENT JOINTS

A. Provide Schluter®-DILEX-AKWS at all tile floors over expansion/construction joints.

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- B. 1. Description: profile with integrated aluminum, trapezoid-perforated anchoring legs, connected by grip bars to a 1/4" (6 mm) wide soft PVC movement zone, which together form the visible surface.
 - 1. 2. Movement Zone Color:
 - a. G Grey
 - 2. Height as required
- C. Provide Schluter®-SCHIENE at all tile floors over saw cut control joints.
 - 1. Description: L-shaped profile with 1/8" (3.2 mm) wide top section and vertical wall section that together form the visible surface, integrated trapezoid-perforated anchoring leg, and integrated grout joint spacer.
 - 2. Anchoring Leg:
 - a. Provide with straight anchoring leg
 - b. Provide with special radius anchoring leg for radius applications
 - 3. Material and Finish:
 - a. E Stainless Steel Type 304 = V2A
 - 4. Height as required

2.05 UNCOUPLING MEMBRANE

- A. Provide Schluter®-DITRA under <u>all tile floors</u> except at showers. Provide seaming membrane at seams and up walls 6" to provide waterproof floor.
 - 1. Description: 1/8" (3 mm) thick, orange, high-density polyethylene membrane with a grid structure of 1/2" x 1/2" (12 mm x 12 mm) square cavities, each cut back in a dovetail configuration, and a polypropylene anchoring fleece laminated to its underside. Conforms to definition for uncoupling membranes in the Tile Council of North America Handbook for Ceramic Tile Installation; and meets or exceeds the requirements of the "American national standard specifications for load bearing, bonded, waterproof membranes for thin-set ceramic tile and dimension stone installation A118.10," and is listed by cUPC®, and is evaluated by ICC-ES (see Report No. ESR-2467 and PMG 1204).
 - 2. Waterproofing seaming membrane:
 - a. Provide with Schluter®-KERDI-BAND Seams and Corners material 0.004" (4 mil) thick, orange polyethylene membrane, with polypropylene fleece laminated on both sides.

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2.06 WATERPROOFING MEMBRANE

- A. Provide Schluter®-KERDI behind all tile all walls.
 - 1. Description: 0.008" (8 mil) thick, orange polyethylene membrane, with polypropylene fleece laminated on both sides, which meets or exceeds the requirements of the "American national standard specifications for load bearing, bonded, waterproof membranes for thin-set ceramic tile and dimension stone installation A118.10," and is listed by cUPC®, and is evaluated by ICC-ES (see Report No. ESR-2467 and PMG 1204).
 - 2. Waterproofing seaming membrane:
 - a. Provide Schluter®-KERDI-BAND Seams and Corners material 0.004" (4 mil) thick, orange polyethylene membrane, with polypropylene fleece laminated on both sides.
 - 3. Waterproofing Accessories:
 - a. Provide Schluter®-KERD-SEAL Mixing Valve seals
 - b. Provide Schluter®-KERD-SEAL pipe seals

2.07 FLOOR DRAIN WITH INTEGRATED BONDING FLANGE

- A. Schluter®-KERDI-DRAIN [Plastic]
 - 1. Install at all floor drain locations that receive a finished floor.
 - 2. Description: floor drain 11-13/16" (300 mm) diameter, trapezoid perforated, sloped integrated bonding flange with thermally laminated polypropylene fleece and grate assembly. Grate assembly includes grate, height adjustment collar, and lateral adjustment ring with trapezoid perforations. Drain listed by UPC® to meet requirements of "International Association of Plumbing and Mechanical Officials Interim Guide Criteria for Floor Drain with Integrated Bonding Flange". Drain type as referenced in methods B422, B422C and B422 STONE of the Tile Council of North America Handbook for Ceramic Tile Installation.
 - 3. Drain Housing Material:
 - a. PVC
 - 4. Grate Material and Finish:
 - a. E Stainless Steel Type 304 = V2A
 - 5. Nominal Grate Size:
 - a. 4" (100 mm) x 4" (100 mm) square

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- 6. Drain Outlet:
 - a. As needed to connect with plumbing.

2.08 SETTING MATERIALS

- A. Schluter®-SET
 - 1. Description: premium unmodified sag-resistant thin-set mortar specifically formulated for use with Schluter membranes and boards. Schluter®-SET is suitable for use with ceramic, porcelain, and stone tile, including large and heavy tile, in conjunction with Schluter®- Systems' uncoupling and waterproofing membranes. Meets the requirements of ANSI A118.1T.
 - 2. Color:
 - a. Grey
- B. Schluter®-ALL-SET
 - 1. Description: specialized sag-resistant modified thin-set mortar specifically formulated for use with Schluter membranes and boards. It is engineered for use both under and over all DITRA and KERDI products. ALL-SET is suitable for use with ceramic, porcelain, and stone tile, including large and heavy tile, in conjunction with Schluter®- Systems' uncoupling and waterproofing membranes. Meets the requirements of ANSI A118.4T, A118.11, and A118.15T.
 - 2. Color:
 - a. Grey
- C. Schluter®-FAST-SET
 - 1. Description: specialized rapid-setting sag-resistant modified thin-set mortar specifically formulated for use with Schluter membranes and boards. It is engineered for use both under and over all DITRA and KERDI products. FAST-SET is suitable for use with ceramic, porcelain, and stone tile, including large and heavy tile, in conjunction with Schluter®-Systems' uncoupling and waterproofing membranes. Meets the requirements of ANSI A118.4TF, A118.11, and A118.15TF.
 - 2. Color:
 - a. Grey

PART 3 - EXECUTION

3.01 INSPECTION/PREPARATION

A. Clean surfaces thoroughly prior to installation.

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B. Review and strictly follow all manufacturer's installation guidelines for surface preparation.

3.02 INSTALLATION

- A. Install materials in strict accordance with manufacturer's recommendations.
- B. Slope setting beds to drains.

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SECTION 09 51 00 ACOUSTICAL CEILINGS

PART 1 - GENERAL

1.01 SUMMARY

- A. Section includes:
 - 1. Suspended metal grid system complete with wall trim.
 - 2. 2 x 2 lay-in ceiling tiles.
- B. Related work:
 - 1. Section 07 21 00 Building Insulation
 - 2. Section 09 29 01 Interior Gypsum Board
 - 3. Division 23 Heating, Ventilation, and Air Conditioning
 - 4. Division 28 Electrical

1.02 SUBMITTALS

- A. Submit detailed product literature to Architect for review.
- B. Submit product samples to Architect for review.

1.03 QUALITY ASSURANCE

- A. Applicator:
 - 1. Shall be approved by the manufacturer.
 - 2. Shall have satisfactorily completed a minimum of 20 installations.

1.04 DELIVERY, STORAGE, AND HANDLING

- A. Do not install acoustical ceilings until the building is enclosed, sufficient heat is provided, dust generating activities have terminated, and overhead mechanical work is completed, tested and approved.
- B. Permit wet work to dry prior to commencement of installation.
- C. Maintain uniform temperatures of minimum 61 degrees F. and humidity of 20 percent to 40 percent prior to, during and after installation.

1.05 WARRANTY

A. 10-year limited warranty on ceiling tiles.

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PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Armstrong (**BASIS** of **DESIGN**)
- B. BPB (Celotex)
- C. Companies with similar experience and expertise.

2.02 SUSPENSION SYSTEM

- A. Standard interior suspension system:
 - 1. Equal to Armstrong Prelude 15/16 inch exposed inverted "tee" with Humiguard Plus performance.
 - 2. Conforms to ASTM C-635 medium duty system.
 - 3. Grid: Exposed tee, all components die cut and interlocking.
 - 4. Accessories: Splices, edge moldings, hold down clips as required to complete and complement suspended ceiling grid system.
 - 5. Materials: 0.020 gauge commercial quality cold-rolled steel; off white enamel finish on exposed surfaces, typical.

2.03 STANDARD LAY-IN PANELS

- A. Standard acoustic tiles:
 - 1. Equal to: Fine Fissured 1728 by Armstrong with Humiguard Plus Performance and BioBlock paint on front and back (inhibits mold and mildew).
 - 2. Mineral fiber composition.
 - 3. 24" x 24" x 5/8" thick, square edge.
 - 4. Fine fissured surface finish.
 - 5. Light reflectance 0.85.
 - 6. UL Classified NRC 0.55, CAC 33.
 - 7. Class A fire resistance.
- B. Provide Owner with one extra package of replacement ceiling tile at project completion.

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2.04 VINYL LAY-IN PANELS

A. Restroom Lay-In Panels:

- 1. Equal to: Clean Room VL 868 by Armstrong with Humiguard Plus Performance and Fire Guard Performance.
- 2. Mineral fiber composition.
- 3. 24" x 24" x 5/8" thick.
- 4. Special vinyl-faced, non-perforated square cut lay-in panel.
- 5. Light reflectance 0.80.
- 6. UL Classified NRC 0.10, CAC 40.
- B. Provide Owner with one extra package of replacement ceiling tile at project completion.

PART 3 - EXECUTION

3.01 COORDINATION

A. Electrical and mechanical work above the suspended ceiling must be strictly coordinated with the work of this section.

3.02 INSTALLATION

- A. Install suspended ceiling systems in accordance with manufacturer's recommendations to produce finished ceiling true to lines and levels and free from warped, soiled or damaged grid or lay-in panels.
- B. Install ceiling systems in a manner capable of supporting all superimposed loads, with maximum permissible deflection of 1/360 of span and maximum surface deviation of 1/8 inch in 10 feet.
- C. Install after major above-ceiling work is complete. Coordinate the location of hangers with other work.
- D. Where ducts or other equipment prevent the regular spacing of hangers, reinforce the nearest adjacent hangers and related carrying channels as required to span the required distance.
- E. Supply hangers or inserts for installation to the respective section in ample time and with clear instructions for their correct placement. Provide additional hangers and inserts as required.
- F. Hang independently of walls, columns, ducts, pipes and conduit. Where carrying members are spliced, avoid visible displacement of the longitudinal axis or face plane of adjacent members.

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- G. Center ceiling systems on room axis leaving equal border pieces.
- H. Do not support fixtures from or on main runners or cross runners if weight of the fixture causes the total dead load to exceed the deflection capability. In such cases, support fixture loads by supplementary hangers located within 6 inches of each corner or support the fixtures independently.
- I. Do not install fixtures so that main runners and cross runners will be eccentrically loaded. Where fixture installation would produce rotation of runners, provide stabilizer bars.
- J. Install edge moldings at intersection of ceiling and vertical surfaces, using maximum lengths, straight, true to line and level. Miter corners. Provide edge moldings at junctions with other ceiling finishes.
- K. Fit acoustic lay-in panels in place, free from damaged edges or other defects detrimental to appearance and function.
- L. Install lay-in panels level, in uniform place and free from twist, warp, and dents.
- M. Prior to beginning installation, verify that required ceiling height does not conflict with work in place or scheduled for execution.

3.03 ADJUSTMENTS/CLEANING

A. Adjust any sags or twists which develop in the ceiling system and replace any part which is damaged or faulty.

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SECTION 09 52 00

SUSPENDED GYPSUM BOARD CEILING

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes
 - 1. Suspension system for gypsum board ceiling and soffit.
- B. Related Sections
 - 1. Section 06 10 00 Rough Carpentry
 - 2. Section 09 22 16.13 Non Structural Metal Stud Framing
 - 3. Section 09 29 01 Interior Gypsum Board

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Metal Joists: Minimum of 18 gauge at 16" o.c. Align directly over metal studs when bearing on a wall assembly. A minimum of 16-gauge joists required at floor systems.
- B. Approved fasteners shall be devices recommended by stud system manufacturer in current printed instructions.

2.02 SUSPENDED GYPSUM BOARD CEILING

- A. Equal to Chicago Metallic system. Main runner spacing: 4'-0" o.c.; furring channel/tees spacing: 16" o.c.
- B. Rated as required.

PART 3 - EXECUTION

3.01 ERECTION

A. Blocking: Secure wood blocking to suspended ceiling system as required.

3.02 TOLERANCES

A. Install members to provide surface plane with maximum variation of 1/8 inch in 10 feet in any direction.

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SECTION 09 65 13.13 RESILIENT BASE

PART 1 - GENERAL

1.01 WORK INCLUDED

- A. Preparation of substrate surfaces.
- B. Provide and install rubber base (refer to Room Finish Schedule).
- C. Cleaning of all surfaces and areas of work.

1.02 REFERENCES

A. FS SS-W-40 - Wall Base: Rubber and Vinyl Plastic.

1.03 SUBMITTALS

A. Include samples of each base material, and color selected.

1.04 ENVIRONMENTAL REQUIREMENTS

- A. Maintain minimum 70 degrees F. air temperature at flooring installation area for three days prior to, during and for 24 hours after installation.
- B. Store flooring materials in area of application. Allow three days for material to reach equal temperature as area.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Johnsonite
- B. Flexco (BASIS of DESIGN)
- C. Roppe

2.02 MATERIALS

- A. Base: Conforming to FS SS-W-40, rubber, rolled, (48" pieces are allowed in special situations with Architect's approval), 4 inch high, 1/8 inch thick including pre-molded end stops and external corners.
- B. Color: refer to Sheet A6.2 (Finish Legend)
- C. Rubber Base Adhesive: As recommended by base manufacturer.

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PART 3 - EXECUTION

3.01 INSTALLATION

- A. If existing spaces include new partitions which require new rubber base, the contractor shall replace all room rubber base to ensure a uniform and complete installation.
- B. Fit joints tight and vertical. Maintain minimum measurement of 18 inches between joints.
- C. Miter internal corners. Use premolded sections for external corners and exposed ends.
- D. Install rubber base on solid backing. Adhere tightly to wall and floor surfaces.
- E. Scribe and fit to door frames and other obstructions.
- F. Install straight and level to variation of plus or minus 1/8 inch over 10 feet.
- G. Take special care to avoid glue smears on finished walls and on carpet.
- H. Rubber cove base (4") required at all base cabinets.

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SECTION 09 65 20

LUXURY VINYL TILE FLOORING (LVT)

PART 1 - GENERAL

1.01 WORK INCLUDED:

- A. Preparation of substrate surfaces.
- B. Provide all materials, labor, equipment and services necessary for supply and installation of flooring materials as indicated on the drawings and specified herein.
- C. Provide and install transition strips between dissimilar flooring materials.
- D. Cleaning of all surfaces and areas of work.

1.02 RELATED SECTIONS

- A. Section 01 25 13 Product Substitution Procedures
- B. Section 01 33 00 Submittal Procedures
- C. Section 03 30 00 Cast in Place Concrete (Building Only)

1.03 QUALITY ASSURANCE AND REGULATORY REQUIREMENTS

A. If required, provide resilient flooring and accessories supplied by one manufacturer, including leveling and patching compounds, and adhesives.

1.04 SUBMITTALS

- A. Reference Section 01 33 00 Submittal Procedures. Submittals which require a material color or finish selection shall submit physical color or finish material samples directly to Architect.
- B. Submit the manufacturer's standard samples showing the required colors for flooring and applicable accessories.

1.05 ENVIRONMENTAL CONDITIONS

- A. Deliver materials in good condition to the jobsite in the manufacturer's original unopened containers that bear the name and brand of the manufacturer, project identification, and shipping and handling instructions.
- B. Store materials in a clean, dry, enclosed space off the ground, and protected from the weather and from extremes of heat and cold. Protect adhesives from freezing. Store flooring, adhesives and accessories in the spaces where they will be installed for at least 48 hours before beginning installation.
- C. Maintain a minimum temperature in the spaces to receive the flooring and accessories of [65°F (18°C) and a maximum temperature of 100°F (38°C)] [85°F (29°C) for Epoxy

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Adhesive] for at least 48 hours before, during, and for not less than 48 hours after installation. Thereafter, maintain a minimum temperature of 55°F (13°C) in areas where work is completed. Protect all materials from the direct flow of heat from hot-air registers, radiators, or other heating fixtures and appliances.

D. Install flooring and accessories after the other finishing operations, including painting, have been completed. Close spaces to traffic during the installation of the flooring. Do not install flooring over concrete slabs until they are sufficiently dry to achieve a bond with the adhesive, in accordance with the manufacturer's recommended bond and moisture tests.

1.06 JOB CONDITIONS

A. Contractor must examine the substrates and supporting structure and the conditions under which the work is to be installed, and notify the Architect of conditions detrimental to the work. Do not proceed with the installation until unsatisfactory conditions have been corrected in a manner acceptable to the installer and the Architect. Initiation of installation indicates acceptance of substrate and existing conditions.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Earthwerks
- B. Shaw Contract
- C. J+J Flooring (**BASIS of DESIGN**)
- D. or Equal

2.02 MATERIALS

A. Refer to Sheet A6.2 (Finish Legend)

2.03 ACCESSORIES

A. Provide all available coordinating transition pieces to meet installation application for finishing and transitioning to other flooring products. Install in accordance with manufacturer's guidelines and intended use.

2.04 EXTRA MATERIALS

- A. Provide five (5%) percent of overage of each type and color used on each project floors, walls and base tile.
- B. Store in location as directed by Owner

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PART 3 - EXECUTION

3.01 INSPECTION

- A. Examine subfloors prior to installation to determine that surfaces are smooth and free from cracks, holes, ridges, and other defects that might prevent adhesive bond or impair durability or appearance of the flooring material.
- B. Inspect subfloors prior to installation to determine that surfaces are free from curing, sealing, parting and hardening compounds; residual adhesives; adhesive removers; and other foreign materials that might prevent adhesive bond. Visually inspect for evidence of moisture, alkaline salts, carbonation, dusting, mold, or mildew
- C. Report conditions contrary to contract requirements that would prevent a proper installation. Do not proceed with the installation until unsatisfactory conditions have been corrected.
- D. Failure to call attention to defects or imperfections will be construed as acceptance and approval of the subfloor. Installation indicates acceptance of substrates with regard to conditions existing at the time of installation.

3.02 PREPARATION

- A. Smooth concrete surfaces, removing rough areas, projections, ridges, and bumps, and filling low spots, control or construction joints, and other defects as recommended by the flooring manufacturer.
- B. Remove paint, varnish, oils, release agents, sealers, and waxes. Removal residual adhesives as recommended by the flooring manufacturer. Remove curing and hardening compounds not compatible with the adhesives used, as indicated by a bond test or by the compound manufacturer's recommendations for flooring. Avoid organic solvents.
- C. Perform subfloor moisture testing in accordance with ASTM F 2170, "Standard Test Method for Determining Relative Humidity in Concrete Slabs Using in-situ Probes" ASTM F 1869, "Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride" and Bond Test.
- D. Perform pH tests on concrete floors regardless of their age or grade level. All test results shall be documented and retained.
- E. Vacuum or broom-clean surfaces to be covered immediately before the application of flooring. Make subfloor free from dust, dirt, grease, and all foreign materials.

3.03 INSTALLATION OF FLOORING

- A. Install flooring in strict accordance with manufacturers installation instructions
- B. Install flooring wall to wall before the installation of furniture, equipment, etc. Extend flooring into toe spaces, door recesses, closets, and similar openings as shown on the drawings.

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- C. Scribe, cut, and fit to permanent fixtures, columns, walls, partitions, pipes, outlets, and built-in furniture and cabinets.
- D. Install flooring with tools, and procedures in strict accordance with the manufacturer's written instructions. Observe the recommended adhesive trowel notching, open times, and working times.

3.04 INSTALLATION OF ACCESSORIES

- A. Apply top set wall base to walls, columns, casework, and other permanent fixtures in areas where top-set base is required. Install base in lengths as long as practical, with inside corners fabricated from base materials that are mitered or coped. Tightly bond base to vertical substrate with continuous contract or horizontal and vertical surfaces.
- B. Fill voids with plastic filler along the top edge of the resilient wall base or integral cove cap on masonry surfaces or other similar irregular substrates.
- C. Place resilient edge strips tightly butted to flooring, and secure with adhesive recommended by the edge strip manufacturer. Install edge strips at edges of flooring that would otherwise be exposed.
- D. Apply edge strips after flooring installation. Secure units to the substrate, complying with the edge strip manufacturer's recommendations

3.05 CLEANING AND PROTECTION

- A. Perform initial maintenance according to the latest edition of manufacturers recommendations
- B. Protect installed flooring as recommended by the flooring manufacturer against damage from rolling loads, other trades, or the placement of fixtures and furnishings.

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SECTION 09 67 00 RESINOUS FLOORING

PART 1 - GENERAL

1.01 WORK INCLUDED

- A. Provide and install resinous flooring
 - 1. Refer to Sheet A1.3 (Surface and Pattern Floor Plan)
 - 2. Refer to Sheet A6.2 (Room Finish Schedule)

1.02 QUALITY ASSURANCE

- A. Installer Qualifications: Engage an experienced installer (applicator) who is experienced in applying resinous flooring systems similar in material, design, and extent to those indicated for this Project, whose work has resulted in applications with a record of successful in-service performance, and who is acceptable to resinous flooring manufacturer.
 - 1. Engage an installer who is certified in writing by resinous flooring manufacturer as qualified to apply resinous flooring systems indicated.
 - 2. The contractor shall have completed at least 10 projects of similar size and complexity.
- B. Source Limitations: Obtain primary resinous flooring materials, including primers, resins, hardening agents, grouting coats, and topcoats, through one source from a single manufacturer, with not less than ten years of successful experience in manufacturing and installing principal materials described in this section. Provide secondary materials, including patching and fill material, joint sealant, and repair materials, of type and from source recommended by manufacturer of primary materials.
- C. Manufacturer Field Technical Service Representatives: Resinous flooring manufacturer shall retain the services of Field Technical Service Representatives who are trained specifically on installing the system to be used on the project.
 - 1. Field Technical Services Representatives shall be employed by the system manufacturer to assist in the quality assurance and quality control process of the installation and shall be available to perform field problem solving issues with the installer.
- D. Mockups: Provide mockups to verify selections made under sample submittals and to demonstrate aesthetic effects (color and texture) and set quality standards for materials and execution.
 - 1. Apply full-thickness mockups on 48-inch square floor area selected by Architect.
 - a. Include 48-inch length of integral cove base.

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- 2. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.
- 3. Sign off from Architect and Owner/Owners agent on texture for slip resistance must be complete before installation of flooring system.

E. Pre-installation Conference:

1. The general contractor shall arrange a meeting not less than thirty days prior to starting work.

2. Attendance:

- a. General Contractor
- b. Architect/Owner's Representative.
- c. Manufacturer/Installer's Representative.

1.03 SUBMITTALS

- A. Product Data: For each type of product indicated. Include manufacturer's technical data, application instructions, and recommendations for each resinous flooring component required.
- B. Samples for Verification: For each resinous flooring system required, 6 inches (150 mm) square, applied to a rigid backing by Installer for this Project.
- C. Product Schedule: Use resinous flooring designations indicated in Part 2 and room designations indicated on Drawings in product schedule.
- D. Installer Certificates: Signed by manufacturer certifying that installers comply with specified requirements.
- E. Maintenance Data: For resinous flooring to include in maintenance manuals.

1.04 PROJECT CONDITIONS

- A. Environmental Limitations: Comply with resinous flooring manufacturer's written instructions for substrate temperature, ambient temperature, moisture, ventilation, and other conditions affecting resinous flooring application.
 - 1. Maintain material and substrate temperature between 65 and 85 deg F (18 and 30 deg C) during resinous flooring application and for not less than 24 hours after application.
- B. Lighting: Provide permanent lighting or, if permanent lighting is not in place, simulate permanent lighting conditions during resinous flooring application.
- C. Close spaces to traffic during resinous flooring application and for not less than 24 hours after application, unless manufacturer recommends a longer period.

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D. Concrete substrate shall be properly cured for a minimum of 30 days. A vapor barrier must be present for concrete subfloors on or below grade. Otherwise, an osmotic pressure resistant or moisture vapor mitigating grout must be installed prior to the resinous flooring

1.05 WARRANTY

A. Manufacturer shall furnish a single, written warranty covering both material and workmanship for a period of (1) full years from date of substantial completion or provide a joint and several warranty signed on a single document by material manufacturer and applicator jointly and severally warranting the materials and workmanship for a period of (1) full year from substantial completion.

PART 2 - PRODUCTS

2.01 RESINOUS FLOORING

Products:

- 1. Equal to Stonhard, Inc.; Stonclad GS®. With topcoat Stonkote GS4.
 - a. Contact: L. Chris Eicher 615.424.2224 or ceicher@stonhard.com.
- C. System Characteristics:
 - 1. Wearing Surface: Include heavy texture at showers and medium texture at all other areas in bid. Contractor shall provide heavy texture mock-up in a 4'x4' medium texture mock-up in the storage room for final approval by Owner and Architect.
 - 2. Color: refer to Sheet A6.2 (Finish Legend)
 - 3. Integral Cove Base: not required
 - 4. Overall System Thickness: 3/16"
- D. System Components: Manufacturer's standard components that are compatible with each other and as follows:
 - 1. Primer:
 - a. Material Design Basis: Stonhard Standard Primer
 - b. Resin: Bisphenol-A epoxy
 - c. Formulation Description: 100% solids
 - d. Application Method: squeegee and backroll

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- E. Number of Coats: one
 - 2. Mortar Base:
 - a. Material design basis: Stonclad GS
 - b. Resin: Epoxy.
 - c. Formulation Description: 100 percent solids.
 - d. Application Method: Metal Trowel.
 - 1) Thickness of Coats: 3/16 inch (4.8 mm).
 - 2) Number of Coats: One.
 - e. Aggregates: Pigmented Blended aggregate.
 - 3. Top Coat: Chemical resistant
 - a. Material design basis: Stonkote GS4
 - b. Resin: Bisphenol A (epoxy coating)
 - c. Formulation description: 100% solids.
 - d. Type: pigmented.
 - e. Finish: Standard. Slip resistant texture optional.
 - f. Number of Coats: one.

2.02 ACCESSORY MATERIALS

- A. Patching and Fill Material: Resinous product of or approved by resinous flooring manufacturer and recommended by manufacturer for application indicated.
- B. Joint Sealant: Type recommended or produced by resinous flooring manufacturer for type of service and joint condition indicated.

PART 3 - EXECUTION

3.01 PREPARATION

- A. General: Prepare and clean substrates according to resinous flooring manufacturer's written instructions for substrate indicated. Provide clean, dry, and neutral Ph substrate for resinous flooring application.
- B. Concrete Substrates: Provide sound concrete surfaces free of laitance, glaze, efflorescence, curing compounds, form-release agents, dust, dirt, grease, oil, and other contaminants incompatible with resinous flooring.

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- 1. Mechanically prepare substrates as follows:
 - a. Shot-blast surfaces with an apparatus that abrades the concrete surface, contains the dispensed shot within the apparatus, and recirculates the shot by vacuum pickup.
 - b. Comply with ASTM C 811 requirements unless manufacturer's written instructions are more stringent.
- 2. Repair damaged and deteriorated concrete according to resinous flooring manufacturer's written recommendations.
- 3. Verify that concrete substrates are dry.
 - a. Perform in situ probe test, ASTM F 2170. Proceed with application only after substrates do not exceed a maximum potential equilibrium relative humidity of 85 percent.
 - b. Perform anhydrous calcium chloride test, ASTM F 1869. Proceed with application only after substrates have maximum moisture-vapor-emission rate of 7 lb. of water/1000 sq. ft. of slab in 24-hours.
 - c. Perform additional moisture tests recommended by manufacturer. Proceed with application only after substrates pass testing.
- 4. Verify that concrete substrates have neutral Ph and that resinous flooring will adhere to them. Perform tests recommended by manufacturer. Proceed with application only after substrates pass testing.
- C. Resinous Materials: Mix components and prepare materials according to resinous flooring manufacturer's written instructions.
- D. Use patching and fill material to fill holes and depressions in substrates according to manufacturer's written instructions.
- E. Treat control joints and other nonmoving substrate cracks to prevent cracks from reflecting through resinous flooring according to manufacturer's written recommendations. Provide Stonflex MP7 joint fill material, and CT5 concrete crack treatment.

3.02 APPLICATION

- A. General: Apply components of resinous flooring system according to manufacturer's written instructions to produce a uniform, monolithic wearing surface of thickness indicated.
 - 1. Coordinate application of components to provide optimum adhesion of resinous flooring system to substrate, and optimum intercoat adhesion.

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- 2. Cure resinous flooring components according to manufacturer's written instructions. Prevent contamination during application and curing processes.
- 3. At substrate expansion and isolation joints, provide joint in resinous flooring to comply with resinous flooring manufacturer's written recommendation.
- 4. Undercoat: Remove any surface irregularities by lightly abrading and vacuuming the floor surface. Mix and apply undercoat with strict adherence to manufacturer's installation procedures and coverage rates.
- 5. Broadcast: Immediately broadcast quartz silica aggregate into the undercoat using manufacturer's specially designed spray-caster. Strict adherence to the manufacturer's installation procedures and coverage rates is imperative.
- 6. Apply topcoat(s) in number of coats indicated for flooring system and at spreading rates recommended in writing by manufacturer.

3.03 TERMINATIONS

- A. Chase edges to "lock" the coating system into the concrete substrate along lines of termination.
- B. Penetration Treatment: Lap and seal coating onto the perimeter of the penetrating item by bridging over compatible elastomer at the interface to compensate for possible movement. Install thermal isolation construction detail where applicable and indicated in detail drawings.
- C. Trenches: Continue coating system into trenches to maintain monolithic protection. Treat cold joints to assure bridging of potential cracks.
- D. Treat floor drains by chasing the coating to lock in place at point of termination. Install thermal isolation construction detail where applicable and indicated in detail drawings.

3.04 JOINTS AND CRACKS

- A. Treat control joints to bridge potential cracks and to maintain monolithic protection.
- B. Treat cold joints and construction joints to bridge potential cracks and to maintain monolithic protection on horizontal and vertical surfaces as well as horizontal and vertical interfaces.
- C. Discontinue floor coating system at vertical and horizontal contraction and expansion joints by installing backer rod and compatible sealant after coating installation is completed. Provide sealant type recommended by manufacturer for traffic conditions and chemical exposures to be encountered.

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3.05 FIELD QUALITY CONTROL

- A. Material Sampling: Owner may at any time and any numbers of times during resinous flooring application require material samples for testing for compliance with requirements.
 - 1. Owner will engage an independent testing agency to take samples of materials being used. Material samples will be taken, identified, sealed, and certified in presence of Contractor.
 - 2. Testing agency will test samples for compliance with requirements, using applicable referenced testing procedures or, if not referenced, using testing procedures listed in manufacturer's product data.
 - 3. If test results show applied materials do not comply with specified requirements, pay for testing, remove noncomplying materials, prepare surfaces coated with unacceptable materials, and reapply flooring materials to comply with requirements.

3.06 CLEANING, PROTECTING, AND CURING

- A. Cure resinous flooring materials in compliance with manufacturer's directions, taking care to prevent contamination during stages of application and prior to completion of curing process. Close area of application for a minimum of 18 hours.
- B. Protect resinous flooring materials from damage and wear during construction operation. Where temporary covering is required for this purpose, comply with manufacturer's recommendations for protective materials and method of application. General Contractor is responsible for protection and cleaning of surfaces after final coats.
- C. Cleaning: Remove temporary covering and clean resinous flooring just prior to final inspection. Use cleaning materials and procedures recommended by resinous flooring manufacturer

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SECTION 09 91 00 PAINTING

PART 1 - GENERAL

1.01 WORK INCLUDED

- A. Preparation of interior and exterior surfaces to receive paint, stain and sealant.
- B. Prime and paint the following interior materials and items (see Room Finish Schedule):
 - 1. All hollow metal frames.
 - 2. All gypsum board walls, furr-downs, and exposed gypsum board ceilings.
 - 3. All exposed concrete masonry units.
 - 4. All exposed metal fabrications.
- C. Prime and paint the following exterior materials and items:
 - 1. All hollow metal frames and doors.
 - 2. All exposed metal fabrications.
 - 3. Traffic stripes.
 - 4. Exterior wood.
 - 5. Exterior soffit.
 - 6. All roof penetrations to match color of roof.
- D. Staining and clear finish are required on the following:
 - 1. Wood doors/wood windows.
 - 2. Birch millwork.
 - 3. Wood trim.
 - 4. Wood windows and trim.

1.02 RELATED WORK

A. Section 07 92 00 – Joint Sealant

1.03 QUALITY ASSURANCE

A. Include on Label of Containers:

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- 1. Manufacturer's Name.
- 2. Type of Paint.
- 3. Manufacturer's stock number.
- 4. Color.

1.04 DELIVERY, STORAGE AND HANDLING

- A. Deliver paint materials in sealed original labeled containers, bearing manufacturer's name, type of paint, brand name, color designation and instructions for mixing and or reducing.
- B. Provide adequate storage facilities. Store paint material at minimum ambient temperature of 45 degrees F in well ventilated area.
- C. Take precautionary measures to prevent fire hazards and spontaneous combustions.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Sherwin Williams (**BASIS of DESIGN**)
- B. Devoe
- C. Benjamin Moore
- D. Pittsburgh Paint
- E. Farrell Calhoun
- F. Approved Equal.

2.02 MATERIALS

- A. Paint, varnish, stain, enamel and fillers: Type and blend listed herein or equivalent products approved by Architect. Prime/paint schedule based on products of Sherwin Williams.
- B. Paints: Ready-Mixed field catalyzed coatings. Pigments fully ground maintain a soft paste consistency, capable to readily and uniformly disperse to a complete homogeneous mixture.
- C. Paints to have good flowing and brushing properties and be capable of dry or curing free of streaks or sags.

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2.03 COLORS

1. Refer to Sheet A6.2 (Finish Legend)

2.04 MIXING AND TINTING

- A. Deliver all paints ready-mixed to the job site.
- B. Accomplish job mixing and job tinting only when acceptable to the Architect.
- C. Mix only in mixing pails in suitable sized non-ferrous or oxide resistant metal pans.
- D. Use tinting colors recommended by manufacturer for the specific type of finish.

PART 3 - EXECUTION

3.01 INSPECTION

- A. Thoroughly examine surfaces scheduled to be painted or stained prior to commencement of work. Report in writing to Architect any condition that may potentially affect proper application. Do not commence until such defects have been corrected. Initiation of painting and staining work indicates acceptance of substrate condition.
- B. Correct defects and deficiencies in surfaces which may adversely affect work of this section.

3.02 ENVIRONMENTAL REQUIREMENTS

- A. Do not apply finishes unless moisture contents of surfaces are below the following maximums:
 - 1. Plaster and gypsum wallboards: 12 percent.
 - 2. Masonry, concrete and concrete block: 12 percent.
 - 3. Interior Located Wood: 15 percent.
- B. Ensure surface temperature or the surrounding air temperature is above 40 degrees F. before applying finishes. Minimum application temperatures for latex paints for interior work is 45 degrees F. and 50 degrees F. for exterior work. Minimum application temperature for varnish finishes is 65 degrees F.
- C. Provide adequate continuous ventilation and sufficient heating facilities to maintain temperatures above 45 degrees F. for 24 hours before, during and 48 hours after application of finishes.
- D. Provide minimum 25 foot candles of lighting on surfaces to be finished.
- E. Comply with Manufacturer's recommendations as to environmental conditions under which coatings and coating systems can be applied.

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- F. Do not apply finish in areas where dust is being generated.
- G. Allow asphaltic paving to cure 14 days minimum before applying traffic stripes.

3.03 PROTECTION

- A. Adequately protect other surfaces from paint and damage. Repair damage as a result of inadequate or unsuitable protection.
- B. Furnish sufficient drop cloths, shields, and protective equipment to prevent spray or droppings from fouling surfaces not being painted and in particular, surfaces within storage and preparation area.
- C. Place cotton waste, cloth, and material which may constitute a fire hazard in closed metal containers and remove daily from site.
- D. Remove electrical plates, surface hardware, fittings and fastenings, prior to painting operations. These items are to be carefully stored, cleaned and replaced on completion of work in each area. Do not use solvents to clean hardware that may remove permanent lacquer finish.
- E. Painting is not required on any of the following unless specifically called for elsewhere in contract documents.
 - 1. Acoustical materials.
 - 2. Stainless steel, copper or anodized aluminum.
 - 3. Aluminum window/door frames and aluminum doors.
 - 4. Pre-finished wood doors
 - 5. Metal roof panels, flashing, and gutters/downspouts.
 - 6. Concealed pipes, ductwork and equipment.
 - 7. Factory finished doors and frames.
 - 8. Factory finished shelves, cabinets and similar material.

3.04 PREPARATION

A. Woodwork

- 1. Back-prime any new exterior woodwork.
- 2. Wipe off dust and grit from miscellaneous wood items and millwork prior to priming. Spot coat knots, pitch streaks, and sappy sections with sealer. Scrape and sand wood surfaces to insure uniform appearance. Clean Woodwork.

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- 3. Nail holes must be puttied after prime or undercoat, then sanded smooth. Putty or wood filler must match color of finish where clear coat is specified.
- 4. Where paint finish is specified for new interior wood, prime entire surface with a penetrating undercoat.
- 5. Check moisture content with a moisture meter before initiating priming/painting work.

B. Ferrous Metal

- 1. Remove all rust and mill scale from surfaces requiring exposed finish coat of paint.
- 2. Prior to blast cleaning, contamination shall be removed from steel surfaces. Remove oil and grease by solvent cleaning.
- 3. Prepare ferrous metal surfaces in strict accordance with rust-inhibitive primer manufacturer's instructions.
- 4. Wash unprimed galvanized metal with a solution of chemical phosphoric metal etch and allow to completely dry.
- 5. Sand and scrape shop primed steel surfaces to remove loose primer and rust. Feather out edges to make touch-up patches inconspicuous. Clean surfaces with solvent. Prime bare steel surfaces.

C. Galvanized Metals

- 1. Galvanized steel surfaces requiring painting must be solvent cleaned to remove all traces of grease or oil before priming as per specification.
- 2. Etching type primer required.

D. New Gypsum Board

- 1. New gypsum board must be free of sanding dust and joint treatment cement must be thoroughly dry.
- 2. Steel corner beadings should be primed with appropriate metal primer before applying latex coatings.

E. Concrete Masonry Units

- 1. At concrete masonry units, remove mortar and other foreign matter.
- 2. Fill large voids, caulk joints and cracks. Repair mortar as required.
- 3. Blow dust off materials with compressed air.
- 4. Check moisture content with a moisture meter before initiating prime/paint work.

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3.05 SCAFFOLDS, LADDERS AND PROTECTION

- A. Contractor must furnish all required ladders, stages, scaffolds, etc. and they must be in safe condition, having adequate strength to support maximum work load, and complying with all current OSHA regulations.
- B. Scaffolds, ladders, etc. must not be left where they would interfere with other workmen, when not in daily use.
- C. Contractor must not only protect his work, but also that of other trades.
- D. Contractor is responsible for removal of all paint or coating splatter, spills, etc. on floors or adjacent colors, material, glass, hardware and other finished surfaces.
- E. Contractor must leave premises clean and free from all rubbish and accumulated material left from his work.

3.06 APPLICATION

- A. Do not apply initial coating (primer) until moisture content of surfaces are within limitations recommended by paint manufacturer.
- B. Apply primer and paint with suitable brushes or rollers.
 - 1. Rate of Application shall not exceed that as recommended by paint manufacturer for the surface involved less 10% allowance for loss.
 - 2. Keep brushes, rollers, and spraying equipment clean, dry, free from contaminates and suitable for finish required.
 - 3. Apply primer and paint by brush or roller.
- C. Comply with recommendations of product manufacturer for drying time between coats.
- D. Sand and dust between each coat to remove defects visible from a distance of six feet.
- E. Finish coats shall be smooth, free of brush marks, streaks, laps or pile-up of paints, and skipped or missed areas.
- F. Finished metal surfaces shall be free of skips, voids, or pinholes.
- G. Leave all parts of molding and ornaments clean and true to details with no undue amount of paint in corners and depressions.
- H. Make edges of paint adjoining other material or colors clean and sharp with no overlapping.
- I. Refinish whole wall, if necessary, where portion of finish has been damaged or is not acceptable.

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- J. Back-prime any new exterior woodwork with house paint primer prior to installation. Runs on face not permitted.
- K. Spot painting to correct soiled or damaged paint surfaces will be allowed only when touch up is blended into surrounding finish and is invisible to normal viewing. Otherwise, re-coat entire section to corners or visible stopping point.
- L. Prime top and bottom edges of wood and metal doors with enamel undercoat when they are to be painted.
- M. Prime top and bottom edges of wood and metal doors with gloss varnish when they are to receive a stain or clear finish.
- N. When paint, stain or coating is roller applied, proper skill must be used to avoid all signs of lapping and excess paint lines from edge of roller. When cutting in with a brush is required, these areas must be of the same texture, color and hiding as adjacent areas, to assure good appearance.
- O. All metal surfaces scheduled to be painted shall be washed with mineral spirits to remove dirt, oil or grease prior to painting.
- P. Approximately 25% of walls will require accent colors in saturated color. These walls may require an additional coat of paint for coverage.

3.07 CLEANING

- A. Touch up and restore finish where damaged.
- B. Remove spilled, splashed or splattered paint from all surfaces.
- C. <u>Leave storage area clean</u>. Remove from site any and all empty paint containers and debris from painting operation.

3.08 MECHANICAL AND ELECTRICAL EQUIPMENT

- A. Refer to mechanical and electrical sections with respect to painting and finishing requirements.
- B. Remove grilles, covers and access panels for mechanical and electrical systems from location and paint separately.
- C. Finish paint primed equipment to color selected.
- D. Where exposed, prime and paint insulated and bare pipes, conduits, boxes, insulated and bare duct, hangers, brackets, collars and supports, except where items are plated or covered with a pre-finished coating.
- E. Replace identification markings on mechanical or electrical equipment when painted over or splattered.

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F. Paint both sides of plywood backboards for electrical equipment before installing backboards and mounting equipment on them.

3.09 PRIME/PAINT SCHEDULE

Note: Schedule is written on Sherwin Williams Products. All finishing requirements (except traffic stripes) are based on and shall be a three (3) coat system.

A. Exterior Surfaces:

1. Woodwork (Siding and Trim):

Back-priming required.

1 coat A-100 Exterior Oil Wood Primer 2 coats A-100 Exterior Latex Flat/Satin or Gloss

2. Wood Doors and Windows:

1 coat A-100 Exterior Oil Wood Primer 2 coats A-100 Exterior Latex Flat/Satin or Gloss

3. Ferrous Metal (Iron and Steel):

1 coat Kem Bond HS Universal Primer or 1 coat DTM Acrylic Primer/Finnish

2 coats A-100 Exterior Latex Flat/Satin or Gloss

4. Galvanized Iron:

1 coat Galvite HS @ 3.0 – 4.5 mils dft/ct

2 coats DTM Acrylic Coating @ 2.5 – 4.0 mils dft/ct or 2 coats Metalatex Semi-Gloss Enamel

5. Metal Doors, Windows and Frames:

1 coat Kem Kromik Universal Metal Primer 2 coats Industrial Semi-Gloss Enamel

6. Masonry (Painted):

1 coat Loxon Exterior Acrylic Masonry Primer 2 coats A-100 Exterior Latex Flat/Satin or Gloss

7. Traffic Stripes:

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2 coats yellow or white traffic paint

2 coats H.C. blue at H.C. areas

8. Gypsum Board Soffits:

1 coat A-100 Exterior Latex Primer 2 coats A-100 Exterior Latex Flat

9. Concrete & Cement Plaster:

1 coat MasterProtect P 150 Primer 2 coats MasterProtect HB 400

B. Interior Surfaces:

1. Gypsum Board & Plaster (Ceilings, Eggshell Finish):

1 coat PrepRite Classic Interior Latex Primer 2 coats ProMar 200 Interior latex Eggshell Wall Paint

2. Gypsum Board (Epoxy):

1 coat PrepRite 200 Interior Latex Primer 2 coats Water Based Catalyzed Epoxy

3. Gypsum Board (Semi-Gloss):

1 coat PrepRite 200 High Build Interior Latex Primer/Surfacer B28W601 2 coats ProMar 200 Interior Latex Semi-Gloss Paint

4. Concrete Block (Eggshell):

2 coats minimum of ProMar Interior Exterior Block Filler as required to fill surface with a solid coat of filler which penetrates holes, surface imperfections, etc. and seals the surface prior to application of paint. The Architect shall approve the block filler application prior to application of the paint finish.

2 coats ProMar 200 Interior Latex Eggshell

5. Concrete Block (Epoxy):

2 coats minimum of ProMar Interior Exterior Block Filler as required to fill surface with a solid coat of filler which penetrates holes, surface imperfections, etc. and seals the surface prior to application of paint. The Architect shall approve the block filler application prior to application of the paint finish.

2 coats Water Based Catalyzed Epoxy or 2 coats Sher-Tile HS Epoxy

6. Woodwork (Painted):

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1 coat PrepRite Classic Interior Latex Primer

2 coats ProClassic Waterborne Acrylic Finish or2 coats Promar 200 Interior Latex or Alkyd Enamels

2 could I formar 200 interior bates of Tringa Bitaine

7. Woodwork (Stained/Clear Finish):

1st coat Oil Stain or Sealer
 Sand/Steel Wool
 2nd Top Coat with Oil Base Varnish or Polyurethane Varnish
 3rd Finish Coat with Oil Base Varnish or Polyurethane Varnish (Satin)

8. Metal Doors, Windows, and Frames:

1 coat Kem Kromik Universal Metal Primer 2 coats Alkyd Semi-Gloss Enamel

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SECTION 10 11 16 MARKER BOARDS

PART 1 - GENERAL

1.01 WORK INCLUDED

A. Provide and install marker boards in areas designated and shown on drawings.

1.02 SUBMITTALS

A. Submit a digital copy of manufacturer's descriptive literature and shop drawings for Architect's review.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Shall be equal to those as manufactured by CLARIDGE, Harrison, Arkansas, telephone: 870-743-2200.

2.02 MARKER BOARDS

- A. LCS white porcelain enamel writing surface, with markers and eraser. 24-gauge porcelain enamel steel skin.
- B. Series 1 aluminum frame (clear anodized) with No. 502A head trim with tack strip (cork), continuous marker tray, and 2" clip angle hangers at 2'-0" o.c.
- C. Size: 4'-0" H x 8'-0" W as shown in the drawings.
- D. Anchor bolts.
- E. Provide two (2) map hooks per board.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Provide solid blocking at top and bottom of unit. Secure to wall at top and bottom utilizing manufacturer's standard mounting details and hardware.

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SECTION 10 11 23

TACK BOARDS

PART 1 - GENERAL

1.01 WORK INCLUDED

A. Provide and install tack boards in areas designated and shown on drawings.

1.02 SUBMITTALS

A. Submit a digital copy of manufacturer's descriptive literature and shop drawings for Architect's review.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Shall be equal to those as manufactured by CLARIDGE, Harrison, Arkansas, telephone: 870-743-2200.

2.02 TACKBOARDS

- A. Tackboard material equal to Calyx by Claridge Cork
 - 1. Pre-selected color: 1109 Buff
- B. Series 1 aluminum frame (clear anodized), and 2" clip angle hangers at 2'-0" o.c.
- C. Size: 4'-0" H x 4'-0" W as shown in the drawings.
- D. Anchor bolts.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Provide solid blocking at top and bottom of unit. Secure to wall at top and bottom utilizing manufacturer's standard mounting details and hardware.

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SECTION 10 14 13 INTERIOR SIGNAGE

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Engraved name and number plates at all spaces as scheduled on Door Schedule.

1.02 REFERENCES

A. ADA – Americans with Disabilities Act, Accessibility Guidelines.

1.03 SUBMITTALS

A. Submit manufacturer's product data and installation instructions. Color to be selected by Owner and Architect. Submit schedule of signage to Architect for approval by Owner.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. See Touch Graphics, Inc., RP 100.
- B. Mohawk Sign Systems, 200A-Type D.
- C. ASI Sign Systems, Intouch.
- D. Supersine, Acrylic.
- E. Or approved equal.

2.02 COMPONENTS

A. Minimum Size:

- 1. Type 1: 6" x 8" (without changeable message, ADA).
- 2. Type 2: 6" x 8" (without changeable message, standard).
- 3. Type 3: 6" x 8" (with changeable message, standard).
- B. Character Proportions: Letters and numbers on signs shall have a width-to-height ratio between 3:5 and 1:1 and a stroke width-to-height ratio between 1:5 and 1:10.
- C. Finish and Contrast: Characters and symbols shall have a non-glare finish. Characters shall contrast with their background with either light characters on a dark background or dark characters on a light background. Material: Plastic laminate or acrylic.
- D. Raised and Brailled Characters and Pictorial Symbol Signs: Letters and numbers on signs shall be raised 1/32" (0.8mm) minimum, upper case, Sans Serif type characters, and

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shall be accompanied with Grade 2 Braille. Raised characters or symbols shall be at least 5/8" (16mm) high, but no higher than 2" (50mm). Pictograms shall be accompanied by the equivalent verbal description placed directly below the pictogram. The border dimension of the pictogram field shall be 6" (152mm) minimum in height. Characters and Braille shall not be located in the pictogram field.

- E. Symbols of Accessibility: Facilities and elements required to be identified as accessible shall use the international symbols of accessibility.
- F. Changeable Signage: Provide changeable message capability as scheduled.
- G. Braille: All Braille located on interior signage shall be contracted (Grade 2).
 - 1. Braille dots shall have a domed or rounded shape.
 - 2. Braille shall be positioned below the corresponding text. If text is multi-lined, Braille shall be placed below the entire text. Braille shall be separated 3/8" (9.5mm) minimum from any other tactile character and 3/8" (9.5mm) minimum from raised borders and decorative elements.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Mounting Location and Height: Interior signage shall be installed on the wall adjacent to the latch side of the door; where there is no wall space to the latch side of the door, including double leaf doors, signs shall be placed on the nearest adjacent wall. Mounting height shall be 60" above the finish floor to the center line of the sign and located 9" from the door jamb frame to the center line of the sign. Mounting location for such signage shall be so that a person may approach within 3" of signage without encountering protruding objects or standing within the swing of the door.
- B. Do not mount signage directly to doors or frames.
- C. Mount with double-faced foam tape and clear silicone.

3.02 SIGNAGE SCHEDULE

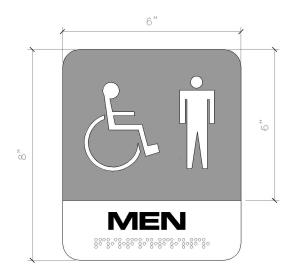
- A. Minimal Signage Required:
 - 1. At restrooms: ADA symbol and appropriate gender symbol (or symbols for unisex restrooms).
 - 2. At designated exit passageways and exit discharges: A tactile sign stating "EXIT" and complying with ICC/ANSI A117.1.
 - 3. Any additional signage required by the Americans with Disabilities Act or local building codes.
- B. Refer to Door Schedule for complete signage requirements.

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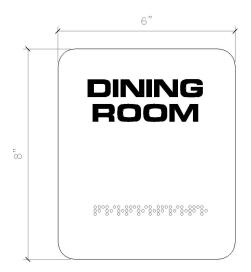
PART 4 - <u>FIGURES</u>

4.01 SIGNAGE TYPE

A. Type 1: 6" x 8" (without changeable message, ADA)



B. Type 2: 6" x 8" (without changeable message, standard)



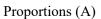
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C. Type 3: 6" x 8" (with changeable message, standard)



4.02 INTERNATIONAL SYMBOLS FOR ACCESSIBILITY









Display Conditions (B)

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SECTION 10 14 16 PLAQUES

PART 1 - GENERAL

1.01 WORK INCLUDED

A. Provide and install project identification plaque.

1.02 SHOP DRAWINGS

- A. Provide shop drawings for Architect's and Owner's approval.
- B. Provide finish samples for Architect's and Owner's approval.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Leeds
- B. Matthews
- C. Southwell Co.
- D. Or equal.

2.02 CONSTRUCTION

- A. Material: Cast bronze.
- B. Size: 24" W x 36" H.
- C. Letter Style: Times Roman.
- D. Border Style: Single line.
- E. Background Texture: Leatherette.
- F. Mounting: Rosettes (verify surface to be mounted on)
- G. Background Color: Natural sandblast bronze.

2.03 CONTENT

- A. Sign shall contain:
 - 1. Name of Project.
 - 2. Name of Owner.

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- 3. Name of Superintendent.
- 4. Names of Board Members.
- 5. Year the Construction was completed.
- 6. Name of Project Architect.
- 7. Name of Contractor.

2.04 PLAQUES IN PUBLIC BUILDINGS

- A. Plaques in public buildings paid for with public funds shall acknowledge the contribution of taxpayers.
- B. Include the following text on plaques in public buildings:
 - 1. This building was paid for by the taxpayers of the State of Mississippi.

PART 3 - EXECUTION

A. Install where directed by Architect/Owner.

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SECTION 10 17 00

SOLID PLASTIC TOILET COMPARTMENTS

PART 1 - GENERAL

1.01 WORK INCLUDED

- A. Furnish labor and materials as required for new urinal screens.
- B. Furnish labor and materials as required for new toilet partitions.

1.02 SUBMITTALS

- A. Submit shop drawings and product data.
- B. Clearly indicate partition layouts, swing of doors, elevations, anchorage and mounting details, panel construction, components hardware, finishes and all relevant dimensions.
- C. Submit manufacturer's descriptive literature and installation instructions.
- D. Provide sample colors. Color to be selected by Owner from complete range of available colors.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Equal to Scranton products
 - 1. Solid one-inch-thick plastic floor-mounted, overhead-braced
 - 2. Color: refer to Sheet A6.2 (Finish Legend)

2.02 MATERIALS

- A. Panels, doors, pilasters and screens shall be fabricated from HDPE polymer resins under high pressure forming a single component section.
- B. Partitions and doors shall be 1 inch thick with all edges machined to a radius of .250 inch and all sharp corners removed. All doors shall have aluminum edging strips fastened to the bottoms with stainless steel fasteners.

C. Hardware:

- 1. Hinges shall be full door length continuous aluminum hinge system. Pilaster is to be manufactured to accept door and hinge mechanism.
- 2. Door closures are to be factory-set to accommodate all conditions and allow for a positive opening and closing action free of impediment.
- 3. Each handicapped door to include: two (2) door pulls and one (1) wall stop.

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- 4. Door strike and keeper shall be fabricated from heavy aluminum extrusion (6364-T5 Alloy) with clear anodized finish with wraparound flange surface-mounted and thru-bolted to pilaster with one-way sex bolts. Size of strike shall be 6" in length.
- 5. Door latch housing shall be fabricated from heavy aluminum extrusion (6464-T5 Alloy) with clear anodized finish, surface-mounted and thru-bolted to door with one-way sex bolts. Slide bolt and button shall be heavy duty aluminum with anodized finish.
- 6. Solid color plastic pilaster shoes shall be anchored to finished floor with plastic anchors and 1-1/2" # 14 stainless steel Phillips head screws.
- 7. Full-length continuous plastic wall brackets (shall be solid in color) weighing not less than .822 lbs. per liner foot. Brackets shall be used for all panels-to-pilaster, pilasters-to-wall, and panel-to-wall connections. Wall brackets shall be thrubolted to panels and pilasters with one-way sex bolts. Attachment of brackets to adjacent wall construction shall be accomplished by 1-1/2" #14 stainless steel Phillips screws anchored directly behind the vertical edge of panels and pilasters at 13" intervals along the full length of bracket and at each 13" interval alternately spaced between anchor connections.
- 8. Headrail shall be heavy duty aluminum extrusion (6364-T5 Alloy) with bright-dipped anodized finish in anti-grip configuration. Headrail shall be fastened to tops of pilasters and headrail brackets by thru-bolting with one-way stainless steel sex bolts.
- 9. Headrail brackets shall be 18-gauge stainless steel.

PART 3 - EXECUTION

3.01 PREPARATION

- A. Examine site conditions to which work is to be applied.
- B. Take site dimensions affecting this work.
- C. Ensure correct spacing to coordinate with existing conditions.
- D. Ensure correct location of built-up framing, anchorage, blocking, and bracing where required.

3.02 INSTALLATION

A. Installation shall be in strict accordance with manufacturer's written instructions.

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SECTION 10 25 30 HEADWALL

PART 1 - GENERAL

1.01 WORK INCLUDED

A. Furnish and install surface mounted factory fabricated non-functioning headwall.

1.02 FURNISH AND INSTALL

A. All non-functioning headwalls including accessories as shown on the Drawings and herein specified.

1.03 RELATED WORK

- A. Section 04 22 00 Concrete Unit Masonry
- B. Division 26 Electrical

1.04 WARRANTY

A. Non-functioning headwall and its components shall be free from defects in material and workmanship for a period of one (1) year from the date of project acceptance.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Cogent Slimline Training Headwall
- B. SimLab Solutions
- C. Amico Corporation Horizontal Headwall (**BASIS of DESIGN**)

2.02 PRODUCT

- A. TTS (Teaching and Training) Sapphire Headwall by Amico Corp.
 - 1. Operational and non-functioning (for educational use only)
 - 2. Horizontal rail (48" wide)
 - 3. Quantity: three (3)
 - 4. Pre-selected color: Antique White

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2.03 DESIGN CRITERIA:

- A. Surface mounted with wall brackets
- B. Gas outlets (non-functioning):
 - 1. One (1) Vacuum
 - 2. One (1) Air
 - 3. One (1) Oxygen
- C. Electrical (ground pin up):
 - 1. Duplex receptacles (red and ivory color differentiation)
- D. Accessories:
 - 1. One (1) Suction Canister and Holder
 - 2. One (1) Oxygen Flowmeter
 - 3. One (1) Medical Air Flowmeter
 - 4. One (1) Vacuum Regulator
 - 5. One (1) Nasal Canula
 - 6. One (1) Humidifier
 - 7. One (1) Suction Tubing
 - 8. DISS hose and fittings

PART 3 - <u>EXECUTION</u>

3.01 EXAMINATION

- A. Examine areas and conditions under which products are to be used to ensure products will perform as specified and identify conditions that may be detrimental to proper performance.
- B. Do not proceed until unsatisfactory conditions have been corrected.

3.02 INSTALLATION

- A. Non-functioning headwalls shall be installed by an authorized installer.
- B. Test per manufacturer's written instructions. Adjust until satisfactory results are obtained.

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3.03 CLEANING AND PROTECTION

- A. Protect from damage during construction operations. Promptly repair any damaged surfaces. Remove and replace work which cannot be satisfactorily repaired.
- B. Clean products, prior to substantial completion, using materials recommended by manufacturer.

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SECTION 10 28 13 TOILET ACCESSORIES

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes
 - 1. Restroom accessories and attachment hardware in all restrooms.
- B. Related Sections
 - 1. Section 04 22 00 Concrete Masonry Units
 - 2. Section 06 10 00 Rough Carpentry
 - 3. Section 09 30 13 Tiling

1.02 SUBMITTALS

A. Submit manufacturer's product data for any substitutions for Architect's review.

1.03 DELIVERY, STORAGE AND HANDLING

- A. Do not deliver accessories to site until rooms in which they are to be installed are ready to receive them.
- B. Pack accessories individually in a manner to protect accessory and its finish.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Bradley (**BASIS of DESIGN**)
- B. Bobrick
- C. ASI Group

2.02 MOUNTING HEIGHTS

A. Reference Sheet A4.0 for mounting heights

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2.03 PRODUCTS

A. Grab bar:

1. 18" ADA-compliant grab bar equal to Bradley series 812, 18-gauge, 304 stainless steel tubing, 1-1/2" diameter, safety grip finish, concealed mounting. One required at each handicap accessible toilet. Mount vertical.

B. Grab bar:

1. 36" ADA-compliant grab bar equal to Bradley series 812, 18-gauge, 304 stainless steel tubing, 1-1/2" diameter, safety grip finish, concealed mounting. One required at each handicap accessible toilet. Mount horizontal.

C. Grab bar:

- 1. 42" ADA-compliant grab bar equal to Bradley series 812, 18-gauge, 304 stainless steel tubing, 1-1/2" diameter, safety grip finish, concealed mounting. One required at each handicap accessible toilet. Mount horizontal.
- D. Toilet tissue dispenser:
 - 1. Model 5234, double roll, surface mounted
- E. Paper towel dispenser
 - 1. Model enMotion 59462 Classic by Georgia Pacific
 - a. Automated touchless, surface mounted, black
- F. Framed Mirrors:
 - 1. Model 780-2436, 24" wide by 36" high
- G. Soap Dispenser:
 - 1. Model STOKO (91128) by Deb
 - a. 1 liter (refillable), surface mounted,
- H. Sanitary Napkin Disposal:
 - 1. Model 4781-11, surface mounted, 22-gauge, 304 stainless steel
- I. Mop and Broom Holder:
 - 1. Model 9953, 3 holders

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- J. Framed Mirrors (Specialty):
 - 1. Custom framed mirror
 - a. Location: at all cosmetology workstations
 - b. Size: 30" (w) x x48" (h)
 - c. Mirror: Standard
 - d. Frame material: Wood
 - e. Frame color: Black
 - f. Frame thickness: 2-inch

PART 3 - EXECUTION

3.01 PREPARATION

- A. Provide solid blocking as required for mounting accessories.
- B. Before starting work, notify the Architect of any conflicts detrimental to installation or operation of accessories.

3.02 INSTALLATION

- A. Install accessories with attachment hardware as provided by accessory manufacturer and in strict accordance with manufacturer's instructions.
- B. Install accessories plumb and level, securely anchored to substrate.

3.03 PROTECTION

A. Protect adjacent or adjoining finished surfaces and work from damage during installation of the work.

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SECTION 10 44 16

FIRE EXTINGUISHERS

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. Furnish and install one (1) fire extinguisher and cabinet as shown in drawings.
- B. Related Sections
 - 1. Section 06 10 00 Rough Carpentry
 - 2. Section 09 22 16.13 Non Structural Metal Stud Framing
 - 3. Section 09 29 01 Interior Gypsum Board

1.02 SUBMITTALS

- A. Submit manufacturer's operation and maintenance data.
- B. Include test, refill or recharge schedules, procedures, and re-certification requirements.

1.03 QUALITY ASSURANCE

A. Conform to NFPA -10, requirements for portable fire extinguishers.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Potter-Roemer, Inc.
- B. J.L. Industries.
- C. Larsen's (BASIS of DESIGN)
- D. Or equal.

2.02 FIRE EXTINGUISHERS

- A. General Purpose for Light and Ordinary Hazard locations:
 - 1. 10-pound
 - 2. Type 2A-80B:C U/L Rating
 - 3. equal to Larsen's MP10.

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B. High Hazard Locations:

- 1. 10-pound
- 2. Type 4A-80B:C U/L Rating
- 3. equal to Larsen's Model MP10.

2.03 FIRE EXTINGUISHER CABINETS

A. General Requirements:

- 1. Aluminum construction
- 2. Semi-recessed mounted
- 3. Rolled radius frame
- 4. Full view panel with text denoting fire extinguisher
- 5. Size cabinets appropriately for the extinguisher housed
- 6. Cabinets shall comply with ADA requirements and protrude no more than 4-inches from the wall

B. Break-front cabinets:

- 1. Tempered safety glass.
- 2. Keyed steel cam locks able to withstand 25 lbs. of pull pressure applied at the edge of the door opposite the hinge.
- 3. Cabinet shall include a handle with the words, "In Case of Fire, Break Glass," inscribed upon it. The action of the handle shall break the safety glass and provide access to the fire extinguisher.

PART 3 - EXECUTION

3.01 PREPARATION

- A. Do not install extinguishers when ambient temperatures may result in freezing.
- B. Verify cabinets are correctly sized and located.
- C. The beginning of installation indicates acceptance of existing conditions.

3.02 INSTALLATION

- A. Install cabinets plumb and level, 48 inches from finished floor to cabinet handle or as shown on Drawings.
- B. Secure rigidly in place in accordance with manufacturer's instructions.

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SECTION 10 51 13 METAL LOCKERS

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Double tier locker units with hinged doors
- B. Accessories and hardware.

1.02 SUBMITTALS

- A. Submit under provisions of Section 01 33 00.
- B. Shop Drawings: Indicate locker plan layout and numbering plan.
- C. Product Data: Provide data on locker types, sizes, and accessories

1.03 DELIVERY, STORAGE, AND HANDLING

A. Protect locker finish and adjacent surfaces from damage.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Penco (BASIS of DESIGN)
- B. List
- C. Lyon
- D. Or Equal

2.02 MATERIALS

- A. Lockers: Vanguard by Penco
 - 1. 12" x 12" x 72" (double tier) (Cat. No. 6231V) flush door with louver vent slots, "Vanguard" locker handles.
- B. Provide metal trim for connection to adjoining materials and at ceiling on recessed units.

2.03 ACCESSORIES

- A. For each locker:
 - 1. Three (3) single-prong wall hooks and one (1) double-prong ceiling hook.
 - 2. Aluminum number plate attached with rivets.

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2.04 FABRICATION

- A. Locker Body: Cold rolled steel formed for rigidity. 24-gauge steel.
- B. Frames: Formed channel shape, welded and ground flush. 16-gauge steel, intermembering parts to be mortised and tenoned.
- C. Doors: Full channel construction; welded construction, channel reinforced top and bottom, grind and finish edges smooth. 16-gauge steel construction.
- D. Hinges: Two for doors under 42-inches high; three for doors over 42-inches high. .074" thick, 2" high, five-knuckle, welded to door frame, fastened to door with 2 steel rivets.
- E. Number Plates: Provide rectangular shaped aluminum plates. Form numbers 3/8 inch high of block font style, in contrasting color.
- F. Provide ventilation openings at top and bottom of each locker.
- G. Finish edges smooth without burrs.
- H. Fabricate sloped metal tops, ends and closure pieces. Provide flush hairline joints against adjacent surfaces.
- I. Provide ADA compliant lockers to equal not less than 2% of the total required.
- J. End panels for exposed ends of 16 gauge metal, cover type with only primary frame bolts exposed. Closure tops, closure strips, and fillers as required for a complete installation.

2.05 FINISH

A. Chemically pretreated metal with a six stage cleaning phosphatizing and metal preparation process. The finish coat shall be hot airless electrostatically applied enamel baked on at 350 to 400 degrees. Primed and painted inside and out.

2.06 FINISHES

- A. Paint locker units throughout.
- B. Color: refer to Sheet A6.2 (Finish Legend)

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Verify that prepared bases are in correct position and configuration.
- B. Verify bases and embedded anchors are properly sized.

3.02 INSTALLATION

A. Install in accordance with manufacturer's instructions.

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- B. Install lockers plumb and square.
- C. Place and secure on prepared base.
- D. Secure lockers with anchor devices to suit substrate materials. Minimum Pullout Force: 100 lbs. Secure wall study and/or blocking as required by manufacturer.
- E. Bolt adjoining locker units together to provide rigid installation.
- F. Install end panels, filler panels, and flat tops.
- G. Install accessories.

3.03 CLEANING

A. Clean locker interiors and exterior surfaces.

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SECTION 10 57 23 CLOSET AND UTILITY SHELVING

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes
 - 1. Utility Shelving.
- B. Related Sections
 - 1. Section 06 10 00 Rough Carpentry

1.02 SUBMITTALS

A. Furnish samples of plastic laminate to Owner for color selection.

1.03 QUALITY ASSURANCE

A. Fabricate utility shelving in accordance with recommendations of Quality Standards of Architectural Woodwork (AWI).

1.04 DELIVERY, STORAGE AND HANDLING

- A. Do not deliver utility shelving until site conditions are adequate to receive the work. Protect items from weather while in transit.
- B. Store utility shelving items indoors, in ventilated areas with a constant, minimum temperature of 60 degrees Fahrenheit, maximum relative humidity of 25 to 55 percent.

1.05 JOB CONDITIONS

A. Contractor must examine the substrates and supporting structure and the conditions under which the work is to be installed and notify the Architect of conditions detrimental to the work. Do not proceed with the installation until unsatisfactory conditions have been corrected in a manner acceptable to the installer and the Architect. Initiation of installation indicates acceptance of substrate and existing conditions.

1.06 COORDINATION

A. Take special care to furnish and install solid wood blocking for secure mounting of all shelving brackets.

PART 2 - PRODUCTS

2.01 UTILITY SHELVING

A. Shelves shall be 3/4" thick low pressure laminate equal to Melamine on industrial grade particleboard with PVC edges.

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- B. Shelving standards shall be equal to Knape & Vogt No. 80.
 - 1. Finish: refer to Sheet A6.2 (Finish Legend)
- C. Shelving brackets shall be equal to Knape & Vogt No. 180.
 - 1. Finish: refer to Sheet A6.2 (Finish Legend)
- D. Shelves shall be 16 inches deep unless noted otherwise.
 - 1. 24" deep shelving required at TOOL STORAGE 129

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Space brackets at 16 inches on center or as indicated on drawings.
- B. Construct members of continuous pieces of longest possible lengths.

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SECTION 10 73 00 PROTECTIVE COVERS

PART 1 - GENERAL

1.01 WORK INCLUDED

A. Provide and install pre-finished walkway cover system and canopies.

1.02 QUALITY ASSURANCE

- A. Furnish a one-year, no-leaks warranty.
- B. Furnish shop drawings. Show sections of all details, column spacings, and product literature. Field verify all existing conditions and dimensions affecting the work of this section.
- C. The walkway cover and all of its components shall be designed to resist the following loads:
 - 1. Live load of 20 psf minimum.
 - 2. Extreme wind loading in accordance with SBCCI 50 year mean recurrence interval.
- D. Deflection under full live loading shall be limited to the following values:
 - 1. Cold formed shapes: L/60.
 - 2. Extruded shapes: L/120.

1.03 RELATED WORK

- A. Section 03 30 05 Cast-In-Place Concrete (paving only)
- B. Section 04 21 00 Brick Masonry

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Aluminum Contractors of Pearl, Mississippi (BASIS of DESIGN)
- B. Texas Aluminum Industries, Inc. (TAI), of Houston, Texas.
- C. Mason Corporation of Birmingham, Alabama.
- D. Superior Metal Products Co. of Birmingham, Alabama.

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2.02 ROOF DECK

A. Aluminum structural "W" panel, 3" thick x 16" wide. Minimum thickness of aluminum: .040.

2.03 FINISH:

A. Color: refer to Sheet A6.2 (Finish Legend)

2.04 FASCIA AND DRAINAGE BEAMS

A. Extruded aluminum (6.2" high x 3.0" wide, minimum size) as required for span and column spacing. Minimum thickness of aluminum: .090. Baked-on enamel finish as selected from manufacturer's standard colors.

2.05 COLUMNS

A. 3" x 3" square (minimum size) extruded aluminum with a minimum yield strength of 25.0 ksi and a minimum wall thickness of 0.125". Column brackets transmitting run-off shall have deflector plates and downspout openings. Baked-on enamel. Finish as selected from manufacturer's standard colors. Increase column sizes as required for height and loading. Do not alter column spacing without approval.

2.06 MATERIALS/DETAILING

- A. All structural connections must be hidden, countersunk, or designed with no more than 3/16" protrusion.
- B. All decking shall be installed with concealed fasteners with neoprene or butyl rubber-faced washers.
- C. The canopy shall feature an internal drainage system. Water shall drain from roof to fascia/beam to columns and spout at designated locations at ground level.

2.07 FLASHINGS/WALLS

A. Continuous break metal to match roofing and columns.

2.08 BEAMS

A. 10" deep C or I beam of 6061-T6 aluminum.

PART 3 - INSTALLATION

3.01 ERECTION

A. Strictly comply with manufacturer's shop drawings and standard procedures. Sealants shall match the finish color of metal. Refer to architectural drawings for assembly detail.

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B. Tolerances:

- 1. Plumbness: Columns, no more than 1/2".
- 2. Straightness: Columns, no more than 1/2".
- 3. Width: No deviation greater than 1/2".
- 4. Connections: No more than 1/16" out of square.
- C. Protection: Isolate aluminum from concrete with an approved coating system.
- D. Fasteners: Non-corroding.

3.02 INSPECTION

A. Inspect finished installation, touch up scratches and damaged finishes, and replace bent and warped components.

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SECTION 11 11 93 AIR COMPRESSOR

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. Furnish and install one (1) air compressor and associated piping as shown on drawings.
- B. Related Sections
 - 1. DIVISION 22 Plumbing
 - 2. DIVISION 26 Electrical

1.02 SUBMITTALS

A. Submit manufacturer's operation and maintenance data.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Campbell Hausfeld (BASIS of DESIGN)
- B. Or equal.

2.02 AIR COMPRESSOR

- A. 120 gallon tank, 15 hp, horizontal, two-stage cast-iron air compressor
- B. 208-230/460 V, three phase, 60 Hz
- C. Provide air compressor with required starter, filter, dryer, etc. for a complete and operable system.

PART 3 - EXECUTION

A. Install where directed by Architect/Owner.

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SECTION 11450

COMMERCIAL APPLIANCES

PART 1 - GENERAL

1.01 WORK INCLUDED

- A. Furnish and install the following:
 - 1. Provide and install one (1) commercial washing machine and one (1) commercial dryer at LAUNDRY 105.

1.02 RELATED WORK

- A. Section 05 50 00 Metal Fabrications
- B. Division 22 Plumbing
- C. Division 26 Electrical

1.03 SUBMITTALS

A. Submit manufacturer's product data for each appliance.

1.04 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Handle equipment with care to prevent damage.
- B. Store appliances indoors.

1.05 WARRANTY

A. One-year replacement for all parts against defects including labor charges.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. UniMac (BASIS of DESIGN)
- B. Huebsch
- C. Speed Queen
- D. or equal

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2.02 PRODUCTS

- A. Commercial Washing Machine.
 - 1. Model Number: UCT030, includes base
 - 2. Quantity: 1 unit
 - 3. Capacity: 30 lbs.
 - 4. Size: 29" (w) x 35.3" (d) x 45" (h), base: 6" (h)
 - 5. Unit shall be 120V/1-phase
- B. Commercial Dryer.
 - 1. Model Number: UT030
 - 2. Quantity: 1 unit
 - 3. Capacity: 30 lbs.
 - 4. Size: 27.9" (w) x 45.5" (d) x 63.9" (h)
 - 5. Unit shall be 208V/3-phase with 21 kW heater

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Install all appliances in strict accordance with the manufacturer's written instructions.
- B. Coordinate mechanical and electrical connections with the different trades and provide units installed in a ready to use state.
- C. Coordinate with millwork for sizing rough openings.

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SECTION 12 36 61.13 SOLID SURFACING COUNTERTOPS

PART 1 - GENERAL

1.01 SUMMARY

- A. Section includes:
 - 1. Lavatory tops with under-mount bowls
 - 2. Cove backsplashes
 - 3. Countertops located above half-wall configurations (per Sheet A3.13)
 - a. COSMETOLOGY LABORATORY 115
 - b. HEALTH SCIENCE LABORATORY 125
- B. Related sections:
 - 1. Section 06 41 16 Plastic Laminate Clad Cabinets
 - 2. Section 09 30 13 Tiling
 - 3. Division 22 Plumbing
 - 4. Division 26 Electrical

1.02 SUBMITTALS

- A. Shop drawings: Indicate dimensions, component sizes, fabrication details, attachment provisions and coordination requirements with adjacent work.
- B. Samples: Submit a minimum of 2" x 2" (50mm x 50mm) samples. Indicate full range of color and pattern variation. Approved samples will be retained as standards for work.
- C. Colors as selected by Owner.
- D. Product data: Indicate product description, fabrication information and compliance with specified performance requirements.
- E. Maintenance data: Submit manufacturer's care and maintenance data, including repair and cleaning instructions. Include in project close-out documents.

1.03 QUALITY ASSURANCE

- A. Allowable tolerances:
 - 1. Variation in component size: +/- 1/8" (3mm).

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2. Location of openings: +/- 1/8" (3mm) from indicated location.

1.04 DELIVERY, STORAGE AND HANDLING

- A. Deliver no components to project site until areas are ready for installation. Store components indoors prior to installation.
- B. Handle materials to prevent damage to finished surfaces. Provide protective coverings to prevent physical damage or staining following installation for duration of project.

1.05 WARRANTY

A. Provide manufacturer's 10-year warranty against defects in materials. Warranty shall provide material and labor to repair or replace defective materials.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. DuPont
- B. Corian (BASIS of DESIGN)
- C. Durasien
- D. or approved equal.

2.02 MATERIALS

- A. Material: Homogeneous filled acrylic; not coated, laminated or of composite construction; meeting ANSI Z124.3 & .6, Type Six, and Fed. Spec. WW-P-541E/GEN.
 - 1. Superficial damage to a depth of 0.010" (.25mm) shall be repairable by sanding and polishing.
- B. Lavatory tops with undermount bowls: 3/4" (19mm) thick countertop of solid polymer material; edge details as indicated on Drawings, complete with undermount bowls Provide countertops complete with backsplashes of size shown on Drawings. Use undermount hardware according to manufacturer's instructions.
- C. Color: refer to Sheet A6.2 (Finish Legend)

2.03 ACCESSORIES

- A. Joint adhesive: Manufacturer's standard two-part adhesive kit to create inconspicuous, nonporous joints, with a chemical bond.
- B. Panel Adhesive: Manufacturer's standard neoprene-based panel adhesive meeting ANSI A 136.1-1967 UL® listed.

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- C. Sealant: Manufacturer's standard mildew-resistant, FDA/UL® recognized silicone sealant in color-matching or clear formulations.
- D. Sink/bowl mounting hardware: Manufacturer's approved bowl clips, brass inserts and fasteners for attachment of undermount sinks/bowls.

2.04 FABRICATION

- A. For warranty coverage, fabricator/installer shall be approved by solid polymer manufacturer.
- B. Fabricate components in shop to greatest extent practical to sizes and shapes indicated, in accordance with approved shop drawings and solid polymer manufacturer requirements.
- C. Form joints between components using manufacturer's standard joint adhesive. Joints shall be inconspicuous in appearance and without voids. Attach 2" (50mm) wide reinforcing strip of solid polymer material under each joint.
- D. Provide grommet holes and cutouts for plumbing and bath accessories as indicated on the drawings.
 - 1. Grommets
 - a. Locations: as shown on Drawings.
 - b. Size: 2" diameter
 - c. Flip top (includes cap and liner)
 - d. Pre-selected color: White (95)
- E. Rout and finish component edges to a smooth, uniform finish. Rout all cutouts, then sand all edges smooth. Repair or reject defective or inaccurate work.
- F. Finish: All surfaces shall have uniform finish.
 - 1. Matte, with a gloss rating of 5-20.
- G. Cove backsplashes: Fabricate 1/2" radius cove at intersection of counters and backsplashes. Form backsplashes using 3/4" solid polymer material. Fabricate in shop or field.

PART 3 - EXECUTION

3.01 JOB MOCK-UP

- A. Prior to final approval of shop drawings, erect one full-size mock-up of each component at project site for Architect review.
- B. Should mock-up not be approved, rework or remake until approval is secured. Remove rejected units from project site.

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C. Approved mock-ups shall remain as part of finished work.

3.02 INSTALLATION

- A. Install components plumb and level, in accordance with approved shop drawings and product installation details.
- B. Form field joints using manufacturer's recommended adhesive, with joints inconspicuous in finished work. Keep components and hands clean when making joints.
- C. Adhere undermount sinks to countertops using manufacturer's recommended adhesive and mounting hardware.
- D. Provide backsplashes and endsplashes as indicated on the drawings. Adhere to countertops using manufacturer's standard color-matched silicone sealant.
- E. Keep components and hands clean during installation. Remove adhesives, sealants, and other stains. Components shall be clean on the date of Substantial Completion.
- F. Make plumbing connections to sinks in accordance with Division 15, Mechanical.
- G. Fabricator/Installer is to provide a Commercial Care and Maintenance video, review maintenance procedures and warranty details with the director of maintenance upon completion of project.

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SECTION 12 90 13 SALON FURNISHINGS

PART 1 - GENERAL

- 1.01 SECTION INCLUDES
 - A. Salon furnishings
- 1.02 RELATED SECTIONS
 - A. Division 22 Plumbing
 - B. Division 26 Electrical
- 1.03 SUBMITTALS
 - A. Submit a digital copy of shop drawings and product data.
 - B. Indicate mounting details to insure coordination with general construction.
 - C. Field verification of dimensional data is the responsibility of the General Contractor.
 - D. Maintenance Data: Submit manufacturer's installation, operation, and maintenance manuals.
- 1.04 DELIVERY, STORAGE, AND HANDLING
 - A. Product delivered on site
 - B. Furnishings to be housed in a clean, dry environment

PART 2 - PRODUCTS

- 2.01 MANUFACTURERS
 - A. Berkeley
 - B. Collins Manufacturing (BASIS of DESIGN)
 - C. Pibbs Industries
 - D. or approved equal.
- 2.02 PRODUCTS
 - A. Manicure Table
 - 1. Equal to Ducted Table for Two by Collins Manufacturing
 - a. Vented/ducted table for two with center storage

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- 2. Quantity: Two (2) units
- 3. Built-in plenum for ventilation
- 4. Pull-out drawers
- 5. Two (2) vent covers
- 6. Two (2) LED lighting
- 7. Two (2) padded rest
- 8. Power: Two (2) 15 amp (from floor)
- 9. Pre-selected color:
 - a. Body: Black (FM 909-58)
 - b. Top Surface: Calcutta Marble (WA 4925K-07)
 - c. Toe Kick: Black (FM 909-58)

B. Pedicure Chair

- 1. Equal to Le Reve Ve by Collins Manufacturing
- 2. Fully electric adjustable chair with leather upholstery, pedicure bowl with adjustable footrest, and full shiatsu massage capabilities.
- 3. Quantity: One (1) unit
- 4. Front/back seat movement
- 5. Plumbing: 1/2" ID supply line (hot/cold); 3/4" ID drain with pump (8' head)
- 6. Power: 120V, 60 Hz, 15 amp
- 7. Preselected color:
 - a. Upholstery: Black
 - b. Base Color: Black
 - c. Bowl color: Smoke

C. Shampoo Backwash Unit

- 1. Equal to Darcy-edu Add-On by Collins Manufacturing
- 2. Freestanding shampoo backwash chair unit with porcelain bowl
- 3. Quantity: Five (5) units

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- 4. Pivoting seat
- 5. Lock-in-place sliding seat
- 6. Porcelain shampoo bowl
- 7. Plumbing access door
- 8. Plumbing: 1/2" ID supply line (hot/cold); 3/4" ID drain
- 9. Preselected color:
 - a. Upholstery: Black (FM 909-58)
 - b. Laminate: Black (FM 909-58)
 - c. Bowl: Black (FM 909-58)

D. Facial Table

- 1. Equal to Lux Stationary Facial Lounge by Collins Manufacturing
- 2. Lounge chair with padded seating, manually reclining, and padded arm rest
- 3. Quantity: One (1) unit
- 4. Preselected color:
 - a. Upholstery: Black (US 393)

E. Receptionist Desk

- 1. Equal to Alta Reception Desk by Collins Manufacturing
- 2. Contemporary design with a high front ledge (for customers) and includes cabinets and work station for a computer screen
- 3. Quantity: One (1) unit
- 4. Keyboard tray
- 5. Storage cabinets
- 6. Pre-selected color:
 - a. Body: Black (FM 909-58)
 - b. Top Surface: Calcutta Marble (WA 4925K-07)
 - c. Toe Kick: Black (FM 909-58)
 - d. Cabinet Pulls: 4" Amati Pull

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PART 3 - <u>EXECUTION</u>

3.01 EXAMINATION

A. Install equipment per manufacturer's recommendations

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SECTION 13 34 19 METAL BUILDING SYSTEMS

PART 1 - GENERAL

1.01 WORK INCLUDED

- A. Furnish all labor, materials, and engineering services required to complete the roof, framing system, including anchor bolts, columns, beams, girts, bracing, mounting accessories, roof insulation, wall panels, metal trim, downspouts, gutters, insulation, and other components required for a complete job.
- B. General Metal Building Descriptions:

BUILDING	LENGTH	SPAN	DESCRIPTION	EAVE HEIGHT
Career & Technical Addition	136'-0"	115'-0"	Straight columns on exterior (maximum depth 20")	16'-0"

C.

- D. Anchor bolts, an anchor bolt setting plan, and anchor bolt templates shall be provided by the metal building system contractor. Anchor bolts shall be of sufficient length to extend to bottom of mat of reinforcing steel.
- E. Metal building manufacturers are cautioned that these are masonry buildings. The design shall limit drift at 10'-0" AFF to H/360, but in no case shall drift at 10'-0" AFF exceed 3/8". There will be no exceptions to this arrangement.
- F. Metal building supplier shall design structural system with close attention to the detailing of the architectural drawings. Columns typically fall within CMU enclosures; therefore, columns shall be sized to fall within enclosure dimensions where possible.

1.02 CODES AND STANDARDS

- A. The metal building shall meet or exceed the live load and wind load requirements of the 2018 International Building Code.
- B. Metal Building Design Loads:
 - 1. Dead Load: Self.
 - 2. Roof Live Load: 20 psf.
 - 3. Collateral Load: 5 psf.
 - 4. Wind Load: 115 mph (ultimate), Exposure category "C"
 - 5. Provide additional framing and structural support for concentrated loads such as hoods at kitchens and mechanical units.

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- C. The stamp of a registered engineer licensed in the State of Mississippi is required on all fabrication/erection drawings.
- D. Structural systems shall be designed to conform to the engineering standards of the American Institute of Steel Construction and the American Iron and Steel Industries. Manufacturer to be AISC-certified Category MB.

1.03 WARRANTIES

- A. Weathertightness: A manufacturer's representative shall inspect the installation of the roofing system and, upon approval, shall furnish a 20-year, no dollar limit (NDL) roofing system warranty for weathertightness. This warranty is to provide up to one (1) full replacement of the roof, including material and labor. The warranty shall include all roofing components consisting of, but not limited to, roof panels, anchoring devices, metal flashing, gutters, roof penetration flashing, roof curbs, plumbing vent flashing, and all other roof items furnished by or approved by the metal roof manufacturer.
- B. Twenty-year wall paint warranty as follows:
 - 1. Will not chalk (gradual erosion of film) in excess of ASTM-D-659 Number 8 rating for a period of twenty (20) years from date of shipment as determined by procedures outlined in ASTM-D-659 Specification.
 - 2. Will not fade (color change of file) in excess of 5NBS units when measured in accordance with the standard procedure specified in ASTM-D-2244-94 for a period of twenty (20) years.
 - 3. Will not noticeably crack, check-blister, or peel for a period of twenty (20) years.
- C. The Contractor shall provide a written guarantee agreeing to maintain the roof free of leaks for a period of two (2) years starting at the time of acceptance of the project by the Owner.
- D. All warranties shall be in the name of the Contractual "Owner" as listed in the Owner-Contractor Agreement for this project. The Contractor (General or Sub) shall not be listed as the "Owner" on any warranties.

1.04 DRAWINGS AND CALCULATIONS

- A. Contractor shall provide erection information and drawings as required to describe and define system. Drawings shall include anchor bolt setting plan and piece marks or all major parts for easy field identification.
- B. Submit letter of design certification for the structural framing and covering panels of the metal building system. Letter of certification is to be signed and sealed by a registered professional engineer licensed in the State of Mississippi.

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PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. CECO (BASIS of DESIGN)
- B. Gulf States
- C. Inland

2.02 PRIMARY MEMBERS

- A. Members fabricated from plate, plate coils, strip mill plate, or flat bar stock shall have flanges and webs joined on one side of the web by a continuous welding process. Minimum yield strength: 50,000 psi.
- B. Members fabricated from W shapes, conforming to physical specification of ASTM A-992. Minimum yield strength: 42,000 psi.
- C. Primary frames may not exceed 20" depth.
- D. Portal frames may not exceed 16" depth.

2.03 SECONDARY MEMBERS

- A. Purlins, girts, eave struts shall be cold formed from steel which has a minimum yield strength of 55,000 psi.
- B. Purlins shall be "Z" sections.
- C. Girts shall be "Z" sections or break formed "C" sections.
- D. Eave struts shall be "C" sections.

2.04 STRUCTURAL STEEL PRIMING

- A. Clean and prepare all steel members in accordance with the latest issue of SSPC (Society for Protective Coating) guidelines, as a minimum.
- B. Prime steel members:
 - 1. Minimum one mil thickness.
 - 2. Primer shall be equal to SSPC No. 15, Type 1, red oxide.

2.05 BRACING

A. Transverse wind/seismic forces shall be transferred to the foundation through the use of portal bracing at walls in combination with "X" bracing in the plane of the roof.

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2.06 STRUCTURAL BOLTS/NUTS

- A. ASTM A-325.
- 2.07 ROOF PANELS (NON-INSULATED)
 - A. Equal to Double-Lok® metal roof panel by CECO
 - B. Thickness: 24-gauge (standing seam panels of roll-formed steel seamed on site with a mechanical seamer).
 - C. Panel Coverage: 24 inches
 - D. Configurations: Interlocking standing legs at side laps which are field-seamed together in to a double fold, lock joint by use of a mechanical seamer, for a full Pittsburgh roll seam. Factory-applied sealant shall be provided in the overlapping standing seam leg.
 - E. Panel Attachment: Concealed fastening System with clips seamed into panel side laps. Screws for clips, self tapping, and length as required.
 - F. Finish: Smooth
 - G. Coating: Signature® 200
 - H. Color: refer to Sheet A6.2 (Finish Legend)
- 2.08 WALL PANELS (NON-INSULATED)
 - A. Equal to PBR wall panel by CECO
 - B. Thickness: 24-gauge (roll-formed from 50,000 psi yield steel).
 - C. Panel Coverage: 36 inches.
 - D. Rib: 12" on center (1-1/4" deep)
 - E. Panel Attachment: Exposed Fastening System. Screws for attachment, self tapping, and length as required.
 - F. Finish: Smooth
 - G. Coating: Signature® 200
 - H. Color: refer to Sheet A6.2 (Finish Legend)
- 2.09 INTERIOR LINER PANELS (PERFORATED)
 - A. Equal to PBU by CECO.
 - B. Thickness: 22-gauge

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- C. Panel Coverage: 36 inches
- D. Perforated with 1/8" round holes on 0.324" staggered centers with approximately 13.5% open area.
- E. Ribs: 6" on center (3/4" deep)
- F. Panel Attachment: Exposed Fastening System. Screws for attachment, self tapping, and length as required.
- G. Finish: Smooth
- H. Coating: Signature® 300
- I. Color: refer to Sheet A6.2 (Finish Legend)
- J. Provide and install complete with all associated trim for a complete installation.
- K. All fasteners and trim shall match panel in color.
- L. Liner panel is required in ADVANCED MANUFACTURING LABORATORY 128

2.10 FLASHING & TRIM

- A. 26-gauge prefinished metal.
- B. Color: refer to Sheet A6.2 (Finish Legend)

2.11 GUTTERS AND DOWNSPOUTS

- A. 26-gauge prefinished metal.
- B. Continuous gutter of manufacturer's standard profile as indicated on drawings.
 - 1. 6" width x 8" height.
- C. Downspouts of manufacturer's standard profile as indicated on drawings.
 - 1. 5" width x 5" depth.
- D. Color: refer to Sheet A6.2 (Finish Legend)

2.12 ROOF INSULATION

- A. Equal to Silvercote Long Tab and Banding System, Double Layer Insulation System
 - 1. General purpose fiber glass insulation blanks made without formaldehyde for use in roofs of pre-engineered metal buildings.
 - 2. Comply with ASTM C 991, Type I / ASTM E 136 / ASTM E84. Flame Spread Classification of 25/50 or less flame spread/ smoke developed rating.

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- 3. Total R-Value: R-32 at roof
- 4. System shall be coordinated and installed to work with roof purlin depth.
- 5. Strapping: Corrosion resistant, 1" wide x .02 strapping with 100,000 lbs/ square inch tensile strength. Color match to fabric liner. Each strap shall be continuous, no field splicing.
- 6. Fasteners: Sealing washers and color matched to the fabric liner system. Size and fastening pattern as required by manufacturer.
- 7. Fabric liner: high density polyethylene fabric with Class A fire retardant rating. Color: White.
- 8. Thermal space blocks as required by ASHRAE 90.1.
- 9. Fiberglass blanket insulation is required underneath all roof panels.

B. WALL INSULATION

- 1. Fiberglass blanket insulation, 6" fiberglass, laminated to 3.2 mil vinyl, UL flame spread of 25 or less.
- 2. Total R-Value: R-19 at walls
- 3. System shall be coordinated and installed to work with wall purlin depth.
- 4. Fiberglass blanket insulation is required underneath all wall panels

2.13 ROOF PENETRATIONS

- A. Notify Architect prior to installation of any penetrations.
- B. Verify type and size of all roof penetrations with Divisions 22 and 28.
- C. All roof penetrations shall be made and installed by the metal building systems contractor.
- D. Round pipe, plumbing stacks, electrical conduits, and flue pipes shall be flashed with EPDM or Neoprene compression molded rubber with 1" wide corrosion-resistant flexible aluminum base. The base flange shall be incorporated with a pleated expansion joint. Set in sealant and use non-corrosive fasteners.
 - 1. Metal building systems contractor shall coordinate with other trades and provide and install flashing for each condition encountered.
 - 2. Install flashing in flat portion of panels or through ribs with approval. Consult with Architect if penetration size exceeds spacing of ribs.
 - 3. Install so as not to block the flow of water.

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- 4. Review each proposed penetration detail with Architect prior to cutting roof.
- 5. Flashing shall be equal to Deck-Mate by Portals Plus or Dektite.
- E. Curbs: Attic fans, exhaust fans, mechanical equipment shall be installed on premanufactured 24-gauge aluminum-zinc allow curbs. Color and finish shall match roof panels.
 - 1. Metal building systems manufacturer shall coordinate with other trades to determine each condition which will be encountered.
 - 2. Curbs shall be furnished by the trade which is providing and installing the equipment. Curb shall be installed by the metal building system contractor.
 - 3. Curbs shall be installed under the roof panels on the up-slope end and over the panels at the down-slope end.
 - 4. Provide additional sub-framing at areas receiving curbs. Install with triple bead tape sealer, sealant, and cinch straps.
 - 5. Review each proposed penetration detail with Architect prior to cutting roof.
 - 6. Curbs shall be equal to custom curbs or LM curbs.

2.14 SEALANTS

- A. Sealants for side laps, end laps, accessories, etc., shall be a preformed, butyl rubber-based compound. The material shall be non-hardening, non-shrinking, and non-corrosive and shall have excellent adhesion to metals, painted surfaces, and plastics to temperatures from –30 degrees F to 160 degrees F. These sealants shall be in tape mastic form, of shape and size recommended by manufacturer of metal building for various applications and shall have paper backing for easy handling.
- B. Tube sealants shall be used to supplement tape mastic sealants and shall be applied in locations indicated by erection instructions. Tube sealant shall be a synthetic, elastomeric-based material which becomes tack-free in less than 2 hours at 75 degrees F but retains flexibility.

PART 3 - EXECUTION

3.01 ERECTION

- A. Erection shall be in accordance with appropriate erection drawings and guides by metal building system manufacturer.
- B. It is the responsibility of the erector to comply with all appropriate legal and safety requirements. It is the responsibility of the erector to determine and provide any and all temporary bracing, shoring, blocking, bridging and/or securing of components.
- C. Take special care to coordinate the work of this section with the following work sections:

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- 1. Section 03 30 00 Cast-In-Place Concrete (Building Only). Furnish and install anchor bolts, an anchor bolt setting plan, and anchor bolt templates for mounting of primary framing elements.
- 2. Section 04 22 00 Concrete Unit Masonry.
- D. Metal building system contractor shall remove from the site all trash and debris that results from the operations of this category of work.

END OF SECTION

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DIVISION 21-28 TABLE OF CONTENTS

DIVISION 21 – FIRE SUPPRESSION

Section 21 00 00	Fire Suppression
Section 21 05 53	Identification of Fire Suppression Piping
Section 21 11 16	Facility Fire Hydrants and Fire Main
Section 21 13 13	Wet Pipe Sprinkler System



DIVISION 22 – PLUMBING

Section 22 00 00	Plumbing
Section 22 05 53	Identification of Plumbing Piping and Equipment
Section 22 07 19	Plumbing Piping Insulation
Section 22 11 13	Facility Water Distribution
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Section 22 40 00	Plumbing Fixtures

DIVISION 23 – HVAC

Section 23 00 00	Heating, Ventilation, and Air Conditioning
Section 23 05 53	Identification for HVAC Piping and Equipment
Section 23 05 93	Testing, Adjusting, and Balancing for HVAC
Section 23 07 13	Duct Insulation
Section 23 11 23	Facility Natural Gas Piping
Section 23 31 13	Metal Ducts
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DIVISION 26 – ELECTRICAL

Section 26 00 00	Electrical
Section 26 05 19	Low Voltage Electrical Power Conductors and Cables
Section 26 05 26	Grounding and Bonding for Electrical Systems
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Section 26 24 16	Panelboards
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Section 26 50 00	Lighting

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<u>DIVISION 27 – COMMUNICATIONS</u>

Section 27 00 00	Communications
Section 27 20 00	Data Communications
Section 27 30 00	Voice Communications

<u>DIVISION 28 – ELECTRONIC SAFETY AND SECURITY</u>

Section 28 00 00	Electronic Safety and Security
Section 28 31 00	Fire Detection and Alarm

END OF SECTION

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SECTION 21 00 00 FIRE SUPPRESSION

PART 1 - GENERAL

1.01 GOVERNING STATEMENT:

- A. The General Conditions, Supplementary General Conditions, Information to Bidders, General Requirements and other pertinent documents issued by the Architect are to be considered as a part of these specifications and shall be complied with in every respect.
- B. This specification indicates the general scope of the project in terms of water-based fire suppression systems. As scope documents the specifications do not necessarily indicate or describe all work required for full performance and completion of the requirements of the Contract Documents. On the basis of the general scope indicated or described, the contractor shall furnish all items required for the proper execution and completion of the work.
- C. Examine the site, mechanical, general construction, structural, electrical, and other pertinent drawings. Plan, install, and coordinate all work with other trades. The Contractor shall become familiar with local building codes and serving utility requirements. The final product is to be free of hazard and fully functional without additional cost to the Owner.
- D. Furnish all material, equipment, labor and all incidentals necessary to install water-based fire suppression systems shown on the drawings and as specified herein in a manner acceptable to the Architect. Install and adjust all equipment and material as shown on the plans, specified, or hereinafter mentioned or implied in such manner as to accomplish the general intent of the plans and specifications. The latest editions of the applicable codes apply to this project and take precedence over any of the project documents (specifications and drawings).
- E. Coordinate seismic bracing requirements with local authority.
- F. Submit only written requests to the Architect for interpretation or clarification of the Contract Documents.

1.02 SCOPE OF WORK

- A. The work to be performed under these Specifications shall include all labor, materials, equipment, transportation, construction, facilities, and incidentals necessary for the proper execution, installation, testing, adjustments, and completion of all Work shown and indicated in the Contract Documents. The intent is that the installation shall be 'complete' in every respect, pleasant in appearance, and ready for use.
- B. The work under these specifications shall in general include, but is not limited to, furnishing and installing the following:
 - 1. Water-based fire suppression system

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- 2. Payment of all fees and permits required for the work of this section, including utility service taps
- 3. Location and sizes of furring, chases and access panels required for installation of water-based fire suppression system systems

1.03 WORK BY OTHERS:

- A. At various phases of the work it may be necessary for others to install systems and/or components not covered by this contract. The contractor shall cooperate with others performing such work.
- B. All components and work not specifically stated herein or on the plans to be by others, which are required to make the system complete and operative, shall be furnished, installed, and governed by the Contract Documents.
- C. All work necessary, but supplemental to the work described in Division 21, shall be complete as described elsewhere in the contract documents by divisional trades. Special services and financial obligations for this work shall be by the Contractor.
- D. The Contractor shall provide new furring and chases required for fire sprinkler system installations. It is the responsibility of the Contractor to coordinate the sizing and location of furring and chases with the work of the other trades. Provide all critical dimensions that relate to fire sprinkler equipment and piping to insure proper coordination.
- E. All power wiring shall be furnished and installed by the Division 26 Trade.
- F. All equipment furnished by Division 21 trades shall be provided with proper supports and vibration isolation.

1.04 DRAWINGS

- A. The drawings are generally diagrammatic and outlets, motors, ducts, piping, etc., shown on the drawings do not indicate that such items shall be placed at the exact location as scaled on the drawings. All building dimensions are to be taken from the architectural drawings.
- B. The drawings and specifications shall be considered as cooperative. Work and material included in either, though not mentioned in both, shall be part of the project to be accomplished and shall be carried out completely.
- C. The drawings indicate the extent and general arrangement of the various systems. If any departure from these drawings is necessary, descriptions of these departures and a statement of the reason therefore shall be submitted to the Construction Manager for approval.
- D. These drawings and specifications shall be considered a part of this Contract. Should an error or omission occur in either or both the drawings and specifications, or conflict with the other, the Contractor shall not avail himself of such unintentional error, omission or

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- conflict, but shall have same explained to him and adjusted before signing the Contract or proceeding with the work.
- E. The Contractor shall prepare shop drawings and required field drawings (one copy will be retained by the Architect) as hereinafter specified or required by the drawings. Shop drawings will include all dimensions, grades, materials, etc., pertinent to installation. The shop drawings shall be coordinated with the work of related trades and shall be submitted for approval before installation is begun. The shop drawings shall be sent electronically to expedite review.
 - 1. Fire sprinkler back flow preventer
 - 2. Fire sprinkler system drawing, equipment, piping, and calculations

1.05 QUALITY ASSURANCE

- A. The materials, components, and installation shall comply with the appropriate sections and articles of:
 - 1. Local Building Ordnance
 - 2. Plumbing Code
 - 3. Gas Code
 - 4. Electrical Code
 - 5. Mechanical Code
 - 6. NFPA
- B. The local authority shall be the interpreter of any code requirements. In the absence of a local enforcing authority the Architect shall interpret the code and his decision shall govern.

1.06 TESTING:

- A. It shall be the responsibility of the Contractor to furnish all testing equipment and labor necessary to perform the following tests:
 - 1. Fire sprinkler piping
- B. Coordinate with the Project Manager for review of all system components prior to concealment or otherwise expose system components for review prior to Project Acceptance.

1.07 CLEAN-UP:

A. The site shall be continuously clean, neat, and orderly. Do not let debris accumulate or become scattered. Maintain the site in a safe, secure, hazard free condition.

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B. Materials stored on the site must be well organized, protected from the weather, and physically secure.

1.08 WARRANTY:

- A. Provide full one (1) year guarantee of the work, to include materials, parts, labor, and transportation for repair and/or replacement of defects in material and/or workmanship. The contractor shall replace any defective materials or remedy other defects without cost to the Owner during the guarantee period.
- B. Provide written statement to the Owner with words to the effect:

"We hereby guarantee all Work performed by us on the above captioned project to be free from defective materials and workmanship for a period of one year or such period of time as may be called for in the Contract Documents for such portions of the Work."

1.09 FEES AND PERMITS:

A. Make all arrangements and pay all costs and assessments by municipalities, utility providers, or other regulatory bodies for building permits, inspection fees, etc. Such costs and assessments shall be included in the base bid.

1.10 ALTERNATES:

A. See Architects instructions for alternates.

1.11 CASH ALLOWANCES:

A. See Architects instructions for cash allowances.

PART 2 - PRODUCTS:

2.01 GENERAL:

- A. All materials (not indicated existing to be re-used) are to be new and of current design for which replacement parts are available.
- B. All new materials shall be recognized for application and use as installed.
- C. All materials shall be properly stored and protected. Materials damaged due to improper storage and/or handling shall be repaired or replaced at the Owner's option.
- D. Where material or equipment is specified or shown on the drawings by name of manufacturer or by accepted trade designation, it denotes the quality desired. The material of other manufacturers may be used, provided the construction, arrangement, finish, and capacity equals or exceeds that specified or shown. Where two or more items are furnished under the same specifications, all are to be of the same manufacturer and shall be identical and inter-changeable.

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E. It shall be the responsibility of the Contractor to ascertain if the substitute items will fit into the space allotted as conveniently as the items specified. Any changes to the building or system design necessary shall be arranged for in writing before material is ordered. All costs involved in making such changes shall be borne by the Contractor. If the Architect deems such changes inadvisable, the Contractor shall install items specified even though substitute item had been previously reviewed. Architect's review of a substitute is for performance and/or design only.

2.02 DESCRIPTION:

- A. Refer to Section 21 05 53 Identification of Fire Suppression Piping
- B. Refer to Section 21 13 13 Wet-Pipe Sprinkler System
- C. Refer to Section 28 31 00 Fire Detection and Alarm

2.03 COMPONENTS INCLUDED:

A. An attempt has been made to identify the major components of the system. Incidental materials and/or operations required to complete the installation shall be furnished without further mention. The intent is to provide a complete, safe, and operable system. Such incidental components and/or operations are to be in keeping with the quality established for the Work.

PART 3 - EXECUTION

3.01 GENERAL:

- A. The Work as described in the Contract Documents is technical in nature. Skilled craftsmen shall perform this work. Trainees and labors shall work only under the supervision of the skilled craftsmen.
- B. A Foreman or Leadsman shall be designated for Division 21 Work. The Foreman or Leadsman shall be on site to participate in or supervise others performing Division 21 Work.
- C. All systems and components shall be installed in strict accordance with the manufacturer's recommendations by technicians skilled with tools and techniques of the trade. Where such recommendations are not routinely published the systems and components shall be installed with tools and techniques of the trade and to traditional industry standards.
- D. In general, all piping shall be concealed below grade, below finished floor, above ceilings, or within walls. Do not conceal piping until the piping has surpassed the required testing and been review by the Project Manager.

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3.02 COORDINATION:

- A. Make provisions for the delivery and safe storage of all materials, and arrange with other trades on the job for the installation of equipment too large to pass through finished openings.
- B. Arrange to have materials delivered to the job at such stages of the work as will expedite the work as a whole. Mark and store all materials in such a manner as to be easily checked, inspected, and issued.
- C. Locations of all outlets, fixtures, ducts, equipment, etc. are to be verified with other trades or specific equipment suppliers prior to roughing in. The cost of relocating such items because of failure to do so shall be at the Contractor's expense.
- D. Avoid interference with structure and work of other trades, preserving adequate headroom and clearing all doors and passageways to approval of the Architect.

3.03 FINAL CONNECTION TO EQUIPMENT:

- A. Certain items of equipment shown on the drawings are existing to be re-used, to be furnished by the Owner, or to be furnished by other trades. The Contractor shall be responsible for final connections including all labor and materials required. Also where applicable, the Contractor shall relocate and/or reinstall such equipment.
- B. Where final connections to equipment provided under Division 21 are to be completed by other trades, for example Division 26, the Division 21 equipment shall be factory ready for field connection without the requirement for other lugs or components. The Contractor shall cooperate and coordinate with others making final connections.
- C. Division 26 Trades shall furnish electrical power final connections. The Contractor shall coordinate and corporate between trades for final power connection requirements.

3.04 EXCAVATION AND BACKFILLING:

- A. The Contractor shall do all excavating and backfilling required for all Division 21 work. Fill, compaction, surface, etc. to meet all the requirements as applicable for the area and shall be governed by Divisions 02 and 31 of these specifications.
- B. The Contractor is to determine the presence and location of any underground service such as telephone, electrical, water, gas, sewage, etc. whether previously existing or as installed by other trades. The Contractor is to bear full consequences for the interference of any such systems.
- C. Backfill containing large rock, paving materials, cinders, large or sharply angular substance, or corrosive material shall not be placed in an excavation where these materials may damage underground piping or other substructures or prevent adequate compaction of fill, or contribute to corrosion of underground piping or other substructures. Where necessary to prevent physical damage to the underground piping, protection shall be provided in the form of granular or selected material, suitable running boards, suitable sleeves, or other approved means.

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D. Do not backfill piping until the system has surpassed the required testing and been reviewed by the Project Manager or otherwise uncover the piping for review prior to Project Acceptance.

3.05 FIRE STOP:

- A. Installations in hollow spaces, vertical shafts, and ventilation of air-handling ducts shall be so made that the possible spread of fire or products of combustion will not be substantially increased. Openings around penetrations through fire-resistant-rated walls, partitions, floors, or ceilings shall be fire-stopped using approved methods to maintain the fire resistance rating. Refer to Division 07 84 13 Penetration Firestopping of these specifications.
- B. Refer to the Architectural Drawings for fire rated partitions and ceilings.

3.06 FLOORS, WALLS, AND CEILING PLATES

A. Furnish and install chrome-plated type floor, wall, and ceiling plates or escutcheons on all exposed pipe passing through floors, walls and ceilings. Inside diameter shall fit around insulation or around pipe; when not insulated, outside diameter shall cover sleeve. Where sleeve extends above finished floor, escutcheon shall clear sleeve extension. Secure escutcheons or plates to pipe or sleeve but not to insulation.

3.07 PIPE SLEEVES

- A. Pipe sleeves of cast iron or zinc coated steel pipe shall be provided for all pipes passing through exterior walls, and slabs on grade, which do not have membrane waterproofing.
- B. Sleeves passing through floors, utility trench, interior walls or floors rated one (1) hour or more, and exterior walls which are provided with membrane waterproofing shall be sealed with approved elastomeric fire proofing sealer. Provide an expandable fire caulk and restraining collar for pipe penetrating rated walls, floors, and ceilings. This caulking shall be UL tested, rated and classified according to 1994 Underwriters Laboratories, Inc., Volume II.
- C. Sleeves passing through floors and exterior walls which are provided with membrane waterproofing shall be threaded steel pipe fitted with companion flanges and arranged to secure membrane. Companion flanges shall be drilled and tapped in such a manner that bolting is affected from the outer (or upper) face only.
- D. Sleeve pipes passing through potentially wet floors that do not have membrane waterproofing such as in toilet rooms, kitchens, serving areas, etc., shall be zinc coated steel pipe and shall project 2 inches above the finished floors, and shall be caulked watertight.
- E. Sleeves shall be provided for all pipes passing through all other floors and walls, and shall be constructed of zinc coated sheet steel not lighter than No. 26 gage, moisture resistant fiber, or plastic.
- F. On new work, sleeves shall be built into the walls and floors as the work progresses.

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- G. Sleeves through exterior walls below grade shall be not less than 2 inches greater in inside diameter than the outside diameter of the pipe it serves; all other sleeves shall be large enough to provide approximately 1/4 inch clear annular space between the sleeve and pipe or between the sleeve and insulation where insulation is required. Except as hereinafter specified for wet area floors, sleeves shall be of sufficient length to terminate flush with the finished floor or wall.
- H. Spaces between pipes and sleeves passing through exterior walls shall be caulked watertight.

3.08 PAINTING AND PATCHING:

- A. All equipment, piping, and supports in finished areas shall be painted. Components provided with pre-painted finishes shall have this finish protected during installation and through out the project. Any portion of the building structure or other equipment that incurs damage to its painted surface from the installation of the Division 21 equipment shall have this surface repainted.
- B. All openings required for Division 21 components shall be properly patched and sealed. Trim must conceal all rough openings.
- C. Painting and patching shall be governed by the requirements of Division 09 of these specifications. This contractor shall arrange and coordinate with Division 09 trades to ensure all expenses are included in the base bid.

3.09 INSTALLATION DIRECTIONS:

A. Obtain manufacturer's printed installation directions to aid in properly executing work on equipment requiring such directions as directed by the Architect. Submit such directions to the Architect for approval prior to time of installation of equipment.

3.10 STARTING AND INSTRUCTION:

- A. All equipment and systems shall be tested as before being placed in operation.
- B. Furnish a competent Technician to supervise the starting, adjusting and testing of all equipment and to train the operator in the operation of the system. Where specified, certain major items of equipment shall be installed under the supervision of and tested by a specialist furnished by the manufacturer of the equipment. Such specialist shall train the operator in the use of his equipment.
- C. Furnish (2) duplicate sets of operating and maintenance instructions for each and every piece of equipment supplied by him together with copies of spare parts lists. This information shall be neatly bound in (3) ring binders, indexed and labeled for each piece of equipment.
- D. Contractor will spend sufficient time with the operator to acquaint him with the complete operation of the systems.

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3.11 PROTECTION OF EQUIPMENT AND MATERIALS:

- A. Responsibility for care and protection of equipment and material under this Contract rests with the Contractor until equipment or materials have been tested and accepted.
- B. All pipe ends, valves and parts of equipment left unconnected permanently or temporarily, shall be capped, plugged or properly protected to prevent entry of foreign matter. Pipe ends shall include a shutoff valve or supply valve as appropriate so as not to valve out entire system when making future tie-ins.

3.12 EQUIPMENT FOUNDATIONS AND SUPPORT:

- A. Install equipment and fixtures in locations shown on the drawings, except where specifically otherwise approved.
- B. Unless noted otherwise on the drawings, provide all support required for equipment specified under this division. Concrete pads shall be reinforced and shall be troweled smooth. Steel supports shall be standard structural channels or angles of the proper sizes to support equipment.
- C. All ferrous and metallic supports and channels shall be finished to prevent corrosion and to provide a pleasant appearance. Refer to Division 05 and Division 09 of these specifications.
- D. Relief valve outlets to be piped to floor drain unless noted otherwise on drawings.
- E. Install all control and interlocking wiring required for the proper operation of equipment. Installation of equipment shall be in accordance with manufacturer's written directions.

3.13 INSPECTION

- A. Check each system component for defects, verifying that all parts are properly furnished and installed, that all items function properly, and all adjustments have been made.
- B. Do not conceal any system component until the required testing has been completed and reviewed by the Project Manager.

3.14 CLOSE OUT SUBMITTALS

- A. Project close out documents shall include the following:
 - 1. Provide (2) sets of product data sheets, spare parts list, and O&M manuals for equipment installed under this contract. The product data sheets, spare parts list, and O&M manuals shall include, but not be limited to fire sprinkler system and components, etc.

END OF SECTION

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SECTION 21 05 53 IDENTIFICATION OF FIRE SUPPRESSION PIPING

PART 1 - GENERAL

1.01 SUMMARY:

A. Provide a thorough and complete system of identification of all pipe and equipment to permit immediate and positive recognition.

1.02 EQUIPMENT LABELS:

- A. All equipment furnished under this division shall be provided with manufacturer's identification labels securely attached to each individual piece of equipment and show complete and comprehensive performance characteristics, size, model number, and serial number.
- B. The Contractor shall furnish and install identification labels (black phenolic with white letters) for each piece of equipment clearly identifying the equipment as referred to on the drawings.

PART 2 - PRODUCTS

2.01 PIPE IDENTIFICATION:

- A. All pipe, except that in un-accessible spaces, shall be identified with standard pipe identification markers equal to Seton "Snap-On". Identification markers shall describe the type of service (ie. Fire Sprinkler) and the normal flow direction.
- B. All new fire sprinkler piping shall be properly cleaned and prepared for field painting. Paint water piping with red industrial enamel.
- C. Include 'Caution Buried Piping' tape in each trench about 6" above buried water piping.
- D. Include #10 AWG copper tracer wire in each trench about 6" above buried water piping. Expose tracer wire at each watering station and buried valve location.

PART 3 - EXECUTION

3.01 INSTALLATION:

- A. Locate pipe markers not over 50 feet apart on each pipe and mark each pipe in at least one easily seen location.
- B. Locate all markers for easy and maximum visibility, and provide arrow indicating normal flow direction.
- C. Standard pipe identification system shall be acceptable and the same systems shall be used throughout.

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D. Pipe markers shall completely band the diameter of pipe or covering and shall overlap at least 2 inches.

3.02 CLOSING IN UNINSPECTED WORK

A. Do not cover up or enclose work until it has been properly and completely reviewed. Should any of the work be covered up or enclosed prior to verification, uncover the work as required for inspection. Make all repairs and replacements with such materials and workmanship as are necessary at no additional cost to the owner.

END OF SECTION

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SECTION 21 11 16 FACILITY FIRE HYDRANTS AND FIRE MAIN

PART 1 - GENERAL

1.01 SUMMARY:

A. Section Includes:

- 1. Furnish and install all materials for modification of the exiting Fire Main piping as shown on the Drawings.
- 2. Coordinate with Owner and local provider for new taps to the existing Fire Mains as shown on the Drawings. Include all fees and assessments for taps in Base Bid.
- 3. Furnish and install Fire Hydrants in the locations as shown on the Drawings. Fire Hydrants shall be complete with roadway gate valve and thrust blocks.
- 4. Furnish and install schedule 40 steel pipe bollards (minimum of two) at each Fire Hydrant. Refer to Architectural Drawings for pipe bollard details.
- 5. Furnish and install schedule 40 metal sleeves under existing paved roadways. Sleeves shall be installed by directionally bore.
- 6. Furnish and install concrete thrust blocks at each change of direction and dead end in Fire Main piping.

1.02 SCOPE:

- A. The work to be performed under these Specifications shall include all labor, materials, equipment, transportation, construction, facilities, and incidentals necessary for the proper execution, installation, testing, adjustments, and completion of all Work shown and indicated in the Contract Documents. The intent that the installation shall be 'complete' in every respect, pleasant in appearance, and ready for use.
- B. The work under these specifications shall in general include, but is not limited to, furnishing and installing the following:
 - 1. Excavation and Fill Refer to Section 31 23 00
 - 2. Cast-In-Place Concrete Refer to Section 03 30 00
 - 3. Fire Suppression Refer to Section 21 00 00
 - 4. Identification of Fire Suppression Piping Section 21 05 53
 - 5. Wet Pipe Sprinkler System Section 21 13 13
 - 6. Fire Detection and Alarm Refer to Section 28 31 00

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1.03 REFERENCES:

- A. All equipment and piping installations shall be performed in accordance with NFPA 90, NFPA 14, and NFPA 13.
- B. NFPA Pamphlet 24 Outside Protection (Yard Piping Systems).

1.04 SUBMITTALS:

- A. Shop drawings for all fire protection system components shall be submitted to the Architect for review prior to scheduling work.
- B. A basic piping layout and hydrant placement diagram has been included in the drawings. Coordinate all work with local authorities.

1.05 COORDINATION:

A. It shall be the responsibility of this contractor to fully examine mechanical, structural, architectural, electrical, etc., plans and coordinate his work and shop drawings with other trades, and the particular requirements of the spaces involved. This contractor shall make changes in the work occasioned by conflicts with other building trades with no revision to the contract price.

1.06 QUALITY ASSURANCE:

- A. The Contractor for the fire protection installation shall be a qualified fire protection contractor, and shall be regularly engaged in the installation of such systems. Contractor shall have been in this business for at least 5 years and shall produce evidence of same to Construction Manager.
- B. All work will be installed for the approval and/or acceptance of pertaining inspection bureaus, fire department, health department, fire marshal, and Owner's insurance carrier.

1.07 WARRANTY:

A. The entire fire protection installation, as specified under this section of the specifications, shall be guaranteed for one (1) year against defective equipment, materials and workmanship. The guarantee period is to begin on the date of acceptance of the project by the Owner.

1.08 PERMITS:

A. All permits for the installation or construction of any of the work included in this section, which are required by any of the authorities and/or agencies having jurisdiction, shall be included in the Base Bid.

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PART 2 - PRODUCTS

2.01 EQUIPMENT:

- A. All materials, equipment valves and devices installed and/or furnished under this section shall be listed and/or approved for use in the fire protection installation by the authorities, agencies, codes and standards named in this section of the specifications.
- B. Refer to Underwriter's Laboratories Approved Fire Protection Equipment List.

2.02 FIRE MAIN SYSTEM:

- A. Shop drawings shall detail piping arrangement, sizes and locations.
- B. Connection to the water supply system shall be made where indicated on the drawings.
- C. The water piping, valves, and hose connections shall be installed complete in all respects, ready for operation, testing in accordance with the approved specifications for plans and approved by the authority having jurisdiction.
- D. The contractor shall conduct all required tests in the presence of the Construction Manger.
- E. Underground mains shall be flushed out thoroughly.
- F. Only a fully experienced and responsible technicians specializing in such work shall do the fire main system layout and installation.

2.03 YARD HYDRANT:

- A. Fire hydrants shall meet or exceed AWWA C502, latest revision. Rated working pressure shall be 250 p.s.i.g., test pressure shall be 500 p.s.i.g.
- B. The main valve closure shall be of the compression type. Traffic feature to be designed for easy 360 degree rotation of nozzle section during field installation.
- C. The main valve opening shall not be less than 4 3/4 inches and be designed so that removal of all working parts can be accomplished without excavating. The seats and draining system of the hydrant shall be bronze and positively activated by the main operating rod. Hydrant drains shall close completely after no more than three turns of the operating nut. Drain shutoff to be by direct compression closure.
- D. Lower hydrant barrel shall be made of centrifugally cast ductile iron.
- E. Fire hydrants must be UL listed, FM approved, or listed or classified by an NRTL and must have two (2-1/2-inch) hose outlets and one (4-1/2-inch) suction connection. Coordinate threading and color requirements with the local authority.
- F. Friction loss shall not exceed 3.0 p.s.i.g. at 1,000 gpm through 4 1/2 pumper nozzle.
- G. Hydrants shall be American Flow Control, U.S. Pipe and Foundry Company, or equal.

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2.04 PIPE AND FITTINGS:

- A. Pipe used in Fire Main System shall be in accordance with Section 21 13 13 or of these specifications and shall be Schedule 40 (black). Piping must be of U.S. manufacture.
- B. Fittings shall be of type specifically approved for sprinkler systems and suitable for a working pressure of not less than 300 pounds per square inch cold water pressure.

2.05 FREEZE PROTECTION:

A. The piping shall be protected from freezing.

2.06 IDENTIFICATION:

- A. All piping below grade shall be marked with caution tape 6" above the piping.
- B. Include #12 AWG copper tracer wire in each trench about 6" above buried water piping. Expose tracer wire at each watering station and buried valve location.
- C. Standard pipe identification system shall be acceptable and the same systems shall be used throughout.
- D. All exposed piping shall be painted red for quick identification.

PART 3 - EXECUTION

3.01 INSTALLATION:

- A. Pipe and accessories shall be handled in such a manner as to insure delivery in sound, undamaged condition. Under no circumstances shall materials be dropped or dumped. Care shall be exercised to prevent damage to pipe coatings.
- B. Every precaution shall be taken to prevent dirt, or other foreign material from entering the pipe. No debris, tools, clothing, or other materials shall be placed in the pipe during laying operations. At times when pipe laying is not in progress, a watertight plug or other approved fitting shall close the open ends of all pipe.
- C. Valves and valve boxes shall be installed in the lines as required and shown on the drawings and shall be set plumb. Valves shall have the interiors cleaned of all foreign matter before installation and shall be inspected in opened and closed positions to see that all parts are in working condition.
- D. Concealed Piping:
 - 1. Piping shall not be enclosed or concealed until all fire protection piping has been installed, tested and inspected.
- E. Install thrust blocks and/or braces at taps and offsets to prevent displacement due to water movement.

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3.02 INSPECTIONS AND TESTS:

- A. All inspections, examinations and tests required by the authorities and/or agencies specified shall be arranged and paid for by the fire protection contractor, as necessary to obtain complete and final acceptance of the fire protection system. The contractor shall deliver certificates of all such inspections to the architect.
- B. All new systems including yard piping shall be tested hydrostatically at not less than two hundred pounds per square inch gauge (200 psig) for eight (8) hours. This requirement supersedes other less stringent requirements in referenced standards.
- C. Each unit of the complete distribution system shall be thoroughly flushed out with enough water to produce an average velocity of not less than two and one-half feet per second (2-1/2 FPS) or according to NFPA requirements, whichever is greater.

END OF SECTION

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SECTION 21 13 13 WET-PIPE SPRINKLER SYSTEM

PART 1 - GENERAL

1.01 SUMMARY:

A. Section Includes

- 1. Furnish and install all materials for the complete installation of a Wet Pipe Sprinkler System and Fire Lines Complete, including Tap from the Main to the Building and shall apply to all phases of work specified, shown on the drawings or reasonably required to provide for the complete installation of approved fire protection systems for the project.
- 2. The scope of fire protection piping shall include the entire building under roof. Sprinkler system shall be of the wet pipe type. Building shall be fully sprinkled according to the requirements of NFPA 13.
- 3. All electrical wiring and equipment pertinent to fire protection control shall be provided and installed as called for in accordance with Division 26 of these specifications. The Contractor shall coordinate the requirements of the Division 21 trade and the Division 26 and Division 28 trade to ensure all components and installation are included in the base bid.

1.02 SCOPE:

- A. The work to be performed under these Specifications shall include all labor, materials, equipment, transportation, construction, facilities, and incidentals necessary for the proper execution, installation, testing, adjustments, and completion of all Work shown and indicated in the Contract Documents. The intent that the installation shall be 'complete' in every respect, pleasant in appearance, and ready for use.
- B. The work under these specifications shall in general include, but is not limited to, furnishing and installing the following:
 - 1. Summary of Work Refer to Section 01 11 00
 - 2. Excavation and Fill Refer to Section 31 23 00
 - 3. Cast-In-Place Concrete Refer to Section 03 30 00
 - 4. Penetration Seals/Fire Protection Refer to Section 07 84 13
 - 5. Painting Refer to Section 09 91 00
 - 6. Fire Suppression Refer to Section 21 00 00
 - 7. Identification of Fire Suppression Piping Section 21 05 53

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8. Fire Detection and Alarm - Refer to Section 28 31 00

1.03 REFERENCES:

- A. All equipment and piping installations shall be performed in accordance with NFPA 90, NFPA 14, and NFPA 13.
- B. NFPA Pamphlet 13 Sprinkler System.
- C. NFPA Pamphlet 24 Outside Protection (Yard Piping Systems).
- D. Fire protection system shall be designed in accordance with a computerized hydraulic analysis, or in accordance with NFPA schedules, at contractor's option.

1.04 SUBMITTALS:

- A. Shop drawings for all fire protection systems shall be submitted to the Architect and Mississippi State Rating Bureau for approval.
- B. A basic piping layout and head placement diagram have been included in the drawings. The contractor shall submit a computerized hydraulic analysis of sprinkler system with shop drawings, should he elect to use hydraulic design. Calculations shall be based on flow conditions at the site and shall be determined by the Contractor. Coordinate all work with local authorities.

1.05 COORDINATION:

A. It shall be the responsibility of this contractor to fully examine mechanical, structural, architectural, electrical, etc., plans and coordinate his work and shop drawings with other trades, and the particular requirements of the spaces involved. This contractor shall make changes in the work occasioned by conflicts with other building trades with no revision to the contract price.

1.06 QUALITY ASSURANCE:

- A. The Contractor for the fire protection installation shall be a qualified fire protection contractor, and shall be regularly engaged in the installation of automatic fire sprinkler systems and other fire protection equipment. Contractor shall have been in this business for at least 5 years and shall produce evidence of same to Construction Manager. Contractor shall provide not less than 5 references of building Owners with telephone numbers, where contractor has installed sprinkler systems of this size or larger.
- B. All work will be installed for the approval and/or acceptance of pertaining inspection bureaus, fire department, health department, fire marshal, and Owner's insurance carrier.

1.07 WARRANTY:

A. The entire fire protection installation, as specified under this section of the specifications, shall be guaranteed for one (1) year against defective equipment, materials and

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- workmanship. The guarantee period is to begin on the date of acceptance of the project by the Owner.
- B. After acceptance of sprinkler system, contractor shall provide instruction to Owner's operating personnel on proper maintenance of the system components, and shall advise him as to how often he should perform service checks on the compressor, valves, and other system components.

1.08 PERMITS:

A. All permits for the installation or construction of any of the work included in this section, which are required by any of the authorities and/or agencies having jurisdiction, shall be included in the Base Bid.

PART 2 - PRODUCTS

2.01 EQUIPMENT:

- A. All materials, equipment valves and devices installed and/or furnished under this section shall be listed and/or approved for use in the fire protection installation by the authorities, agencies, codes and standards named in this section of the specifications.
- B. Refer to Underwriter's Laboratories Approved Fire Protection Equipment List.

2.02 SPRINKLER SYSTEM:

- A. Riser to sprinkler system shall contain water flow indicators with electrical relays which operates on either DC or AC when activated by the water flow indicator. Water flow indicators shall be approved paddle type water flow alarm switch, instantaneously recycling with pneumatic retard with double set of contacts each rated at 15 amps 120 volt AC or .5 amps 120 volt DC. Switches shall be fully compatible with fire alarm system. A water motor alarm gong shall be installed on the exterior wall of the building just outside the mechanical equipment room, and shall sound upon flow of water through the system. Piping arrangement shall permit testing of gong without introducing water into the protected area.
- B. A standard installation of automatic sprinklers arranged as a wet system shall be installed as required by the computerized hydraulic analysis or NFPA schedules. Plans indicate only approximate locations of major system components. Shop drawings shall detail piping arrangement, sizes and locations.
- C. Connection to the water supply system shall be made where indicated on the drawings.
- D. Include back flow preventer in the fire main riser.
- E. The water piping, valve, switches, sprinkling equipment, and hose connections shall be installed complete in all respects, ready for operation, testing in accordance with the approved specifications for plans and approved by the authority having jurisdiction.

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- F. The Contractor shall conduct all required tests in the presence of the Construction Manger.
- G. Underground mains to interior sprinklers shall be flushed out thoroughly before connecting the sprinkler riser.
- H. Only a fully experienced and responsible technicians specializing in such work shall do sprinkler system layout and installation.

2.03 PIPE AND FITTINGS:

Fire Service below grade outside building	Schedule 40 ductile iron 300 psi	Schedule 40 ductile iron 300 psi
Fire Service below grade outside building	ANSI/AWWA C-900 Class 200 gasket joint	ANSI/AWWA C-900 PVC
Fire Service above grade inside building	Schedule 40 black steel, 300 psi. Schedule 10 piping not allowed for use	Schedule 40 black steel, 300 psi

- A. Pipe used in sprinkler systems shall be in accordance with this Section of these specifications. Piping must be of U.S. manufacture.
- B. Fittings shall be of type specifically approved for sprinkler systems and in accordance with this Section of these specifications.
- C. Victaulic couplings and fittings may be used in lieu of welded or threaded connections where permitted by applicable codes.

2.04 FREEZE PROTECTION:

- A. The piping in unconditioned areas shall be protected from freezing.
- B. Piping installed in un-finished areas and/or between the finished ceiling and the roof assembly shall be considered as installed in an unconditioned area and shall be insulated.

2.05 VALVES:

- A. All valves on connections to water supplies and in supply pipes to sprinkler shall be approved outside screw and yoke (O.S. and Y.) or approved indicator type.
- B. Drain valves shall be of the approved straightway type and may be installed in a vertical or horizontal position.
- C. Check valves shall be of approved straightway type and may be installed in a vertical or horizontal position.

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- D. All operable valves, except drain and inspection valves, in the sprinkler system shall be provided with supervisory switches. Switches shall be mounted to valves and shall contain two double pole double throw micro-switches. Cover shall be tamper-proof and shall be painted red. Connection to fire alarm system shall be by Division 28. Valves not monitored by fire alarm system shall be locked in their normal position.
- E. All drain valves and test valves at building exterior shall be equipped with concrete splash blocks to prevent soil erosion.

2.06 IDENTIFICATION:

- A. All pipe, except that in un-accessible spaces, shall be identified with standard pipe identification markers equal to Seton "Snap-On". Identification markers shall describe the type of service (ie. Fire Sprinkler) and the normal flow direction.
- B. Locate pipe markers not over 50 feet apart on each pipe and mark each pipe in at least one easily seen location.
- C. Locate all markers for easy and maximum visibility.
- D. Standard pipe identification system shall be acceptable and the same systems shall be used throughout.
- E. Pipe markers shall completely band the diameter of pipe or covering and shall overlap at least 2 inches.
- F. All exposed piping shall be painted red for quick identification.

2.07 HANGERS AND SUPPORTS:

- A. Sprinkler piping shall be substantially supported from the building structure.
- B. Hangers and supports shall be of an approved type and be installed in conformance with requirements of NFPA Standard No. 13.
- C. For straight pipe runs the maximum distance between supports shall not exceed 12 feet.
- D. For turns and off sets the maximum distance from the turn or off set to the nearest support shall not exceed 3 feet each side of the turn or off set.
- E. Seismic braces shall be installed to prevent abnormal movement of piping system. For dead end piping and taps for heads less than 3 feet additional support is not required.

2.08 SPRINKLER HEADS:

- A. Sprinkler heads shall be of the type included in the materials schedule on the drawings or quick response type when required for a specific occupancy.
- B. Special care is required for mechanical areas. These heads shall have mechanical protection or guards to minimize activation by physical abuse.

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- C. Furnish and install a storage cabinet at the fire main riser with not less than (2) spare heads of each type provided by this contract. The minimum number of spare sprinkler heads required by NFPA 13 shall be provided.
- D. Sprinkler heads located in lay-in ceilings shall be centered in the ceiling tiles.

2.09 UNDERGROUND FIRE LINES:

A. Contractor shall connect fire protection main to existing water main as indicated on plans. Fire protection main shall be complete with post indicator valve (PIV), Siamese connection, and alarm valves.

2.10 ALARM DEVICES:

- A. Provide and install flow and tamper switches for interconnection with fire alarm system.
- B. Provide and install water motor alarm at exterior of building.

2.11 KNOX BOX

A. Coordinate with the local authority, furnish and install a lockable box for emergency access to the facility.

PART 3 - EXECUTION

3.01 INSTALLATION:

- A. Pipe and accessories shall be handled in such a manner as to insure delivery in sound, undamaged condition. Under no circumstances shall materials be dropped or dumped. Care shall be exercised to prevent damage to pipe coatings.
- B. Every precaution shall be taken to prevent dirt, or other foreign material from entering the pipe. No debris, tools, clothing, or other materials shall be placed in the pipe during laying operations. At times when pipe laying is not in progress, a watertight plug or other approved fitting shall close the open ends of all pipe.
- C. Valves and valve boxes shall be installed in the lines as required or shown on the drawings and shall be set plumb. Valves shall have the interiors cleaned of all foreign matter before installation and shall be inspected in opened and closed positions to see that all parts are in working condition.
- D. All piping space shall be arranged such that it is 100% drainable by operation of drain valves. Drain valves and required test connections shall be located by the contractor, and shall be piped to discharge locations which will not permit splashing of water onto the building, nor will by their discharge cause any other objectionable consequences. Discharge will be permitted to drains, over exterior landscaped areas, or areas which may be subsequently washed down. Arrange system such that a minimum number of drains will be required.
- E. Concealed Piping:

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- 1. Piping shall not be enclosed or concealed until all fire protection piping has been installed, tested and inspected.
- 2. Where exposed to temperatures below 40 degrees the concealed wet piping shall be protected from freezing.
- F. Install thrust blocks and/or braces at taps and offsets to prevent movement due to water movement or seismic activity.

3.02 INSPECTIONS AND TESTS:

- A. All new systems including yard piping shall be tested hydrostatically at not less than two hundred pounds per square inch gauge (200 psig) for eight (8) hours. No leakage shall be permitted. This requirement supersedes other less stringent requirements in referenced standards.
- B. After the system has been proven water tight, each unit of the complete distribution system shall be thoroughly flushed out with enough water to produce an average velocity of not less than two and one-half feet per second (2-1/2 FPS) or according to NFPA requirements, whichever is greater.
- C. The Inspector's test station shall be activated and alarm system operation observed.
- D. For any portion of the piping supplying potable water, the piping shall be disinfected with a minimum of 50 ppm free chlorine for 24 hours or as described in the latest version of AWWA C651. The piping shall then be flushed with fresh water until the chlorine concentration is no greater than 1 ppm. After disinfection, water samples for testing shall presented to the Health Department for evaluation. Subject to the recommendation of the Health Department the piping shall be further cleaned, disinfected, flushed, and tested until the piping is determined not to be a health hazard.
- E. All inspections, examinations and tests required by the authorities and/or agencies specified shall be arranged and paid for by the Contractor, as necessary to obtain complete and final acceptance of the fire protection system. The Contractor shall deliver certificates of all such inspections to the architect.

3.03 INSPECTION SERVICE:

- A. After completion of the fire protection system installation at the start of the guarantee year, the fire protection contractor shall execute the National Automatic Sprinkler and Fire Control Association, Inc., standard form of "Inspection Agreement", without charge to the Owner, calling for four (4) inspections of the sprinkler system during the year guaranteed. During the guarantee, inspections shall be made as per the "Inspection Agreement" plus the following maintenance is to be performed during the course of the fourth inspection:
 - 1. Operation of all control valves
 - 2. Lubrication of operating stems of all interior control valves

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- 3. Operation of the inspector's test station
- 4. Operation of water motor gong and/or electric alarm.
- 5. Cleaning of alarm valves.
- 6. Cleaning of pipe valves.
- 7. Lubrication of fire department hose connection inlets
- B. The standard form of the National Automatic Sprinkler and Fire Control Association, Inc., "Report of Inspection" shall be filled out in triplicate after each inspection and the copies sent to the Owner, insurance carrier, fire department or other authorities that the Owner may designate. Noted deficiencies shall be corrected by the Contractor with no additional cost to the Owner.

END OF SECTION

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SECTION 22 00 00 PLUMBING

PART 1 - GENERAL

1.01 GOVERNING STATEMENT:

- A. The General Conditions, Supplementary General Conditions, Information to Bidders, General Requirements and other pertinent documents issued by the Architect are to be considered as a part of these specifications and shall be complied with in every respect.
- B. This specification indicates the general scope of the project in terms of plumbing systems. As scope documents the specifications do not necessarily indicate or describe all work required for full performance and completion of the requirements of the Contract Documents. On the basis of the general scope indicated or described, the contractor shall furnish all items required for the proper execution and completion of the work.
- C. Examine the site, mechanical, general construction, structural, electrical, and other pertinent drawings. Plan, install, and coordinate all work with other trades. The Contractor shall become familiar with local building codes and serving utility requirements. The final product is to be free of hazard and fully functional without additional cost to the Owner.
- D. Furnish all material, equipment, labor and all incidentals necessary to install plumbing systems shown on the drawings and as specified herein in a manner acceptable to the Architect. Install and adjust all equipment and material as shown on the plans, specified, or hereinafter mentioned or implied in such manner as to accomplish the general intent of the plans and specifications. The latest editions of the applicable codes apply to this project and take precedence over any of the project documents (specifications and drawings).
- E. Coordinate seismic bracing requirements with local authority.
- F. Submit only written requests to the Architect for interpretation or clarification of the Contract Documents.

1.02 SCOPE OF WORK

- A. The work to be performed under these Specifications shall include all labor, materials, equipment, transportation, construction, facilities, and incidentals necessary for the proper execution, installation, testing, adjustments, and completion of all Work shown and indicated in the Contract Documents. The intent is that the installation shall be 'complete' in every respect, pleasant in appearance, and ready for use.
- B. The work under these specifications shall in general include, but is not limited to, furnishing and installing the following:
 - 1. Condensate waste piping
 - 2. Domestic water system

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- 3. Sanitary sewer system
- 4. Plumbing fixtures and accessories
- 5. Payment of all fees and permits required for the work of this section, including utility service taps
- 6. Location and sizes of furring, chases and access panels required for installation of plumbing systems

1.03 WORK BY OTHERS:

- A. At various phases of the work it may be necessary for others to install systems and/or components not covered by this contract. This contractor shall cooperate with others performing such work.
- B. All components and work not specifically stated herein or on the plans to be by others, which are required to make the system complete and operative, shall be furnished, installed, and governed by the Contract Documents.
- C. All work necessary, but supplemental to the work described in Division 22, shall be complete as described elsewhere in the contract documents by divisional trades. Special services and financial obligations for this work shall be by the Contractor.
- D. The Contractor shall provide new furring and chases required for mechanical installations. It is the responsibility of the Contractor to coordinate the sizing and location of furring and chases with the work of the other trades. Provide all critical dimensions that relate to mechanical equipment to insure proper coordination.
- E. All power wiring shall be furnished and installed by the Division 26 Trade.
- F. All equipment furnished by Division 22 trades shall be provided with proper supports and vibration isolation.

1.04 DRAWINGS

- A. The drawings are generally diagrammatic and outlets, motors, ducts, piping, etc., shown on the drawings do not indicate that such items shall be placed at the exact location as scaled on the drawings. All building dimensions are to be taken from the architectural drawings.
- B. The drawings and specifications shall be considered as cooperative. Work and material included in either, though not mentioned in both, shall be part of the project to be accomplished and shall be carried out completely.
- C. The drawings indicate the extent and general arrangement of the various systems. If any departure from these drawings is necessary, descriptions of these departures and a statement of the reason therefore shall be submitted to the Construction Manager for approval.

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- D. These drawings and specifications shall be considered a part of this Contract. Should an error or omission occur in either or both the drawings and specifications, or conflict with the other, this Contractor shall not avail himself of such unintentional error, omission or conflict, but shall have same explained to him and adjusted before signing the Contract or proceeding with the work.
- E. The Contractor shall prepare shop drawings and required field drawings (one copy will be retained by the Architect) as hereinafter specified or required by the drawings. Shop drawings will include all dimensions, grades, materials, etc., pertinent to installation. The shop drawings shall be coordinated with the work of related trades and shall be submitted for approval before installation is begun. The shop drawings shall be submitted electronically to expedite review.
 - 1. Pipe insulation
 - 2. Plumbing fixtures and accessories
 - 3. Domestic water heaters and P&T valves

1.05 QUALITY ASSURANCE

- A. The materials, components, and installation shall comply with the appropriate sections and articles of:
 - 1. Local Building Ordnance
 - 2. Plumbing Code
 - 3. Gas Code
 - 4. Electrical Code
 - 5. Mechanical Code
 - 6. NFPA
- B. The local authority shall be the interpreter of any code requirements. In the absence of a local enforcing authority the Architect shall interpret the code and his decision shall govern.

1.06 TESTING:

- A. It shall be the responsibility of the Contractor to furnish all testing equipment and labor necessary to perform the following tests:
 - 1. Domestic water piping
 - 2. Sanitary sewer piping

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B. Coordinate with the Project Manager for review of all system components prior to concealment or otherwise expose system components for review prior to Project Acceptance.

1.07 CLEAN-UP:

- A. The site shall be continuously clean, neat, and orderly. Do not let debris accumulate or become scattered. Maintain the site in a safe, secure, hazard free condition.
- B. Materials stored on the site must be well organized, protected from the weather, and physically secure.

1.08 WARRANTY:

- A. Provide full one (1) year guarantee of the work, to include materials, parts, labor, and transportation for repair and/or replacement of defects in material and/or workmanship. The contractor shall replace any defective materials or remedy other defects without cost to the Owner during the guarantee period.
- B. Provide written statement to the Owner with words to the effect:

"We hereby guarantee all Work performed by us on the above captioned project to be free from defective materials and workmanship for a period of one year or such period of time as may be called for in the Contract Documents for such portions of the Work."

1.09 FEES AND PERMITS:

A. Make all arrangements and pay all costs and assessments by municipalities, utility providers, or other regulatory bodies for building permits, inspection fees, etc. Such costs and assessments shall be included in the base bid.

1.10 ALTERNATES:

A. See Architects instructions for alternates.

1.11 CASH ALLOWANCES:

A. See Architects instructions for cash allowances.

PART 2 - PRODUCTS:

2.01 GENERAL:

- A. All materials (not indicated existing to be re-used) are to be new and of current design for which replacement parts are available.
- B. All new materials shall be recognized for application and use as installed.
- C. All materials shall be properly stored and protected. Materials damaged due to improper storage and/or handling shall be repaired or replaced at the Owner's option.

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- D. Where material or equipment is specified or shown on the drawings by name of manufacturer or by accepted trade designation, it denotes the quality desired. The material of other manufacturers may be used, provided the construction, arrangement, finish, and capacity equals or exceeds that specified or shown. Where two or more items are furnished under the same specifications, all are to be of the same manufacturer and shall be identical and inter-changeable.
- E. It shall be the responsibility of the Contractor to ascertain if the substitute items will fit into the space allotted as conveniently as the items specified. Any changes to the building or system design necessary shall be arranged for in writing before material is ordered. All costs involved in making such changes shall be borne by the Contractor. If the Architect deems such changes inadvisable, the Contractor shall install items specified even though substitute item had been previously reviewed. Architect's review of a substitute is for performance and/or design only.

2.02 DESCRIPTION:

- A. Refer to Section 22 05 53 Identification of Plumbing Piping and Equipment
- B. Refer to Section 22 07 19 Plumbing Pipe Insulation
- C. Refer to Section 22 11 13 Facility Water Distribution
- D. Refer to Section 22 11 23 Domestic Water Pumps
- E. Refer to Section 22 13 00 Facility Sanitary Sewer
- F. Refer to Section 22 40 00 Plumbing Fixtures

2.03 COMPONENTS INCLUDED:

A. An attempt has been made to identify the major components of each system. Incidental materials and/or operations required to complete the installation shall be furnished without further mention. The intent is to provide a complete, safe, and operable system. Such incidental components and/or operations are to be in keeping with the quality established for the Work.

PART 3 - EXECUTION

3.01 GENERAL:

- A. The Work as described in the Contract Documents is technical in nature. Skilled craftsmen shall perform this work. Trainees and labors shall work only under the supervision of the skilled craftsmen.
- B. A Foreman or Leadsman shall be designated for Division 22 Work. The Foreman or Leadsman shall be on site to participate in or supervise others performing Division 22 Work.

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- C. All systems and components shall be installed in strict accordance with the manufacturer's recommendations by technicians skilled with tools and techniques of the trade. Where such recommendations are not routinely published the systems and components shall be installed with tools and techniques of the trade and to traditional industry standards.
- D. In general, all piping shall be concealed below grade, below finished floor, above ceilings, or within walls. Do not conceal piping until the piping has surpassed the required testing and been review by the Project Manager.

3.02 COORDINATION:

- A. Make provisions for the delivery and safe storage of all materials, and arrange with other trades on the job for the installation of equipment too large to pass through finished openings.
- B. Arrange to have materials delivered to the job at such stages of the work as will expedite the work as a whole. Mark and store all materials in such a manner as to be easily checked, inspected, and issued.
- C. Locations of all outlets, fixtures, ducts, equipment, etc. are to be verified with other trades or specific equipment suppliers prior to roughing in. The cost of relocating such items because of failure to do so shall be at the Contractor's expense.
- D. Avoid interference with structure and work of other trades, preserving adequate headroom and clearing all doors and passageways to approval of the Architect.

3.03 FINAL CONNECTION TO EQUIPMENT:

- A. Certain items of equipment shown on the drawings are existing to be re-used, to be furnished by the Owner, or to be furnished by other trades. The Contractor shall be responsible for final connections including all labor and materials required. Also where applicable, the Contractor shall relocate and/or reinstall such equipment.
- B. Where final connections to equipment provided under Division 22 are to be completed by other trades, for example Division 26, the Division 22 equipment shall be factory ready for field connection without the requirement for other lugs or components. The Contractor shall cooperate and coordinate with others making final connections.
- C. Division 26 Trades shall furnish electrical power final connections. The Contractor shall coordinate and corporate between trades for final power connection requirements.

3.04 EXCAVATION AND BACKFILLING:

- A. The Contractor shall do all excavating and backfilling required for all Division 22 work. Fill, compaction, surface, etc. to meet all the requirements as applicable for the area and shall be governed by Division 02 and 31 of these specifications.
- B. The Contractor is to determine the presence and location of any underground service such as telephone, electrical, water, gas, sewage, etc. whether previously existing or as

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- installed by other trades. The Contractor is to bear full consequences for the interference of any such systems.
- C. Backfill containing large rock, paving materials, cinders, large or sharply angular substance, or corrosive material shall not be placed in an excavation where these materials may damage underground piping or other substructures or prevent adequate compaction of fill, or contribute to corrosion of underground piping or other substructures. Where necessary to prevent physical damage to the underground piping, protection shall be provided in the form of granular or selected material, suitable running boards, suitable sleeves, or other approved means.
- D. Do not backfill piping until the system has surpassed the required testing and been reviewed by the Project Manager or otherwise uncover the piping for review prior to Project Acceptance.

3.05 FIRE STOP:

- A. Installations in hollow spaces, vertical shafts, and ventilation of air-handling ducts shall be so made that the possible spread of fire or products of combustion will not be substantially increased. Openings around penetrations through fire-resistant-rated walls, partitions, floors, or ceilings shall be fire-stopped using approved methods to maintain the fire resistance rating. Refer to Division 07 84 00 of these specifications.
- B. Refer to the Architectural Drawings for fire rated partitions and ceilings.

3.06 FLOORS, WALLS, AND CEILING PLATES

A. Furnish and install chrome-plated type floor, wall, and ceiling plates or escutcheons on all exposed pipe passing through floors, walls and ceilings. Inside diameter shall fit around insulation or around pipe; when not insulated, outside diameter shall cover sleeve. Where sleeve extends above finished floor, escutcheon shall clear sleeve extension. Secure escutcheons or plates to pipe or sleeve but not to insulation.

3.07 PIPE SLEEVES

- A. Pipe sleeves of cast iron or zinc coated steel pipe shall be provided for all pipes passing through exterior walls, and slabs on grade, which do not have membrane waterproofing.
- B. Sleeves passing through floors, utility trench, interior walls or floors rated one (1) hour or more, and exterior walls which are provided with membrane waterproofing shall be sealed with approved elastomeric fire proofing sealer. Provide an expandable fire caulk and restraining collar for pipe penetrating rated walls, floors, and ceilings. This caulking shall be UL tested, rated and classified according to 1994 Underwriters Laboratories, Inc., Volume II.
- C. Sleeves passing through floors and exterior walls which are provided with membrane waterproofing shall be threaded steel pipe fitted with companion flanges and arranged to secure membrane. Companion flanges shall be drilled and tapped in such a manner that bolting is affected from the outer (or upper) face only.

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- D. Sleeve pipes passing through potentially wet floors that do not have membrane waterproofing such as in toilet rooms, kitchens, serving areas, etc., shall be zinc coated steel pipe and shall project 2 inches above the finished floors, and shall be caulked watertight.
- E. Sleeves shall be provided for all pipes passing through all other floors and walls, and shall be constructed of zinc coated sheet steel not lighter than No. 26 gage, moisture resistant fiber, or plastic.
- F. On new work, sleeves shall be built into the walls and floors as the work progresses.
- G. Sleeves through exterior walls below grade shall be not less than 2 inches greater in inside diameter than the outside diameter of the pipe it serves; all other sleeves shall be large enough to provide approximately 1/4 inch clear annular space between the sleeve and pipe or between the sleeve and insulation where insulation is required. Except as hereinafter specified for wet area floors, sleeves shall be of sufficient length to terminate flush with the finished floor or wall.
- H. Spaces between pipes and sleeves passing through exterior walls shall be caulked watertight.

3.08 PAINTING AND PATCHING:

- A. All equipment, piping, and supports in finished areas shall be painted. Components provided with pre-painted finishes shall have this finish protected during installation and through out the project. Any portion of the building structure or other equipment that incurs damage to its painted surface from the installation of the Division 22 equipment shall have this surface repainted.
- B. All openings required for Division 22 components shall be properly patched and sealed. Trim must conceal all rough openings.
- C. Painting and patching shall be governed by the requirements of Division 09 of these specifications. This contractor shall arrange and coordinate with Division 09 trades to ensure all expenses are included in the base bid.

3.09 INSTALLATION DIRECTIONS:

A. Obtain manufacturer's printed installation directions to aid in properly executing work on equipment requiring such directions as directed by the Architect. Submit such directions to the Architect for approval prior to time of installation of equipment.

3.10 STARTING AND INSTRUCTION:

- A. All equipment and systems shall be tested as before being placed in operation.
- B. Furnish a competent Technician to supervise the starting, adjusting and testing of all equipment and to train the operator in the operation of the system. Where specified, certain major items of equipment shall be installed under the supervision of and tested by

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- a specialist furnished by the manufacturer of the equipment. Such specialist shall train the operator in the use of his equipment.
- C. Furnish (2) duplicate sets of operating and maintenance instructions for each and every piece of equipment supplied by him together with copies of spare parts lists. This information shall be neatly bound in (3) ring binders, indexed and labeled for each piece of equipment.
- D. Contractor will spend sufficient time with the operator to acquaint him with the complete operation of the systems.

3.11 PROTECTION OF EQUIPMENT AND MATERIALS:

- A. Responsibility for care and protection of equipment and material under this Contract rests with the Contractor until equipment or materials have been tested and accepted.
- B. All pipe ends, valves and parts of equipment left unconnected permanently or temporarily, shall be capped, plugged or properly protected to prevent entry of foreign matter. Pipe ends shall include a shutoff valve or supply valve as appropriate so as not to valve out entire system when making future tie-ins.

3.12 EQUIPMENT FOUNDATIONS AND SUPPORT:

- A. Install equipment and fixtures in locations shown on the drawings, except where specifically otherwise approved.
- B. Unless noted otherwise on the drawings, provide all support required for equipment specified under this division. Concrete pads shall be reinforced and shall be troweled smooth. Steel supports shall be standard structural channels or angles of the proper sizes to support equipment.
- C. All ferrous and metallic supports and channels shall be finished to prevent corrosion and to provide a pleasant appearance. Refer to Division 05 and Division 09 of these specifications.
- D. Relief valve outlets to be piped to floor drain unless noted otherwise on drawings.
- E. Install all control and interlocking wiring required for the proper operation of equipment. Installation of equipment shall be in accordance with manufacturer's written directions.

3.13 INSPECTION

- A. Check each system component for defects, verifying that all parts are properly furnished and installed, that all items function properly, and all adjustments have been made.
- B. Do not conceal any system component until the required testing has been completed and reviewed by the Project Manager.

3.14 CLOSE OUT SUBMITTALS

A. Project close out documents shall include the following:

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1. Provide (2) sets of product data sheets, spare parts list, and O&M manuals for equipment installed under this contract. The product data sheets, spare parts list, and O&M manuals shall include, but not be limited to plumbing fixtures and plumbing specialties, water heaters, etc.

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SECTION 22 05 53 IDENTIFICATION OF PLUMBING PIPING AND EQUIPMENT

PART 1 - GENERAL

1.01 SUMMARY:

A. Provide a thorough and complete system of identification of all pipe and equipment to permit immediate and positive recognition.

1.02 EQUIPMENT LABELS:

- A. All equipment furnished under this division shall be provided with manufacturer's identification labels securely attached to each individual piece of equipment and show complete and comprehensive performance characteristics, size, model number, and serial number.
- B. The Contractor shall furnish and install identification labels (black phenolic with white letters) for each piece of equipment clearly identifying the equipment as referred to on the drawings.

PART 2 - PRODUCTS

2.01 PIPE IDENTIFICATION:

- A. All pipe, except that in un-accessible spaces, shall be identified with standard pipe identification markers equal to Seton "Snap-On". Identification markers shall describe the type of service (ie. Domestic Cold Water) and the normal flow direction.
- B. Include 'Caution Buried Piping' tape in each trench about 6" above buried water piping.
- C. Include #12 AWG copper tracer wire in each trench about 6" above buried water piping. Expose tracer wire at each watering station and buried valve location.

PART 3 - EXECUTION

3.01 INSTALLATION:

- A. Locate pipe markers not over 50 feet apart on each pipe and mark each pipe in at least one easily seen location.
- B. Locate all markers for easy and maximum visibility, and provide arrow indicating normal flow direction.
- C. Standard pipe identification system shall be acceptable and the same systems shall be used throughout.
- D. Pipe markers shall completely band the diameter of pipe or covering and shall overlap at least 2 inches.

3.02 CLOSING IN UNINSPECTED WORK

A. Do not cover up or enclose work until it has been properly and completely reviewed. Should any of the work be covered up or enclosed prior to verification, uncover the work as required for inspection. Make all repairs and replacements with such materials and workmanship as are necessary at no additional cost to the owner.

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SECTION 22 07 19 PLUMBING PIPING INSULATION

PART 1 - <u>GENERAL</u> PART 2 - SUMMARY:

A. Furnish and install insulation for all above grade domestic water, condensate waste, and low and high pressure refrigerant piping.

PART 3 - PRODUCTS

3.01 PIPING INSULATION:

- A. Domestic Water Piping: 1/2" inch thick fiberglass pipe covering with ASJ jacket and self-sealing lap and butt strips equal to Johns Manville Micro-lok. Staple all laps. Apply insulation in strict accordance with the manufacturer's recommendations. Insulation shall be secured to piping with not less than two aluminum bands per section of insulation. Tightly butt all joints together. Insulate fittings and valves with pre-cut, flexible fiberglass insulation of same thickness as insulation on adjacent pipes. Secure insulation to fittings or valves with insulation tape and cover with Zeston one-piece, pre-molded, PVC fitting covers. Circumferential edges of covers to be wrapped with vapor barrier pressure sensitive tape.
- B. Condensate Drain Piping: 1/2" thick equal to Armstrong No. 520. Adhesive shall be brushed on each of the split surfaces and allowed to dry until tacky before applying the covering. Insulation shall then be applied to the pipe and split edges sealed together. Seal the butt joints same as the splits. Insulate fittings in same manner. Where pipe insulation passes through a pipe hanger or where the insulation must resist compression, supporting devices such as short wood dowels or wood blocks shall be used in combination with galvanized sheet metal hanger shields. The wood devices shall be the same thickness as the insulation and sealed into the insulation with 520 adhesive. Where exposed to the weather, finish insulation with two coats of weather resistant finish.

3.02 INSULATION SUMMARY SCHEDULE:

- 1. Domestic Cold Water 1/2" thick fiberglass with vapor barrier
- 2. Domestic Hot Water 1/2" thick fiberglass with vapor barrier
- 3. Domestic Hot Water Return 1/2" thick fiberglass with vapor barrier
- 4. Condensate Drain Piping 1/2" thick expanded foam rubber

SECTION 22 11 13 FACILITY WATER DISTRIBUTION

PART 1 - GENERAL

1.01 SUMMARY:

- A. Pipe, fittings and valves shall be in accordance with the following schedule to be installed as shown on the drawings.
- B. Review installation details for exceptions.

PART 2 - PRODUCTS

2.01 PIPE AND FITTINGS:

A. All piping must be of U.S. manufacturer.

SERVICE	PIPE MATERIAL	FITTING MATERIAL
Domestic water above slab on grade inside building	Copper type L hard drawn ASTM B88 or ANSI B16.22	Wrought Copper ANSI B16.18 or B16.22
Domestic water below slab on grade inside building	Copper type K soft drawn	No joints below slab on grade
Domestic water below grade outside building	PVC Schedule 40 ASTM D- 1785 solvent weld joint	PVC-ASTM D-2466 or D-2467

2.02 VALVES (COPPER PIPE SERVICE):

SERVICE	ТҮРЕ	MODEL NUMBER
Shutoff domestic water	Ball	Apollo bronze body, stainless steel ball and stem, Teflon seats, 200 psig minimum
Throttling	Ball	Apollo bronze body, stainless steel ball and stem, Teflon seats, 200 psig minimum
Non-return	Check	Nibco S-413-Y, 200 psig minimum
Water and Condensate	Strainer	Cast Acme 125 p.s.i.

PART 3 - <u>EXECUTION</u>

3.01 INSTALLATION:

- A. Install all piping parallel with, or perpendicular to, building lines, or as indicated on the drawings.
- B. Grade all water piping toward the high points, with all low points provided with drain valves. Install other piping level and plumb, free from traps, and in a manner to conserve space for other work.
- C. Cushion all bearing points to minimize transfer of sound. Firmly support all pipes in position. Provide complete isolation of all dissimilar metals, using EPCO, or approved equal, dielectric unions.
- D. Provide water hammer arresters and chrome shut off supplies with metal flange at all fixtures.
- E. Conceal all piping unless otherwise shown on the drawings. Do not conceal piping until the required testing has been completed and the system reviewed by the Project Manager or otherwise expose the piping for testing and review prior to Project Acceptance.
- F. Locate valves for easy access and operation. Do not install valves with stems below horizontal.
- G. Inspect each piece of pipe, tubing, fittings, and equipment for defects and obstructions. Promptly remove all defective materials from the site.
- H. Install pipes to clear all beams and obstructions. Do not cut into any structural members without the prior approval of the Architect.
- I. Where piping is installed horizontally through the stud space of partition walls and the pipe is within 1 1/2 inch of the stud space, furnish and install 1/16 inch thick steel plates to protect the piping.

3.02 JOINTS:

- A. Make all joints watertight and/or gas-tight under pressure as per required testing procedure.
- B. Cut all pipes evenly. Remove burrs from piping. Ream all copper piping to full inside bore.
- C. Make all joints in water copper tubing with lead free solder applied in strict accordance with manufacturer's recommendations.

3.03 CLEANING

A. Clean the interior of all piping with a dry lintless cloth.

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3.04 SWEAT JOBS:

- A. Tubing shall be cut so ends are perfectly square and will "bottom" in the fitting. There must be no gaps left through which solder can run into the line. If possible, a pipe cutter should be used. If a hack saw must be used, it shall always be guided with a miter box to insure a square, even cut. Tubing shall be reamed to remove burrs, being careful not to expand tubing while reaming.
- B. The outside of the copper pipe and the inside of the fittings, where solder will be applied, shall be burnished. Fine crocus cloth or fitting brushes specially made for this type of work shall be used. Surfaces shall be burnished until all dirt and oxide is removed. Cleaned surface shall not be touched with hands or gloves.
- C. A light coat of brazing flux shall be applied to both pipe and fittings. An acid flux such as muriatic (hydrochloric) acid shall not be used as the resulting corrosion can seriously affect the pipe and composition for brazing.
- D. Joint shall be heated to proper brazing temperature being sure that is uniformly hot so brazing material will flow to all parts of the joint. The brazing material shall be fed to the joint until a uniform line of brazing material appears around the pipe at the end of the fitting.
- E. An oxy-acetylene torch shall be used for heating the joint for brazing. During brazing, the pipe and fittings must be kept full of an inert gas, N or C02, to prevent formation of scale.
- F. Hard solder such as silver solder or sil-fos shall be used.
- G. When solenoid stop valves are being installed, the coil shall be removed to prevent the heat of soldering from ruining the electrical insulation. When sight glasses are being installed, the glass shall be removed to prevent cracking. No heat shall be applied near the bulb of the expansion valve or any other place where an excessive temperature may cause damage.
- H. Pipe covering shall not be installed nor the piping anchored until testing is completed and all leaks have been properly eliminated.

3.05 TESTING

- A. The contractor shall provide all equipment and materials necessary to accomplish testing of piping systems.
- B. Domestic Water Lines:
 - 1. The Contractor shall subject all new piping to 150 PSI hydrostatic test pressure for four hours with no detectable leaks. The project superintendent and/or construction manager shall witness and record the success of this pressure test.

3.06 HANGERS AND SUPPORTS:

A. Coordinate seismic bracing requirements with local authority.

B. Hangers for suspended piping shall not exceed the following spacing on centers:

PIPING MATERIAL	MAXIMUM HORIZONTAL SPACING (ft)	MAXIMUM VERTICAL SPACING (ft)
Copper or copper-alloy piping	12	10
Copper or copper-alloy tubing 1-1/4" diameter & smaller	6	10
Copper or copper-alloy tubing 1-1/2" diameter & larger	10	10

- C. Use a separate hanger for each pipe.
- D. U-bolts, clips or clamps shall be used to hold pipes on specific centers.
- E. Copper pipes shall be isolated from direct contact with the steel parts of hangers.
- F. All hangers and supports shall be finished to prevent corrosion and to present a pleasant appearance. Refer to Division 05 and Division 09 of these specifications.

3.07 CLEANING THE SYSTEM

A. Piping: After piping systems have been tested and proved tight, thoroughly flush out and clean various piping systems to remove all dirt, scale, oil, grease, and other foreign substances which may have accumulated during installation process.

3.08 STERILIZATION OF PIPES

A. Chlorination:

- 1. After preliminary flushing of a system, chlorinate the entire potable water system in accordance with requirements of Mississippi State Board of Health.
- 2. Upon completion of sterilization, thoroughly flush the entire potable water system.
- 3. When sterilization is complete, arrange with the pertinent authorities for tests on mains and systems.
- 4. Chlorinate only when building is unoccupied.
- B. Certification: Deliver a "Certificate of Completion of Chlorination" to the Construction Manager.

C. Piping: After piping systems have been tested and proved tight, thoroughly flush out and clean various piping systems to remove all dirt, scale, oil, grease, and other foreign substances which may have accumulated during installation process.

SECTION 22 13 00 FACILITY SANITARY SEWER

PART 1 - GENERAL

1.01 SUMMARY:

- A. Pipe, fittings and valves shall be in accordance with the following schedule to be installed as shown on the drawings.
- B. Review installation details for exceptions.

PART 2 - PRODUCTS

2.01 PIPE AND FITTINGS:

A. All piping must be of U.S. manufacture.

SERVICE	PIPE MATERIAL	FITTING MATERIAL
Sanitary waste and vent above slab on grade	PVC-ASTM D-2665 solvent weld joint (DWV)	PVC-ASTM D-2466 or D-2467
Sanitary waste and vent below slab on grade	PVC-ASTM D-2665 solvent weld joint (DWV)	PVC-ASTM D-2466 or D-2467
Sanitary waste below grade outside building	PVC-ASTM D-2665 solvent weld joint (DWV)	PVC-ASTM D-2466 or D-2467
Condensate waste above slab on grade inside building	PVC Schedule 40 ASTM D 1785 solvent weld Joint	PVC-ASTM D-2466 or D-2467
Condensate waste below slab on grade inside building	Copper type K soft drawn	No joints below slab on grade
Condensate waste below grade outside building	PVC Schedule 40 ASTM D- 1785 solvent weld joint	PVC-ASTM D-2466 or D-2467

PART 3 - EXECUTION

3.01 INSTALLATION:

- A. Install all piping parallel with, or perpendicular to, building lines, or as indicated on the drawings.
- B. Cushion all bearing points to minimize transfer of sound. Firmly support all pipes in position. Provide complete isolation of all dissimilar metals, using EPCO, or approved equal, dielectric unions.

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- C. Horizontal waste and soil piping (below grade):
 - 1. Preparation of the trench bottom and placement of the pipe shall be carefully done so that when in final position, the pipe is true to line and grade. Trenches shall be kept free of water during joining and curing of pipe joints.
 - 2. The piping shall be supported uniformly with concrete pad, sand or select backfill properly tamped.
 - 3. For sanitary and condensate waste the invert of the pipe shall be uniform and without low areas that pond water and shall maintain at least a pitch of 1/8 inch fall per running foot of pipe.
 - 4. Pipe shall be bedded in selected backfill (with bell holes if applicable) to 1/3 of the pipe diameter. Under no circumstances shall bricks or other such "spot" supports be used to bring pipe to grade.
 - 5. After pipe is bedded and checked for grade and leak tested as per specifications, additional select backfill is to be placed by shovel at sides and over the top of the pipe and tamped. This tamping will support a much greater load and is less likely to be subsequently disturbed or shifted.
 - 6. Reasonably clean backfill shall be placed in 6 inch lifts and compacted until the compacted fill is at least 12 inches over the pipe.
 - 7. The trench may now be backfilled by any conventional means: loader, bulldozer, etc.
 - 8. Refer to Division 02 and Division 31 of these specifications for specific compaction requirements.
- D. Install cleanouts and/or test tees at base of soil, waste and drain stacks, and every 50 feet on all horizontal piping. Cleanouts shall be same size as line on which installed, except 4 inch is the maximum size required. Exterior cleanouts to be set in 18-inch square, 6-inch thick, concrete pad level with finished grade.
- E. Pitch all vents and equipment drain lines for proper drainage.
- F. Conceal all piping unless otherwise shown on the drawings. Do not conceal piping until the required testing has been completed and the system reviewed by the Project Manager or otherwise expose the piping for testing and review prior to Project Acceptance.
- G. Inspect each piece of pipe, tubing, fittings, and equipment for defects and obstructions. Promptly remove all defective materials from the site.
- H. Install pipes to clear all beams and obstructions. Do not cut into any structural members without the prior approval of the Architect.

3.02 JOINTS:

- A. Make all joints watertight and/or gas-tight under pressure as per required testing procedure.
- B. Joints in interior PVC condensate piping shall be made in accordance with recommendations of manufacturer of fittings and solvent glue.

3.03 CLEANING

A. Clean the interior of all piping with a dry lintless cloth.

3.04 PIPE TESTING:

- A. Soil, Waste and Vent Lines:
 - 1. The Contractor shall subject all piping to 10 feet hydrostatic test pressure for ten (10) hours with no detectable leaks. The project superintendent and/or construction manager shall witness and record the success of this pressure test.

3.05 CLEANING THE SYSTEM

A. Piping: After piping systems have been tested and proved tight, thoroughly flush out and clean various piping systems to remove all dirt, scale, oil, grease, and other foreign substances which may have accumulated during installation process.

3.06 HANGERS AND SUPPORTS:

A. Coordinate seismic bracing requirements with local authority.

B. Hangers for suspended piping shall not exceed the following spacing on centers:

PIPING MATERIAL	MAXIMUM HORIZONTAL SPACING (ft)	MAXIMUM VERTICAL SPACING (ft)
PVC pipe	4	10

- C. Use a separate hanger for each pipe.
- D. U-bolts, clips or clamps shall be used to hold pipes on specific centers.
- E. Copper pipes shall be isolated from direct contact with the steel parts of hangers.
- F. All hangers and supports shall be finished to prevent corrosion and to present a pleasant appearance. Refer to Division 05 and Division 09 of these specifications.

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SECTION 22 15 00 COMPRESSED AIR PIPING

PART 1 - GENERAL

1.01 SUMMARY:

- A. Pipe, fittings and valves shall be in accordance with the following schedule to be installed as shown on the drawings.
- B. Review installation details for exceptions.

PART 2 - PRODUCTS

2.01 PIPE AND FITTINGS:

A. All piping must be of U.S. manufacture.

SERVICE	PIPE MATERIAL	FITTING MATERIAL
Compress air above slab on grade outside/inside building	ASTM A53 or A120 black steel	Malleable iron

2.02 VALVES (STEEL PIPE SERVICE):

SERVICE	ТҮРЕ	MODEL NUMBER
Shutoff 2" and smaller:	Ball	Apollo 70-100/200 series, 2- piece bronze body, stainless steel ball, Teflon seats, 600 psig WOG, threaded ends, stem extension
Shutoff 2 ½" and larger:	Butterfly	Nibco LD2000 Lug type, Cast iron body; stainless steel shaft; Teflon, nylatron, or acetal bearings; EPDM resilient seat. Disk to be aluminum-bronze. Pressure rated to 200 psig. Valve assembly to be bubble tight to 150 psig with no downstream flange/pipe attached. 2-position lever handle for 6" and smaller, gear operator for 8" and above

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2.03 IDENTIFICATION

- A. All pipe, except that in un-accessible spaces, shall be identified with standard pipe identification markers equal to Seton "Snap-On". Identification markers shall describe the type of service (ie. Compressed Air) and the normal flow direction.
- B. All new compressed air piping at shall be properly cleaned and prepared for field painting. Paint water piping with blue industrial enamel.

PART 3 - EXECUTION

3.01 INSTALLATION:

- A. Install all piping parallel with, or perpendicular to, building lines, or as indicated on the drawings.
- B. Grade all compressed air piping toward the high points, with all low points provided with drain valves. Install other piping level and plumb, free from traps, and in a manner to conserve space for other work.
- C. Cushion all bearing points to minimize transfer of sound. Firmly support all pipes in position. Provide complete isolation of all dissimilar metals, using EPCO, or approved equal, dielectric unions.
- D. Conceal all piping unless otherwise shown on the drawings. Do not conceal piping until the required testing has been completed and the system reviewed by the Project Manager or otherwise expose the piping for testing and review prior to Project Acceptance.
- E. Locate valves for easy access and operation. Do not install valves with stems below horizontal
- F. Inspect each piece of pipe, tubing, fittings, and equipment for defects and obstructions. Promptly remove all defective materials from the site.
- G. Install pipes to clear all beams and obstructions. Do not cut into any structural members without the prior approval of the Architect.

3.02 JOINTS:

- A. Make all joints watertight and/or gas-tight under pressure as per required testing procedure.
- B. Cut all pipes evenly. Remove burrs from piping. Ream all copper piping to full inside bore.

3.03 TESTING

A. The Contractor shall subject all new piping to 250 PSI pneumatic test pressure for two hours with no detectable leaks. The project superintendent and/or construction manager shall witness and record the success of this pressure test.

3.04 CLEANING

A. Clean the interior of all piping with a dry lintless cloth.

3.05 HANGERS AND SUPPORTS:

A. Coordinate seismic bracing requirements with local authority.

B. Hangers for suspended piping shall not exceed the following spacing on centers:

PIPING MATERIAL	MAXIMUM HORIZONTAL SPACING (ft)	MAXIMUM VERTICAL SPACING (ft)
Steel pipe	12	15

- C. Use a separate hanger for each pipe.
- D. U-bolts, clips or clamps shall be used to hold pipes on specific centers.
- E. All hangers and supports shall be finished to prevent corrosion and to present a pleasant appearance. Refer to Division 05 and Division 09 of these specifications.

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SECTION 22 40 00 PLUMBING FIXTURES

PART 1 - GENERAL

1.01 SUMMARY

- A. Furnish and install plumbing fixtures as shown on drawings and as listed on the plumbing fixtures schedule on drawings and as outlined in this specification.
- B. Plumbing Fixtures: The contractor shall furnish and set according to the manufacturer's directions, fixtures as specified hereinafter or listed on the Plumbing Schedule. All fixtures shall be of first quality and any fixtures, which are marred or broken before the time of acceptance of completed contract, shall be replaced with new fixture or fixtures. Carefully protect all fixtures with heavy paper wrappings. Fixtures shall be carefully and thoroughly cleaned after all painting and cleaning down of the building has been done. All fixtures shall be manufactured by the indicated manufacturers listed on the Plumbing Fixture Schedule.

PART 2 - PRODUCTS

2.01 PLUMBING FIXTURES

- A. Plumbing fixtures shall be provided complete with wall/floor mounted carriers and supports.
- B. Exposed metal of plumbing fixtures and trim of miscellaneous plumbing materials shall be yellow brass base metal.
- C. Finish of exposed metal shall be chromium plated or as noted.
- D. Finish shall be uniform for the entire project. Any manufacturer's model numbers noted herein shall be modified to conform with the above general clause relative to base metal and finish.
- E. Other materials, not specifically described, but required for a complete and operable plumbing system, shall be new first quality of their respective kinds, and as selected by the Contractor subject to the approval of the Architect.
- F. All flush valves provided on the project shall be of one manufacturer, anti-siphon.

2.02 CLEANOUTS AND TEST TEES

- A. Cleanouts shall be the same size as pipe except that cleanouts larger than 4 inches are not required. Install cleanouts and/or test tees at the foot of all soil, waste and drain stacks. Cleanouts shall be installed every 50 feet or less on all horizontal drain lines.
- B. Cleanouts shall be as manufactured by Zurn, Josam, Wade, or J. R. Smith, and shall be similar and equal to the numbers specified hereinafter.

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- C. Cleanouts for lines concealed above inaccessible ceilings or furrings, below first floor slab and/or in vertical chases shall be flush type cleanouts. No flush type cleanouts shall be installed in the horizontal surfaces of finished ceilings or furrings.
- D. Cleanouts shall be as follows:
 - 1. Vertical Lines Concealed: Josam 58910.
 - 2. Vertical Lines Exposed: Josam 58600.
 - 3. Horizontal Lines Concealed Under Floors with Tile, Vinyl, Terrazzo and/or Concrete Finish: Souix Chief 834 Series.
 - 4. Horizontal Lines Concealed Under Floors with Carpet Finish: Souix Chief 834 Series with carpet marker.

2.03 FLOOR DRAINS

- A. Floor drains shall be equal to Smith number on schedule with flashing clamp and P trap with primer connection. Install 1/4" O.D. copper tubing from primer connection to nearest fixture which will allow concealment of primer tap.
- B. Floors shall slope to floor drains at a minimum 1/16" per foot.

PART 3 - EXECUTION

3.01 PLUMBING FIXTURES:

- A. All fixtures shall be of first quality and any fixtures which are marred or broken before the time of acceptance of completed contract shall be replaced with new fixture or fixtures.
- B. The Contractor shall furnish and set all fixtures according to the manufacturer's printed instructions.
- C. Carefully protect all fixtures with heavy paper wrappings. Fixtures shall be carefully and thoroughly cleaned after all painting and cleaning down of the building has been done.
- D. The Contractor shall coordinate and provide rough-ins for final connection by the restaurant equipment supplier to any equipment not listed on fixture schedule.
- E. Support fixtures and fasten in a satisfactory manner. Secure to concrete with brass bolts or screws in lead sleeve type anchorage units or brass expansion bolts. Expansion bolts shall be recommended size brass bolts for solid concrete or brickwork fitted with loose tubing or sleeves of proper length to bring expansion sleeves in solid concrete or brick walls.
- F. Where secured to hollow block wall or partitions, fasten with recommended size brass toggle or through bolts.

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- G. Secure to partitions faced with glazed tile with Phillips "Red Head", or approved equal, inserts except where chair carriers are specified. Inserts shall be securely anchored. Install inserts flush with finished wall, completely concealed with fixtures installed. Use through bolts only where end opposite fixture can be concealed; screw heads and washers to be chromium plated.
- H. All wall mounted lavatories and urinals shall be supported by chair carriers concealed in the wall.
- I. Any fixture marred or broken before final acceptance of contract shall be replaced with new fixtures.
- J. Caulk around all glazed surfaces adjacent to walls.

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SECTION 23 00 00 HEATING, VENTILATING, AND AIR CONDITIONING

PART 1 - GENERAL

1.01 GOVERNING STATEMENT:

- A. The General Conditions, Supplementary General Conditions, Information to Bidders, General Requirements and other pertinent documents issued by the Architect are to be considered as a part of these specifications and shall be complied with in every respect.
- B. This specification indicates the general scope of the project in terms of mechanical systems. As scope documents the specifications do not necessarily indicate or describe all work required for full performance and completion of the requirements of the Contract Documents. On the basis of the general scope indicated or described, the contractor shall furnish all items required for the proper execution and completion of the work.
- C. Examine the site, mechanical, general construction, structural, electrical, and other pertinent drawings. Plan, install, and coordinate all work with other trades. The Contractor shall become familiar with local building codes and serving utility requirements. The final product is to be free of hazard and fully functional without additional cost to the Owner.
- D. Furnish all material, equipment, labor and all incidentals necessary to install mechanical systems shown on the drawings and as specified herein in a manner acceptable to the Architect. Install and adjust all equipment and material as shown on the plans, specified, or hereinafter mentioned or implied in such manner as to accomplish the general intent of the plans and specifications. The latest editions of the applicable codes apply to this project and take precedence over any of the project documents (specifications and drawings).
- E. Coordinate seismic bracing requirements with local authority.
- F. Submit only written requests to the Architect for interpretation or clarification of the Contract Documents.

1.02 SCOPE OF WORK

- A. The work to be performed under these Specifications shall include all labor, materials, equipment, transportation, construction, facilities, and incidentals necessary for the proper execution, installation, testing, adjustments, and completion of all Mechanical Work shown and indicated in the Contract Documents. The intent is that the installation shall be 'complete' in every respect, pleasant in appearance, and ready for use.
- B. The work under these specifications shall in general include, but is not limited to, furnishing and installing the following:
 - 1. Heating, ventilating, and air conditioning systems
 - 2. Natural gas distribution system

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- 3. Control wiring
- 4. Payment of all fees and permits required for the work of this section, including utility service taps
- 5. Location and sizes of furring, chases and access panels required for installation of mechanical systems
- 6. Ductwork, accessories and fans for exhaust

1.03 WORK BY OTHERS:

- A. At various phases of the work it may be necessary for others to install systems and/or components not covered by this contract. This contractor shall cooperate with others performing such work.
- B. All components and work not specifically stated herein or on the plans to be by others, which are required to make the system complete and operative, shall be furnished, installed, and governed by the Contract Documents.
- C. All work necessary, but supplemental to the work described in Division 23, shall be complete as described elsewhere in the contract documents by divisional trades. Special services and financial obligations for this work shall be by the Contractor.
- D. The Contractor shall provide new furring and chases required for mechanical installations. It is the responsibility of the Contractor to coordinate the sizing and location of furring and chases with the work of the other trades. Provide all critical dimensions that relate to mechanical equipment to insure proper coordination.
- E. All power wiring shall be furnished and installed by the Division 26 Trade.
- F. All equipment furnished by Division 23 trades shall be provided with proper supports and vibration isolation.

1.04 DRAWINGS

- A. The drawings are generally diagrammatic and outlets, motors, ducts, piping, etc., shown on the drawings do not indicate that such items shall be placed at the exact location as scaled on the drawings. All building dimensions are to be taken from the architectural drawings.
- B. The drawings and specifications shall be considered as cooperative. Work and material included in either, though not mentioned in both, shall be part of the project to be accomplished and shall be carried out completely.
- C. The drawings indicate the extent and general arrangement of the various systems. If any departure from these drawings is necessary, descriptions of these departures and a statement of the reason therefore shall be submitted to the Construction Manager for approval.

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- D. These drawings and specifications shall be considered a part of this Contract. Should an error or omission occur in either or both the drawings and specifications, or conflict with the other, the Contractor shall not avail himself of such unintentional error, omission or conflict, but shall have same explained to him and adjusted before signing the Contract or proceeding with the work.
- E. The Contractor shall prepare shop drawings and required field drawings (one copy will be retained by the Architect) as hereinafter specified or required by the drawings. Shop drawings will include all dimensions, grades, materials, etc., pertinent to installation. The shop drawings shall be coordinated with the work of related trades and shall be submitted for approval before installation is begun. The shop drawings shall be submitted electronically to expedite review.
 - 1. Duct insulation
 - 2. Exhaust/supply fans
 - 3. Mechanical heating and cooling equipment
 - 4. Grilles & registers
 - 5. Natural gas regulators
 - 6. Natural gas pipe, valves, and fittings

1.05 QUALITY ASSURANCE

- A. The materials, components, and installation shall comply with the appropriate sections and articles of:
 - 1. Local Building Ordnance
 - 2. Plumbing Code
 - 3. Gas Code
 - 4. Electrical Code
 - 5. Mechanical Code
 - 6. NFPA
- B. The local authority shall be the interpreter of any code requirements. In the absence of a local enforcing authority the Architect shall interpret the code and his decision shall govern.

1.06 TESTING:

A. It shall be the responsibility of the Contractor to furnish all testing equipment and labor necessary to perform the following tests:

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- 1. Natural gas piping
- B. Coordinate with the Project Manager for review of all system components prior to concealment or otherwise expose system components for review prior to Project Acceptance.

1.07 CLEAN-UP:

- A. The site shall be continuously clean, neat, and orderly. Do not let debris accumulate or become scattered. Maintain the site in a safe, secure, hazard free condition.
- B. Materials stored on the site must be well organized, protected from the weather, and physically secure.

1.08 WARRANTY:

- A. Provide full one (1) year guarantee of the work, to include materials, parts, labor, and transportation for repair and/or replacement of defects in material and/or workmanship. The contractor shall replace any defective materials or remedy other defects without cost to the Owner during the guarantee period.
- B. Provide written statement to the Owner with words to the effect:

"We hereby guarantee all Work performed by us on the above captioned project to be free from defective materials and workmanship for a period of one year or such period of time as may be called for in the Contract Documents for such portions of the Work."

1.09 FEES AND PERMITS:

A. Make all arrangements and pay all costs and assessments by municipalities, utility providers, or other regulatory bodies for building permits, inspection fees, etc. Such costs and assessments shall be included in the base bid.

1.10 ALTERNATES:

A. See Architects instructions for alternates.

1.11 CASH ALLOWANCES:

A. See Architects instructions for cash allowances.

PART 2 - PRODUCTS:

2.01 GENERAL:

- A. All materials (not indicated existing to be re-used) are to be new and of current design for which replacement parts are available.
- B. All new materials shall be recognized for application and use as installed.

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- C. All materials shall be properly stored and protected. Materials damaged due to improper storage and/or handling shall be repaired or replaced at the Owner's option.
- D. Where material or equipment is specified or shown on the drawings by name of manufacturer or by accepted trade designation, it denotes the quality desired. The material of other manufacturers may be used, provided the construction, arrangement, finish, and capacity equals or exceeds that specified or shown. Where two or more items are furnished under the same specifications, all are to be of the same manufacturer and shall be identical and inter-changeable.
- E. It shall be the responsibility of the Contractor to ascertain if the substitute items will fit into the space allotted as conveniently as the items specified. Any changes to the building or system design necessary shall be arranged for in writing before material is ordered. All costs involved in making such changes shall be borne by the Contractor. If the Architect deems such changes inadvisable, the Contractor shall install items specified even though substitute item had been previously reviewed. Architect's review of a substitute is for performance and/or design only.

2.02 DESCRIPTION:

- A. Refer to Section 23 05 53 Identification for HVAC Piping and Equipment
- B. Refer to Section 23 05 93 Testing, Adjusting, and Balancing
- C. Refer to Section 23 07 13 Duct Insulation
- D. Refer to Section 23 11 13 Facility Natural Gas Piping
- E. Refer to Section 23 31 13 Metal Ducts
- F. Refer to Section 23 34 00 HVAC Fans
- G. Refer to Section 23 74 00 Packaged HVAC Equipment

2.03 COMPONENTS INCLUDED:

A. An attempt has been made to identify the major components of each system. Incidental materials and/or operations required to complete the installation shall be furnished without further mention. The intent is to provide a complete, safe, and operable system. Such incidental components and/or operations are to be in keeping with the quality established for the Work.

PART 3 - EXECUTION

3.01 GENERAL:

A. The Work as described in the Contract Documents is technical in nature. Skilled craftsmen shall perform this work. Trainees and labors shall work only under the supervision of the skilled craftsmen.

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- B. A Foreman or Leadsman shall be designated for Division 23 Work. The Foreman or Leadsman shall be on site to participate in or supervise others performing Division 23 Work.
- C. All systems and components shall be installed in strict accordance with the manufacturer's recommendations by technicians skilled with tools and techniques of the trade. Where such recommendations are not routinely published the systems and components shall be installed with tools and techniques of the trade and to traditional industry standards.
- D. In general, all piping shall be concealed below grade, below finished floor, above ceilings, or within walls. Do not conceal piping until the piping has surpassed the required testing and been review by the Project Manager.

3.02 COORDINATION:

- A. Make provisions for the delivery and safe storage of all materials, and arrange with other trades on the job for the installation of equipment too large to pass through finished openings.
- B. Arrange to have materials delivered to the job at such stages of the work as will expedite the work as a whole. Mark and store all materials in such a manner as to be easily checked, inspected, and issued.
- C. Locations of all outlets, fixtures, ducts, equipment, etc. are to be verified with other trades or specific equipment suppliers prior to roughing in. The cost of relocating such items because of failure to do so shall be at the Contractor's expense.
- D. Avoid interference with structure and work of other trades, preserving adequate headroom and clearing all doors and passageways to approval of the Architect.

3.03 FINAL CONNECTION TO EQUIPMENT:

- A. Certain items of equipment shown on the drawings are existing to be re-used, to be furnished by the Owner, or to be furnished by other trades. The Contractor shall be responsible for final connections including all labor and materials required. Also where applicable, the Contractor shall relocate and/or reinstall such equipment.
- B. Where final connections to equipment provided under Division 23 are to be completed by other trades, for example Division 26, the Division 23 equipment shall be factory ready for field connection without the requirement for other lugs or components. The Contractor shall cooperate and coordinate with others making final connections.
- C. Division 26 Trades shall furnish electrical power final connections. The Contractor shall coordinate and corporate between trades for final power connection requirements.

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3.04 EXCAVATION AND BACKFILLING:

- A. The Contractor shall do all excavating and backfilling required for all Division 23 work. Fill, compaction, surface, etc. to meet all the requirements as applicable for the area and shall be governed by Division 02 and Division 31 of these specifications.
- B. The Contractor is to determine the presence and location of any underground service such as telephone, electrical, water, gas, sewage, etc. whether previously existing or as installed by other trades. The Contractor is to bear full consequences for the interference of any such systems.
- C. Backfill containing large rock, paving materials, cinders, large or sharply angular substance, or corrosive material shall not be placed in an excavation where these materials may damage underground piping or other substructures or prevent adequate compaction of fill, or contribute to corrosion of underground piping or other substructures. Where necessary to prevent physical damage to the underground piping, protection shall be provided in the form of granular or selected material, suitable running boards, suitable sleeves, or other approved means.
- D. Do not backfill piping until the system has surpassed the required testing and been reviewed by the Project Manager or otherwise uncover the piping for review prior to Project Acceptance.

3.05 FIRE STOP:

- A. Installations in hollow spaces, vertical shafts, and ventilation of air-handling ducts shall be so made that the possible spread of fire or products of combustion will not be substantially increased. Openings around penetrations through fire-resistant-rated walls, partitions, floors, or ceilings shall be fire-stopped using approved methods to maintain the fire resistance rating. Refer to Division 07 84 00 of these specifications.
- B. Refer to the Architectural Drawings for fire rated partitions and ceilings.

3.06 FLOORS, WALLS, AND CEILING PLATES

A. Furnish and install chrome-plated type floor, wall, and ceiling plates or escutcheons on all exposed pipe passing through floors, walls and ceilings. Inside diameter shall fit around insulation or around pipe; when not insulated, outside diameter shall cover sleeve. Where sleeve extends above finished floor, escutcheon shall clear sleeve extension. Secure escutcheons or plates to pipe or sleeve but not to insulation.

3.07 PIPE SLEEVES

- A. Pipe sleeves of cast iron or zinc coated steel pipe shall be provided for all pipes passing through exterior walls, and slabs on grade, which do not have membrane waterproofing.
- B. Sleeves passing through floors, utility trench, interior walls or floors rated one (1) hour or more, and exterior walls which are provided with membrane waterproofing shall be sealed with approved elastomeric fire proofing sealer. Provide an expandable fire caulk and restraining collar for pipe penetrating rated walls, floors, and ceilings. This caulking

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- shall be UL tested, rated and classified according to 1994 Underwriters Laboratories, Inc., Volume II.
- C. Sleeves passing through floors and exterior walls which are provided with membrane waterproofing shall be threaded steel pipe fitted with companion flanges and arranged to secure membrane. Companion flanges shall be drilled and tapped in such a manner that bolting is affected from the outer (or upper) face only.
- D. Sleeve pipes passing through potentially wet floors that do not have membrane waterproofing such as in toilet rooms, kitchens, serving areas, etc., shall be zinc coated steel pipe and shall project 2 inches above the finished floors, and shall be caulked watertight.
- E. Sleeves shall be provided for all pipes passing through all other floors and walls, and shall be constructed of zinc coated sheet steel not lighter than No. 26 gage, moisture resistant fiber, or plastic.
- F. On new work, sleeves shall be built into the walls and floors as the work progresses.
- G. Sleeves through exterior walls below grade shall be not less than 2 inches greater in inside diameter than the outside diameter of the pipe it serves; all other sleeves shall be large enough to provide approximately 1/4 inch clear annular space between the sleeve and pipe or between the sleeve and insulation where insulation is required. Except as hereinafter specified for wet area floors, sleeves shall be of sufficient length to terminate flush with the finished floor or wall.
- H. Spaces between pipes and sleeves passing through exterior walls shall be caulked watertight.

3.08 PAINTING AND PATCHING:

- A. All equipment, piping, and supports in finished areas shall be painted. Components provided with pre-painted finishes shall have this finish protected during installation and through out the project. Any portion of the building structure or other equipment that incurs damage to its painted surface from the installation of the Division 23 equipment shall have this surface repainted.
- B. All openings required for Division 23 components, piping, ducts, grilles, registers, etc. shall be properly patched and sealed. Trim must conceal all rough openings.
- C. Painting and patching shall be governed by the requirements of Division 09 of these specifications. This contractor shall arrange and coordinate with Division 09 trades to ensure all expenses are included in the base bid.

3.09 INSTALLATION DIRECTIONS:

A. Obtain manufacturer's printed installation directions to aid in properly executing work on equipment requiring such directions as directed by the Architect. Submit such directions to the Architect for approval prior to time of installation of equipment.

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3.10 STARTING AND INSTRUCTION:

- A. All equipment and systems shall be tested as before being placed in operation.
- B. Furnish a competent Technician to supervise the starting, adjusting and testing of all equipment and to train the operator in the operation of the system. Where specified, certain major items of equipment shall be installed under the supervision of and tested by a specialist furnished by the manufacturer of the equipment. Such specialist shall train the operator in the use of his equipment.
- C. Furnish (2) duplicate sets of operating and maintenance instructions for each and every piece of equipment supplied by him together with copies of spare parts lists. This information shall be neatly bound in (3) ring binders, indexed and labeled for each piece of equipment.
- D. Contractor will spend sufficient time with the operator to acquaint him with the complete operation of the systems. Operators, such as switches, pushbuttons, changeovers, etc., shall be identified.

3.11 PROTECTION OF EQUIPMENT AND MATERIALS:

- A. Responsibility for care and protection of equipment and material under this Contract rests with the Contractor until equipment or materials have been tested and accepted.
- B. All pipe ends, valves, ducts, and parts of equipment left unconnected permanently or temporarily, shall be capped, plugged or properly protected to prevent entry of foreign matter. Pipe ends shall include a shutoff valve or supply valve as appropriate so as not to valve out entire system when making future tie-ins.e

3.12 EQUIPMENT FOUNDATIONS AND SUPPORT:

- A. Install equipment and fixtures in locations shown on the drawings, except where specifically otherwise approved.
- B. Unless noted otherwise on the drawings, provide all support required for equipment specified under this division. Concrete pads shall be reinforced and shall be troweled smooth. Steel supports shall be standard structural channels or angles of the proper sizes to support equipment.
- C. All ferrous and metallic supports and channels shall be finished to prevent corrosion and to provide a pleasant appearance. Refer to Division 05 and Division 09 of these specifications.
- D. Relief valve outlets to be piped to floor drain unless noted otherwise on drawings.
- E. Install all control and interlocking wiring required for the proper operation of equipment. Installation of equipment shall be in accordance with manufacturer's written directions.

3.13 INSPECTION

- A. Check each system component for defects, verifying that all parts are properly furnished and installed, that all items function properly, and all adjustments have been made.
- B. Do not conceal any system component until the required testing has been completed and reviewed by the Project Manager.

3.14 CLOSE OUT SUBMITTALS

- A. Project close out documents shall include the following:
 - 1. Provide (2) sets of product data sheets, spare parts list, and O&M manuals for equipment installed under this contract. The product data sheets, spare parts list, and O&M manuals shall include, but not be limited to HVAC equipment, HVAC T&B report, and components, etc.

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SECTION 23 05 53 IDENTIFICATION FOR HVAC PIPING AND EQUIPMENT

PART 1 - GENERAL

1.01 SUMMARY:

A. Provide a thorough and complete system of identification of all pipe and equipment to permit immediate and positive recognition.

1.02 EQUIPMENT LABELS:

- A. All equipment furnished under this division shall be provided with manufacturer's identification labels securely attached to each individual piece of equipment and show complete and comprehensive performance characteristics, size, model number, and serial number.
- B. The Contractor shall furnish and install identification labels (black phenolic with white letters) for each piece of equipment clearly identifying the equipment as referred to on the drawings.

PART 2 - PRODUCTS

2.01 PIPE IDENTIFICATION:

- A. All pipe, except that in un-accessible spaces, shall be identified with standard pipe identification markers equal to Seton "Snap-On". Identification markers shall describe the type of service (ie. Natural Gas) and the normal flow direction.
- B. All new natural gas piping shall be properly cleaned and prepared for field painting. Paint natural gas piping with yellow industrial enamel.
- C. Include 'Caution Buried Piping' tape in each trench about 6" above buried gas piping.
- D. Include #10 AWG copper tracer wire in each trench about 6" above buried gas piping. Expose tracer wire at each watering station and buried valve location.

PART 3 - EXECUTION

3.01 INSTALLATION:

- A. Locate pipe markers not over 50 feet apart on each pipe and mark each pipe in at least one easily seen location.
- B. Locate all markers for easy and maximum visibility, and provide arrow indicating normal flow direction.
- C. Standard pipe identification system shall be acceptable and the same systems shall be used throughout.

D. Pipe markers shall completely band the diameter of pipe or covering and shall overlap at least 2 inches.

3.02 CLOSING IN UNINSPECTED WORK

A. Do not cover up or enclose work until it has been properly and completely reviewed. Should any of the work be covered up or enclosed prior to verification, uncover the work as required for inspection. Make all repairs and replacements with such materials and workmanship as are necessary at no additional cost to the owner.

Addition at Career and Technical Center (Itawamba County School District)

SECTION 23 05 93 TESTING, ADJUSTING, AND BALANCING FOR HVAC

PART 1 - GENERAL

1.01 SUMMARY:

- A. The balancing, testing, and adjusting of the heating, ventilating, and air conditioning systems shall be performed by an independent, AABC, TABB, or NEBB certified balancing company who possesses calibrated instruments, qualified engineers, and skilled technicians to perform all tests.
- B. The testing and balancing agency (TAB) shall be responsible for inspecting, adjusting, balancing and logging the data on the performance of fans, all dampers in the duct system, and all air distribution devices.
- C. The Contractor shall cooperate with the TAB to provide all necessary data on the design and proper application of the systematic components and shall furnish all labor and material required to eliminate any deficiencies in construction.
- D. The fully executed test and balance report shall be issued to the professional no less than 48 hours prior to a request for a final inspection. All equipment must be installed and operational.
- E. Expenses related to Testing, Adjusting, and Balancing shall be included in the Base Bid.

PART 2 - PRODUCTS

2.01 EQUIPMENT:

A. TAB shall provide all equipment and materials necessary to accomplish testing, adjusting and balancing as specified herein.

PART 3 - EXECUTION

3.01 PERFORMANCE TESTS:

- A. Performance testing shall be by the approved certified TAB. The records from the performance testing/balancing shall be submitted to the Architect for review.
- B. Each and every phase of the heating, ventilation and air conditioning plant shall be operated separately, or in conjunction one with the other for a sufficient period of time to demonstrate to the entire satisfaction of the Owner, the ability of the systems to meet the capacity and performance requirements while maintaining design conditions, in accordance with the true intent and purpose of these specifications. Hourly readings shall be recorded on outside and inside dry and wet bulb temperatures during the test period.
- C. Previous to such performance tests, the Contractor shall have set and adjusted all dampers, motors, controllers, thermostats, etc., and shall have the building operating and maintaining design temperatures and air circulation throughout all areas of the building.
- D. For the purpose of placing heating, ventilating and air conditioning systems in operation according to design conditions and certifying the same, the Contractor shall assure that all air flow and water flow rate are as shown on the drawings and provide balancing reports to the Architect. Contractor shall perform the following tests and compile the following information:

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- 1. Air Systems and Air Distribution Balance: Air Handling Equipment (Supply, Return, Fresh Air, and Exhaust Systems).
 - a. Supply cfm (design and measured)
 - b. Supply static pressure (measured)
 - c. Return cfm (measured)
 - d. Outside air (design and measured)
 - e. Motor Horsepower
 - f. Fan rpm
 - g. Fan motor brake horsepower
- 2. Installed Equipment:
 - a. Manufacturer
 - b. Size
 - c. Arrangement, discharge class
 - d. Motor horsepower, volt, phase, cycle and full Load amps
- 3. Field Tests:
 - a. Fan Speed
 - b. Fan motor operating amperes (by Phase)
 - c. Fan motor operating brake horsepower
 - d. Field volts (Line to Line or Line to Neutral)
 - e. Static pressure at outlet
 - f. Total pressure at inlet
- 4. Cooling & Heating Coil Data:
 - a. Entering air DB temperature, design and actual
 - b. Entering air WB temperature, design and actual
 - c. Leaving air DB temperature, design and actual
 - d. Leaving air WB temperature, design and actual
- 5. Individual Outlets (Grilles, Registers, and Diffusers) Including Supply, Return and Exhaust:
 - a. Each outlet shall be identified as to location and area.
 - b. Outlet manufacturer and type.
 - c. Outlet size.
 - d. Outlet free area, core area or neck area.
 - e. Outlet factor.
 - f. Required fpm and test result velocity for each outlet.

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- g. Required cfm and test results, each outlet.
- E. All tests shall be performed with calibrated anemothern, velometer, or manometer and pitot tube. All outlets shall be set for air pattern. All supply air, return air, and exhaust air shall be adjusted and set for design cfm.
- F. If requested, the contractor shall conduct tests as specified herein in the presence of the project superintendent or construction manager.
- G. Included as a part of his original submittal, the Contractor shall provide copies of manufacturer's fan performance data and curves, and air distribution balancing data.

3.02 OPERATING TESTS

- A. After work has been completed, tested, adjusted, and approved, test systems under normal operating conditions for two 8-hour days or longer when so directed to demonstrate that they fulfill requirements of drawings and specifications, and that they operate satisfactorily.
- B. During operating tests, arrange and pay for services of qualified and authorized representatives of the manufacturer of the systems, equipment and controls, to instruct designated Owner's operating personnel in operating and maintaining the systems. Prior to final inspection, provide letter certifying that appropriate operating and maintenance instructions have been provided for the designated personnel.

3.03 CLEANING THE SYSTEM

- A. Ductwork: After ductwork has been tested and proved tight, thoroughly clean all components of ductwork and remove all dirt, scale, oil and other foreign substances which may have accumulated during installation process.
- B. Equipment: After equipment has been started and proved operational, carefully clean all accessible parts of each piece of equipment, thoroughly removing all traces of dirt, oil, grease, and other foreign substances.

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SECTION 23 07 13 DUCT INSULATION

PART 1 - <u>GENERAL</u> PART 2 - SUMMARY:

A. Furnish and install insulation for all HVAC supply, return, and fresh air duct.

PART 3 - PRODUCTS

3.01 HVAC DUCTWORK:

- A. Indoor sheet metal duct (above ceilings)
 - 1. Insulate the exterior of all supply, intake, and return air ducts with formaldehydefree fiber glass duct wrap insulation equal to Johns Manville Microlite. Insulation shall have a minimum installed R value of 6.0.
 - 2. Vapor barrier facing shall be fiber glass reinforced aluminum foil with a permeance of 0.02 perms. Insulation shall have a composite UL Fire Hazard Classification rating of 25/50.
 - 3. Insulation shall be certified to resist the breeding and growth of fungi and bacteria.
 - 4. Follow manufacturer's instructions for installation for each application.
- B. Indoor sheet metal duct (internally lined square duct only where exposed)
 - 1. Insulate the air stream side of all supply, intake, and return air ducts with formaldehyde free duct liner equal to Johns Manville Polycoustic. Insulation shall have a minimum installed R value of 4.0.
 - 2. All joints to butt tight, overlap all corner joints.
 - 3. Insulation shall be adhered to the sheet metal with full coverage of 100% fire retardant adhesive, all exposed leading edges and transfer joints shall be coated with Johns Manville SuperSeal Duct Butter, SuperSeal Edge Treatment or equal.
 - 4. Additionally, secure liner with metal fasteners and caps not more than 12 inches on centers each way. When width exceeds 12 inches or height exceeds 24 inches, fasteners shall start within 3 inches of leading edge or transverse joints. Point fastener caps with adhesive.
 - 5. Insulation shall be certified to resist the breeding and growth of fungi and bacteria.
 - 6. Insulation shall have a composite UL Fire Hazard Classification rating of 25/50.

C. Outdoor sheet metal duct

- 1. Insulate the air stream side of all supply, intake, and return air ducts with formaldehyde free duct liner equal to Johns Manville Polycoustic. Insulation shall have a minimum installed R value of 3.0.
- 2. Insulate the weather side of all supply, intake, and return air ducts with rigid fiber glass board equal to Johns Manville Permacote Linacoustic R-300. Insulation

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shall have a minimum installed R value of 6.0. The Permacote surface shall face the air stream.

- 3. All joints to butt tight, overlap all corner joints.
- 4. Insulation shall be adhered to the sheet metal with full coverage of 100% fire retardant adhesive, all exposed leading edges and transfer joints shall be coated with Johns Manville SuperSeal Duct Butter, SuperSeal Edge Treatment or equal.
- 5. Additionally, secure liner with metal fasteners and caps not more than 12 inches on centers each way. When width exceeds 12 inches or height exceeds 24 inches, fasteners shall start within 3 inches of leading edge or transverse joints. Point fastener caps with adhesive.
- 6. The exterior insulation shall be covered with not less than 0.016 inch thick aluminum jacket to protect the insulation from damage due to weather and physical abuse.
- 7. Insulation shall be certified to resist the breeding and growth of fungi and bacteria.
- 8. Insulation shall have a composite UL Fire Hazard Classification rating of 25/50.

D. Exposed spiral metal duct

- 1. Duct and fittings shall be double wall, pre-insulated with Loloss Tees as manufactured by United McGill Corporation. The inter lining shall be perforated to reduce noise transmission. The interior insulation shall be 1 inch fiberglass with a minimum installed R value of 6.0.
- 2. Insulation shall be certified to resist the breeding and growth of fungi and bacteria.
- 3. Insulation shall have a composite UL Fire Hazard Classification rating of 25/50.

E. Plenums

- 1. Insulate the interior of all supply, return, and mixed air plenums with formaldehyde free rigid fiber glass board equal to Johns Manville Permacote Linacousite R300. Insulation shall have a minimum installed R Value of 4.0. The Permacote surface shall face the air stream.
- 2. All joints to butt tight, overlap all corner joints.
- 3. Insulation shall be adhered with full coverage of 100% fire retardant adhesive, all exposed leading edges and transfer joints shall be coated with Johns Manville SuperSeal Duct Butter, SuperSeal Edge Treatment or equal.
- 4. Additionally, secure liner with metal fasteners and caps not more than 12 inches on centers each way. When width exceeds 12 inches or height exceeds 24 inches, fasteners shall start within 3 inches of leading edge or transverse joints. Point fastener caps with adhesive.
- 5. Insulation shall be certified to resist the breeding and growth of fungi and bacteria.
- 6. Insulation shall have a composite UL Fire Hazard Classification rating of 25/50.

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3.02 INSULATION SUMMARY SCHEDULE:

- 1. Indoor Sheet Metal Fabricated HVAC Supply Duct 2" thick foil faced fiberglass.
- 2. Indoor Sheet Metal Fabricated HVAC Return Duct 2" thick foil faced fiberglass
- 3. Indoor Sheet Metal Fabricated and Pre-Fabricated Fresh Air Duct 2" thick foil faced fiberglass
- 4. Indoor Sheet Metal Fabricated HVAC Supply Duct 1" thick fiberglass duct liner.
- 5. Indoor Sheet Metal Fabricated HVAC Return Duct 1" thick fiberglass duct liner
- 6. Indoor Sheet Metal Fabricated and Pre-Fabricated Fresh Air Duct 1" thick fiberglass duct liner
- 7. Outdoor Sheet Metal Fabricated HVAC Supply Duct Air stream side, 1" thick coated duct liner
- 8. Outdoor Sheet Metal Fabricated HVAC Return Duct Air stream side, 1 1/2" thick coated duct liner
- 9. Outdoor Sheet Metal Fabricated HVAC Supply Duct Weather side, 1 1/2" thick rigid fiberglass with aluminum weather jacket (field applied)
- 10. Outdoor Sheet Metal Fabricated HVAC Return Duct Weather side, 1 1/2" thick rigid fiberglass with aluminum weather jacket (filed applied)
- 11. Exposed Spiral Metal Duct double wall, pre-insulated duct and fittings with 1" fiberglass insulation
- 12. Plenums 1" thick rigid fiberglass plenum liner board

SECTION 23 11 23 FACILITY NATURAL GAS PIPING

PART 1 - GENERAL

1.01 SUMMARY:

- A. Pipe, fittings and valves shall be in accordance with the following schedule to be installed as shown on the drawings.
- B. Review installation details for exceptions.

PART 2 - PRODUCTS

2.01 PIPE AND FITTINGS:

A. All piping shall be from a US manufacturer.

SERVICE	PIPE MATERIAL	FITTING MATERIAL
Natural gas above slab on grade inside building, 5 psi and lower	ASTM A53 or A120 black steel	Malleable iron
Natural gas below grade outside building	ASTM A53 or A120 black steel, factory wrapped or Polyethylene ASTM D2513 fused joint	Welded or malleable iron wrapped or Polyethylene fused

2.02 VALVES (STEEL PIPE SERVICE):

SERVICE	ТҮРЕ	MODEL NUMBER
Shutoff 2" and smaller:	Ball	Apollo 70-100/200 series, 2- piece bronze body, stainless steel ball, Teflon seats, 600 psig WOG, threaded ends, stem extension

Shutoff	Butterfly	Nibco LD2000 Lug type, Cast	
2 ½" and larger:		iron body; stainless steel shaft; Teflon, nylatron, or acetal bearings; EPDM resilient seat.	
		Disk to be aluminum-bronze.	
		Pressure rated to 200 psig. Valve assembly to be bubble	
		tight to 150 psig with no downstream flange/pipe	
		attached. 2-position lever	
		handle for 6" and smaller, gear operator for 8" and above	

PART 3 - EXECUTION

3.01 INSTALLATION:

- A. Install all piping parallel with, or perpendicular to, building lines, or as indicated on the drawings.
- B. Cushion all bearing points to minimize transfer of sound. Firmly support all pipes in position. Provide complete isolation of all dissimilar metals, using EPCO, or approved equal, dielectric unions.
- C. Install natural gas piping in accordance with Fuel Gas Code.
- D. Locate valves for easy access and operation. Do not install valves with stems below horizontal.
- E. Inspect each piece of pipe, tubing, fittings, and equipment for defects and obstructions. Promptly remove all defective materials from the site.
- F. Install pipes to clear all beams and obstructions. Do not cut into any structural members without the prior approval of the Architect.
- G. Where piping is installed horizontally through the stud space of partition walls and the pipe is within 1 1/2 inch of the stud space, furnish and install 1/16 inch thick steel plates to protect the piping.

3.02 **JOINTS**:

A. Make all joints watertight and/or gas-tight under pressure as per required testing procedure.

3.03 CLEANING

A. Clean the interior of all piping with a dry lintless cloth.

3.04 TESTING

A. Natural Gas Piping:

- 1. The Contractor shall test all new low pressure (0.5 psi) natural gas piping to 3.0 psig air pressure for 10 minutes with no drop noticed on the air gauge. The range of gauge should be no more than 1 15 psig. The project superintendent and/or construction manager shall witness and record the success of this pressure test.
- 2. High pressure (2.0 psi) natural gas piping lines will be tested to 10 psi for 10 minutes with no drop noticed on the air gauge. The range of the gauge shall be no more than 0 50 psi. The project superintendent and/or construction manager shall witness and record the success of this pressure test.

3.05 HANGERS AND SUPPORTS:

A. Coordinate seismic bracing requirements with local authority.

B. Hangers for suspended piping shall not exceed the following spacing on centers:

PIPING MATERIAL	MAXIMUM HORIZONTAL SPACING (ft)	MAXIMUM VERTICAL SPACING (ft)
Steel pipe	12	15

- C. Use a separate hanger for each pipe.
- D. U-bolts, clips or clamps shall be used to hold pipes on specific centers.
- E. Copper pipes shall be isolated from direct contact with the steel parts of hangers.
- F. All hangers and supports shall be finished to prevent corrosion and to present a pleasant appearance. Refer to Division 05 and Division 09 of these specifications.

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SECTION 23 31 13 METAL DUCTS

PART 1 - GENERAL

1.01 SUMMARY:

A. Furnish and install ducts as shown on drawings and specified herein.

PART 2 - PRODUCTS

2.01 DUCTWORK:

- A. All sheet metal ducts shall be constructed of galvanized sheet metal using metal gages and construction methods as set forth in the latest edition of SMACNA "Low Pressure" Duct Construction Standards.
- B. All duct sizes shown on the drawings are net interior dimensions.

2.02 DUCTWORK SPECIALTIES:

- A. Operators for duct volume dampers shall be Young No. 403 or 443 damper operators or equal.
- B. Operators for duct splitter dampers shall be Young No. 900 air-split regulator or equal.
- C. Where duct runouts to diffusers are indicated to be connected into duct main and no diverting type duct fittings are indicated, provide Waterloo Model DTA, or approved equal, worm operated air volume extractor. Each air volume extractor in ducts shall be provided with a Young No. 927 gear assembly and a No. 401 or 443-A damper regulator mounted on duct exterior.
- D. Install turning vanes for all 90° turns for rectangular ducts and for all 'Bull Head Tee' applications.
- E. Furnish and install dynamic rated fire dampers in ducts passing through rated barriers and partitions. Include duct access doors and ceiling access doors at each location for servicing fire dampers.
- F. Exposed spiral metal duct (all exposed round duct)
 - 1. Duct and fittings shall be double wall, pre-insulated with Loloss Tees as manufactured by United McGill Corporation. The inter lining shall be perforated to reduce noise transmission. The interior insulation shall be 1 inch fiberglass with a minimum installed R value of 4.0.
 - 2. Ductwork shall be painted. Color by the Architect.

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PART 3 - EXECUTION

3.01 INSTALLATIONS:

- A. Fabricate and install all ductwork in strict accordance with the construction methods set forth in SMACNA "Construction Standards".
- B. Longitudinal seams for rectangular duct to be Pittsburgh lock types. Corner closures to be pocket lock type.
- C. Wherever obstructions require a change in the duct shape, maintain the equivalent areas.
- D. Duct elbows in rectangular ducts shall be radius elbow turns with a double wall turning vane. Use one and one-half times the duct width for the radii for all radius turns.
- E. Duct elbows for round ducts shall be factory fabricated using five-piece construction. Use one and one-half times duct diameter for elbow.
- F. Provide "Ventglass" fabric flexible connectors between all rotating equipment and ducts. Flexible connectors to be at least 4 inches long and to be secured to equipment and ducts with galvanized iron hoops.
- G. Provide manual and/or splitter dampers where indicated on the drawings. Dampers shall be constructed of metal at least two gages heavier than ducts in which they are installed.
- H. Furnish and install sheet metal doors in ductwork to permit repairs, resetting or adjustment of temperature controllers, dampers, smoke detectors, etc. Make all such doors airtight with felt stripping, and provide them with latches so they can be opened from the outside. All access doors shall be panel type, using metal that is two gages heavier than metal of duct into which it is installed.
- I. Support all duct runs from the structure. For ducts with exterior insulation provide thermal break between duct sheet metal and metal support hanger and provide wood blocking to prevent compressing insulation. For flexible duct provide support saddles to prevent deformation of duct at supports.
- J. Coordinate with local authority for seismic bracing requirements of HVAC duct.
- K. All ducts in non-conditioned areas shall be airtight and ducts in conditioned areas shall be reasonably airtight. Leakage rate for reasonably airtight ducts shall not exceed 5% of volume of air handled.
- L. Install and make all necessary connections required for complete supply, return and exhaust systems indicated on the drawings, including all ductwork, grilles, registers, grille collars, operators, connections, fasteners, hangers, and other items required.
- M. All air distribution devices shall be supplied with frames to suit the surface on which installed. Final finish shall be selected by the Architect.

3.02 QUALITY

A. The Contractor shall guarantee the ductwork to be free of chatter, vibration, and other objectionable noises and the low pressure ductwork to have no more than 5% leakage.

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SECTION 23 34 00 HVAC FANS

PART 1 - GENERAL

1.01 SUMMARY:

A. Furnish and install ventilation and exhaust fans as shown on the plans.

PART 2 - PRODUCTS

2.01 EXHAUST/SUPPLY FANS:

A. See schedule on drawings for manufacturer and model number.

PART 3 - EXECUTION

3.01 INSTALLATION:

- A. Install fans as per manufacturer's recommendation.
- B. Duct fans to the roof or as shown on the drawings with weatherproof hood with insect screen.

3.02 CONTROL WIRING:

A. Run all control wiring in conduit as to protect from attack from rodents and other mechanical damage. All conduit for control wiring shall be furnished and installed by the Contractor.

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SECTION 23 74 00 PACKAGE HVAC UNITS

PART 1 - GENERAL

1.01 SUMMARY

A. Provide and install package HVAC units as shown on drawings and specified herein.

1.02 WARRANTY

A. Packaged units shall have one full year warranty on parts and labor. Unit compressors shall have an additional four year warranty on parts only (excludes only refrigerant and labor). Heat exchangers in rooftop units shall have full five year non-pro rated warranty (first year, parts and labor; years two through five, parts only).

1.03 OUALITY ASSURANCE:

- A. Units shall be rated in accordance with ARI Standards 210/240 and 270. Designed in accordance with UL Standard 465.
- B. Unit shall be designed to conform to ANSI/ASHRAE 15.
- C. Unit shall be UL tested and certified in accordance with ANSI Z21.47 Standards and CSA or CGA certified as a total package.
- D. Insulation and adhesive shall meet NFPA 90A requirements for flame spread and smoke generation.

PART 2 - PRODUCTS

2.01 OUTDOOR PACKAGED HVAC UNIT

A. SYSTEM DESCRIPTION - Outdoor mounted, electrically controlled, heating and cooling unit utilizing reciprocating compressor(s) for cooling duty and gas combustion for heating duty. Unit shall discharge supply air horizontally or vertically as shown on drawings.

2.02 MANUFACTURERS

A. Units shall be Trane or approved equal by York or Daiken.

2.03 EQUIPMENT:

A. General: Factory assembled, single piece, heating and cooling unit. Contained within the unit enclosure shall be all factory wiring, piping controls, refrigerant charge and special features required prior to field start-up.

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2.04 UNIT CABINET:

- A. Unit cabinet shall be constructed of galvanized steel, bonderized and coated with a prepainted baked enamel finish.
- B. Indoor blower compartment interior cabinet surfaces shall be insulated with a minimum 1/2" thick, flexible glass fiber insulation, coated on the air side. Aluminum foil faced glass fiber insulation shall be used in the furnace compartment.
- C. All cabinets shall have hinged access doors for servicing. Doors shall be opened by handles and shall not require the use of tools.
- D. Filters will be accessible through a hinged access door. Doors shall be opened by handles and shall not require the use of tools.
- E. Holes shall be provided in the base rails for rigging shackles to facilitate overhead rigging.
- F. Unit shall have a factory-installed internal condensate drain trap.

2.05 FANS:

- A. Indoor blower (evaporate fan):
 - 1. Fan shall be directly driven with 2 speed or belt driven as shown on the equipment drawings. Belt drive shall include an adjustable pitch motor pulley.
 - 2. Fan wheel shall be double-inlet type with forward curved blades.
 - 3. Bearings shall be sealed, permanently lubricated, ball-bearing type.
- B. Indoor blower shall be made from steel with a corrosion resistant finish and shall be dynamically balanced.
- C. Outdoor (condenser) fan shall be of the direct driven propeller type and shall discharge air vertically upward.
- D. Outdoor fan shall be aluminum blades riveted to corrosion resistant steel spiders and dynamically balanced.
- E. Induced draft blower shall be of the direct driven single inlet forward curved centrifugal type, made from steel with a corrosion resistant finish and dynamically balanced.

2.06 COMPRESSOR

- A. Fully hermetic type.
- B. Factory rubber shock mounted and internally spring mounted for vibration isolation.
- C. Equipped with a factory installed crankcase heater to minimize liquid refrigerant accumulation in compressor during shutdown and prevent refrigerant dilution of oil.

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2.07 COILS:

- A. Evaporator and condenser coils shall have aluminum plat fins mechanically bonded to seamless copper tubes with all joints brazed.
- B. Tube sheet openings shall be belled to prevent tube wear.
- C. Evaporator coil shall be of the full face active design.

2.08 HEATING SECTION:

- A. Induced draft combustion type with energy saving direct spark ignition system and redundant main gas valve.
- B. The heat exchanger shall be of the tubular section type constructed of a minimum of 20 gauge steel coated with a nominal 1.2 mil aluminum-silicone alloy for corrosion resistance.
- C. Burners shall be of the in-shot type constructed of aluminum coated steel.
- D. All gas piping shall enter the unit cabinet at a single location.

2.09 REFRIGERANT COMPONENTS:

- A. Refrigerant circuit components shall include:
 - 1. Acutrol (Trademark) or equal feed system
 - 2. Filter drier
 - 3. Service gauge connections on suction, discharge and liquid lines.

2.10 FILTER SECTION:

- A. Standard filter section shall consist of factory-installed low velocity, disposable 2 in. thick glass fiber filters of commercially available sizes.
- B. Filter face velocity shall not exceed 320 fpm at nominal airflows.
- C. Filter section should use only one size filter.
- D. The Contractor shall maintain clean MERV 8 filters throughout the duration of the project. A clean set of filters shall be installed just prior to Final Inspection. One clean set shall be furnished to the Owner for future use.

2.11 CONTROLS AND SAFETIES:

A. Unit Controls - unit shall be complete with self-contained low voltage control circuit.

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- B. Unit shall incorporate a solid state compressor protector which provides reset capability at the space thermostat, should any of the following safety devices trip and shut off compressor:
 - 1. Compressor over-temperature, overcurrent
 - 2. Low-pressure switch
 - 3. Freezeset, evaporator coil
 - 4. High-pressure switch
 - 5. Heating section shall be provided with the following minimum protections:
 - a. High temperature limit switch
 - b. Induced draft motor centrifugal switch
 - c. Flame rollout switch (manual reset).
 - d. Flame proving controls.

2.12 OPERATING CHARACTERISTICS:

- A. Unit shall be capable of starting and running at 115 degrees ambient outdoor temperature per maximum load criteria of ARI Standard 210/240.
- B. Compressor shall be capable of operation down to 25 degrees F. ambient outdoor temperature.
- C. Unit provided with fan time delay to prevent cold air delivery before heat exchanger warms up.
- D. Electrical Requirements
 - 1. All unit power wiring shall enter unit cabinet at a single location.

2.13 MOTORS:

- A. Compressor motors shall be cooled by suction gas passing through motor windings and shall have line break thermal and current overload protection.
- B. Indoor blower motor shall have permanently lubricated bearings and inherent automatic reset thermal overload protection.
- C. Outdoor totally enclosed motor shall have permanently lubricated bearings and inherent automatic reset thermal overload protection.
- D. Induced draft motor shall have permanently lubricated sealed bearings and inherent automatic reset thermal overload protection.

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2.14 ADDITIONAL FEATURES:

- A. Economizer and barometric relief
 - 1. Set damper to provide outside air as stated on schedule during normal operation. Damper shall modulate during economizer mode.
 - 2. Damper shall close upon indoor fan shut-off.
- B. Optional Compressor Cycle Delay: Compressor shall be prevented from restarting for a minimum of five minutes after shutdown.
- C. Provide unit with single zone VAV operation for part load conditions.
- D. Provide unit with hot gas reheat for dehumidification.
- E. Provide unit with BACnet card for connection to future energy management system.
- F. Low Ambient Package:
 - 1. Package shall consist of low pressure switch and freezestat.
 - 2. Package shall allow unit operation down to 25 F. outdoor ambient temperature.
- G. Head Pressure Control Package
 - 1. Consists of solid-state control and condenser coil temperature sensor for head pressure control.
- H. Manual or Automatic Changeover Zone Sensor with 7-day programming:
 - 1. Keyboard selection of HEAT-COOL-FAN-AUTO-ON settings.
 - 2. Indicator lights for ON-HEAT-COOL or SERVICE.
 - 3. Night Setback Sensor with (1) Occupied, (1) Unoccupied, and (1) Override program per day.
 - 4. Provide tamper proof thermostat covers.
- I. Flue Shield: Provides protection from the hot sides of the gas flue hood.
- J. Hail Guard: Hail guard shall protect against damage from hail and flying debris.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Each unit shall be started up and checked out by a factory trained service representative. A record of this service in the form of a test log shall be furnished to the Engineer. This test log shall indicate operating refrigerant pressure, voltages, amperages, and other operational date obtained during this service.
- B. Heat cycle shall be tested before the building is occupied.

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- C. Heat anticipators shall be adjusted during the start up and check out period.
- D. Units shall not be operated when sheet rock sanding or other construction activities occur that generate dust and debris that could contaminate the unit, coil, and ductwork. Failure to comply can result the replacement of the unit and associated ductwork.

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SECTION 26 00 00 ELECTRICAL

PART 1 - GENERAL

1.01 GOVERNING STATEMENT

- A. The General Conditions, Supplementary General Conditions, Information to Bidders, General Requirements and other pertinent documents issued by the Architect are to be considered as a part of these specifications and shall be complied with in every respect.
- B. This specification indicates the general scope of the project in terms of the electrical systems. The specifications do not necessarily indicate or describe all work required for full performance and completion of the Contract Documents. Based on the general scope indicated or described, the Contractor shall furnish all items required for the proper execution and completion of the work with no revision to the contract price or contract time of completion of the work.
- C. Examine and become familiar with the requirements of the other trades, alternates, and bid packages for this project. Coordinate with each for specific requirements.
- D. Examine the site, mechanical, general construction, structural, electrical, and other pertinent drawings. Plan, install, and coordinate all work with other trades. The Contractor shall become familiar with local building codes and serving utility requirements. The final product is to be free of hazard and fully functional.
- E. Furnish all material, equipment, labor and all incidentals necessary to install electrical systems shown on the drawings and as specified herein in a manner acceptable to the Architect. Install and adjust all equipment and material as shown on the plans, specified, or hereinafter mentioned or implied in such manner as to accomplish the general intent of the plans and specifications. The current editions of the applicable codes apply to this project and take precedence over any of the project documents (specifications and drawings).
- F. In general, all wiring shall be installed in a raceway system concealed below grade, below finished floor, above ceilings, or within walls. Furnish and install junction boxes, outlet boxes, devices, and cover plates.
- G. Coordinate with the Project Manager for a full review of systems prior to concealment or otherwise expose concealed systems for review prior to Project Acceptance.
- H. Skilled craftsmen shall execute the work using current tools and techniques of the trade.
- I. Coordinate seismic bracing requirements with applicable building codes and the local authority.
- J. Submit only written requests to the Architect for interpretation or clarification of the Contract Documents.

1.02 UTILITY COMPANY SERVICES

A. Furnish all labor, materials, etc. necessary for a complete approved electrical service as required by the structure including inspection and approval by the authority having jurisdiction.

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- B. Coordinate with the local authorities for temporary service, permanent service, and construction power requirements. Include all costs in base bid or appropriate bid alternate.
- C. Unless otherwise required by Section 01 18 04 Project Utility Sources, the Contractor shall make all arrangements with the local utility for temporary electrical power connections. This is to include posting the deposit and paying all usage expenses for temporary electrical power. At a time to be chosen by the Contractor, final billing arrangements may be made and any deposits due may be reclaimed.
- D. The Contractor shall make all arrangements with the local utility for permanent electrical power connections. This is to include posting the deposit and paying all usage expenses until final acceptance by the Owner. The Contractor may then call for final billing and reclaim any deposits due. The Owner will then assume financial responsibility for deposits and electrical consumption expenses.

1.03 SCOPE

- A. The work to be performed under these specifications shall include all labor, materials, equipment, transportation, construction, facilities, and incidentals necessary for the proper execution, installation, testing, adjustments, and completion of all electrical work shown and indicated in the Contract Documents. The intent is that the installation shall be 'complete' in every respect, pleasant in appearance, and ready for use.
- B. The work under these specifications shall in general include, but is not limited to, furnishing and installing the following:
 - 1. Section 01 11 00 Summary of Work
 - 2. Section 01 18 04 Project Utility Sources
 - 3. Section 01 21 00 Allowances
 - 4. Section 01 23 00 Alternates
 - 5. Section 03 30 00 Cast In Place Concrete
 - 6. Section 07 84 13 Penetration Firestopping
 - 7. Division 08 Doors and Windows
 - 8. Section 09 91 00 Painting
 - 9. Section 21 13 13 Wet Pipe Sprinkler System
 - 10. Section 26 05 19 Low Voltage Electrical Power Conductors and Cables
 - 11. Section 26 05 26 Grounding and Bonding for Electrical Systems
 - 12. Section 26 05 29 Hangers and Supports for Electrical Systems
 - 13. Section 26 05 33 Raceway and Boxes for Electrical Systems
 - 14. Section 26 05 53 Identification for Electrical Systems
 - 15. Section 26 24 16 Panelboards
 - 16. Section 26 27 26 Wiring Devices

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- 17. Section 26 43 13 Surge Protective Device
- 18. Section 26 50 00 Lighting
- 19. Division 27 Communications
- 20. Division 28 Electronic Safety and Security
- 21. Section 31 23 00 Excavation and Fill

1.04 WORK BY OTHERS

- A. Review the descriptions of Utility and Owner requirements for specific responsibilities. The Contractor shall coordinate the work of each local service provider to ensure that all the work required is included in the Base Bid or applicable alternate.
- B. Review the descriptions of each trade for specific responsibilities. The Contractor shall coordinate the work of each trade to ensure that all the work required is included in the Base Bid or applicable alternate.
- C. Equipment with electric components provided under other Divisions of this Contract, unless otherwise specified or shown, shall be furnished and set in place by the Divisional Trade.
- D. The Owner will furnish and install some equipment, components, and appliances that will require electrical connections by Division 26 Trades. The Contractor shall coordinate and cooperate with the Owner and other trades to avoid conflicts.
- E. At various phases of the work it may be necessary for others to install wiring and components not covered by this contract. The Contractor shall cooperate with others performing such work.
- F. Unless specifically stated herein or on the plans to be by others, all components and work, which are required to make the system complete and operative, shall be furnished and installed by the Contractor and governed by the Contract Documents.
- G. All work necessary, but supplemental to the work described in Division 26, shall be complete as described elsewhere in the Contract Documents by divisional trades. Financial obligations for special services by other divisional trades which are required for Division 26 work shall be included in the Base Bid or appropriate bid alternate.

1.05 COORDINATION

A. It shall be the responsibility of the Contractor to fully examine mechanical, structural, architectural, electrical, etc. plans and coordinate his work and shop drawings with other trades, and the particular requirements of the spaces involved. The Contractor shall make changes in the work occasioned by conflicts with other building trades with no revision to the contract price.

1.06 DRAWINGS

A. The drawings are generally diagrammatic, and outlets, switches, motors, etc. shown on the drawings do not indicate that such items shall be placed at the exact location as scaled on the drawings. All building dimensions are to be taken from the architectural drawings.

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- B. The drawings and specifications shall be considered as cooperative. Work and material included in either, though not mentioned in both, shall be part of the project to be accomplished and shall be carried out completely.
- C. The drawings indicate the extent and general arrangement of the various systems. Electrical circuits shall have the indicated load connected, but location of conduit may be arranged to best fit building conditions. If any departure from these drawings is necessary, descriptions of these departures and a statement of the reason shall be submitted to the Construction Manager for approval.
- D. The drawings and specifications shall be considered a part of this Contract. Should an error or omission occur in either or both the drawings and specifications, or conflict with the other, the Contractor shall not avail himself of such unintentional error, omission, or conflict, but shall have same explained to him and adjusted before signing the Contract or proceeding with the work.
- E. The Contractor shall prepare shop drawings and required field drawings (one copy will be retained by the Architect) as hereinafter specified or required by the drawings. Shop drawings will include all dimensions, grades, materials, etc. pertinent to installation. The shop drawings will be coordinated with the work of related trades and shall be submitted for approval before installation is begun. The shop drawings shall be submitted electronically to expedite review.
 - 1. Electrical Panels and Transient Voltage Surge Suppression where applicable
 - 2. Disconnects and controllers
 - 3. Receptacles and wall switches
 - 4. Fire Sealant/Caulking
 - 5. Light fixtures and controls

1.07 OUALITY ASSURANCE

- A. The materials, components, and installation shall comply with the appropriate sections and articles of:
 - 1. National Electrical Code
 - 2. National Electrical Safety Code
 - 3. National Fire Protection Association Standards
 - 4. Local Building Ordnance
- B. The local authority shall be the interpreter of any code requirements. In the absence of a local enforcing authority the Architect shall interpret the code and his decision shall govern.

1.08 TESTING

- A. It shall be the responsibility of this Contractor to furnish all testing equipment and labor necessary to perform the following tests:
 - 1. For wiring less than 600 volts, after wires or cables are in place, but before being connected to devices and equipment, the wiring shall be tested for shorts, opens,

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and grounds by means of approved insulation resistance test equipment (Line to Line, Line to Neutral, Line to Ground, and Neutral to Ground). After wiring has been verified to have no shorts, apply a high voltage source (Megger) to each phase wire for an acceptance test. The voltage applied shall not be less than 500 volts dc nor greater than 1,000 volts dc. Record the resistance after the 1 minute charging cycle. Resistance readings less than 1 meg-ohm shall be considered a short and the wiring shall be replaced.

- 2. Any wiring device, lighting fixture, communications component, signaling component, or electrical apparatus in this contract, if grounded, shorted, or opened shall be removed and the trouble corrected.
- 3. Each system and sub-system shall be fully tested and certified as functional and operational prior to project acceptance.

1.09 CLEAN-UP

- A. The site shall be continuously clean, neat, and orderly. Do not let debris accumulate or become scattered. Maintain the site in a safe, secure, hazard-free condition.
- B. Materials stored on the site must be well organized, protected from the weather, and physically secure.

1.10 WARRANTY

- A. Provide full one (1) year guarantee of the work to include materials, parts, labor, and transportation for repair and/or replacement of defects in material and/or workmanship. The Contractor shall replace any defective materials or remedy other defects without cost to the Owner during the guarantee period.
- B. Lighting lamps are exempt from the one (1) year warranty. All lamps are to be operative at Final Acceptance of the work.
- C. Provide written statement to the Owner with words to the effect:

"We hereby guarantee that all Work performed by us on the above captioned project to be free from defective and/or nonconforming materials and workmanship and that for a period of one (1) year from the date of Substantial Completion, or such period of time as may be called for in the Contract Documents for such portions of the Work. During this period, we will repair and/or replace any defective and/or nonconforming materials and workmanship in accordance with the requirements of the Contract Documents."

1.11 FEES AND PERMITS

- A. Make all arrangements and pay all costs and assessments by municipalities, utilities, or other regulatory bodies for building permits, inspection fees, etc. Such costs and assessments required for Division 26 work shall be included in the Base Bid or appropriate bid alternate.
- B. Coordinate with all local utility providers. 'Aid to Construction' and/or connection fees shall be as outlined in Section 01 18 04 Project Utility Sources or fees and assessments associated with Division 26 trades shall be fully included in the Base Bid.

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1.12 ALTERNATES

A. Refer to Section 01 23 00 - Architects instructions for alternates.

1.13 ALLOWANCES

A. Refer to Section 01 21 00 - Architects instructions for cash allowances.

PART 2 - PRODUCTS

2.01 GENERAL

- A. All materials (not indicated existing to be re-used) are to be new and of current design for which replacement parts are available.
- B. All new materials shall be listed and labeled by UL or ETL for application and use as installed.
- C. All materials shall be properly stored and protected. Materials damaged due to improper storage and/or handling shall be repaired or replaced at the Owner's option.

2.02 SUBSTITUTIONS OF MATERIALS

- A. Where material or equipment is specified or shown on the drawings by name of manufacturer or by accepted trade designation, it denotes the quality desired. The material of other manufacturers may be used, provided the construction, arrangement, finish, voltage, and safe load carrying capacity equals that specified or shown. Where two or more items are furnished under the same specifications, all are to be of the same manufacture and shall be identical and inter-changeable.
- B. It shall be the responsibility of the Contractor to ascertain if the substitute items will fit into the space allotted as conveniently as the items specified. Any changes to the building or system design necessary shall be arranged for in writing before material is ordered. All costs involved in making such changes shall be borne by the Contractor. If the Architect deems such changes inadvisable, the Contractor shall install items specified even though substitute item had been previously reviewed. Architect's review of a substitute is for performance and/or design only.

2.03 COMPONENTS INCLUDED

A. An attempt has been made to identify the major components of each system. Incidental materials and/or operations required to complete the installation shall be furnished without further mention. The intent is to provide a complete, safe, and operable system. Such incidental components and/or operations are to be in keeping with the quality established for the Work.

PART 3 - EXECUTION

3.01 GENERAL

A. The Work as described in the Contract Documents is technical in nature. Skilled craftsmen shall perform this work. Trainees and labors shall work only under the supervision of the skilled craftsmen.

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- B. A Foreman or Leadsman shall be designated for work involving Division 26 trades. The Foreman or Leadsman shall be on site to participate in or supervise others performing Division 26 Work.
- C. All systems and components shall be installed in strict accordance with the manufacturer's recommendations by technicians skilled with tools and techniques of the trade. Where such recommendations are not routinely published the systems and components shall be installed with tools and techniques of the trade and to traditional industry standards.

3.02 COORDINATION

- A. Make provisions for the delivery and safe storage of all materials, and arrange with other trades on the job for the installation of equipment too large to pass through finished openings.
- B. Arrange to have materials delivered to the job at such stages of the work as will expedite the work as a whole. Mark and store all materials in such a manner as to be easily checked, inspected, and issued.
- C. Locations of all outlets, fixtures, receptacles, etc. are to be verified with other trades, millwork, and specific equipment suppliers prior to roughing in. Cost of relocating such items because of failure to do so shall be at the Contractor's expense.
- D. Provide new conduits, junction boxes, wiring, etc as required to maintain services and/or systems with components that conflict with the work of this project. Unless specifically identified all existing electrical power, lighting, signaling, and communications circuits must be maintained.
- E. Avoid interference with structure and the work of other trades, preserving adequate headroom and clearing all doors and passageways to approval of the Architect.

3.03 FINAL CONNECTIONS TO EQUIPMENT

- A. Certain items of existing equipment are to be re-used, to be furnished by the Owner, or to be furnished by other trades. The Contractor shall be responsible for providing all labor, wire, conduit, incidentals, and final connections to such items. Also where applicable, the Contractor shall relocate and/or reinstall such equipment.
- B. Provide power and final connections to mechanical equipment as indicated. This is to include providing disconnect and wiring to the controller and to the load. Components of pre-packaged/pre-wired systems such as air conditioning systems are to be utilized as provided by the manufacturer. Power wiring to loads such as pumps, fans, etc., which are not pre-wired, shall be completed by Division 26 trades and shall be included in the Base Bid or appropriate Bid Alternate.

3.04 EXCAVATION AND BACKFILLING

- A. The Contractor shall do all excavating and backfilling required for all Division 26 work. Fill, compaction, surface, etc. to meet all the requirements as applicable for the area and shall be governed by Division 02 and Division 31 of these specifications.
- B. The Contractor is to determine the presence and location of any underground service such as telephone, electrical, water, gas, sewage, etc. whether previously existing or as

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- installed by other trades. The Contractor is to bear full consequences for the interference of any such systems.
- C. Backfill containing large rock, paving materials, cinders, large or sharply angular substance, or corrosive material shall not be placed in an excavation where materials may damage raceways, cables, or other substructures or prevent adequate compaction of fill or contribute to corrosion of raceways, cables, or other substructures. Where necessary to prevent physical damage to the raceway or cable, protection shall be provided in the form of granular or selected material, suitable running boards, suitable sleeves, or other approved means.

3.05 FIRE STOP

- A. Electrical installations in hollow spaces, vertical shafts, and ventilation of air-handling ducts shall be so made that the possible spread of fire or products of combustion will not be substantially increased. Openings around electrical penetrations through fire-resistant-rated walls, partitions, floors, or ceilings shall be fire stopped using approved methods to maintain the fire resistance rating. Refer to Division 07 of these specifications.
- B. Refer to the Architectural Drawings for fire rated partitions and ceilings.

3.06 PAINTING AND PATCHING

- A. All exposed panels, boxes, and raceways in finished areas are to be painted. Components provided with pre-painted finishes shall have this finish protected during installation and through out the project. Any portion of the building structure or other equipment that incurs damage to its painted surface from the installation of the electrical equipment shall have this surface repainted.
- B. All openings required for electrical components, panels, boxes, conduits, etc. shall be properly patched and sealed. Trim must conceal all rough openings.
- C. Painting and patching shall be governed by the requirements of Division 09 of these specifications. The Contractor shall arrange and coordinate with Division 09 trades to ensure all expenses are included in the Base Bid or appropriate bid alternate.
- D. Exposed conduits in habitable areas shall be painted to compliment the adjacent surface.

3.07 INSTALLATION DIRECTIONS

A. Obtain manufacturer's printed installation directions to aid in properly executing work on equipment requiring such directions as directed by the Architect. Submit such directions to the Architect for approval prior to time of installation of equipment.

3.08 STARTING AND INSTRUCTION

- A. All equipment and systems shall be tested before being placed in operation.
- B. Furnish a competent technician to supervise the starting, adjusting, and testing of all equipment and to train the operator in the operation of the system. Where required, certain major items of equipment shall be installed under the supervision of and tested by a specialist furnished by the manufacturer of the equipment. Such specialist shall train the operator in the use of the equipment.

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- C. Furnish (2) duplicate sets of operating and maintenance instructions for each and every piece of equipment supplied by him together with spare parts lists. This information shall be neatly bound in (3) ring binders, indexed and labeled for each system.
- D. The Contractor shall spend sufficient time with the Owner to acquaint him with the complete operation of the systems furnished under Division 26 of these specifications.

3.09 PROTECTION OF EQUIPMENT AND MATERIALS

A. The Contractor is responsible for care and protection of equipment and material furnished and/or installed under this contract until Final Acceptance of the project

3.10 EQUIPMENT FOUNDATIONS AND SUPPORT

- A. Install equipment and fixtures in locations shown on the drawings, except where specifically otherwise approved.
- B. Unless noted otherwise on the drawings, provide all support required for equipment specified under this division. Concrete pads shall be reinforced and shall be troweled smooth. Steel supports shall be standard structural channels or angles of the proper sizes to support equipment.
- C. All equipment and components shall be securely fastened in place. Take special care where seismic bracing is required.
- D. All ferrous metal supports and braces shall be finished to prevent corrosion and to present a pleasing appearance. Refer to Division 05 and Division 09 of these specifications.

3.11 INSPECTION

- A. Check each system component for defects, verifying that all parts are properly furnished and installed, that all items function properly, and all adjustments have been made.
- B. Coordinate with authority having jurisdiction for all required inspections before proceeding with other work.
- C. Have all systems reviewed by the Project Manager and proper officials prior to concealing or otherwise expose concealed systems for review prior to Final Acceptance.

3.12 MOUNTING HEIGHTS OF OUTLETS

- A. Where devices of the same mounting height are shown in close proximity on the wall it is intended that they be ganged under one cover plate. If the size of a device prohibits ganging, this device shall be located close to the single or ganged devices even though the scale prevents them from being shown close together on the drawings.
- B. The exact height of each switch, receptacle, light fixture, outlet, etc. shall be determined on the premises in conference with Architect, General Contractor, and Equipment supplier. The following is a list of normal mounting heights. Unless otherwise noted, specified, or required, these heights shall apply.

Device	Mounting Height	To	
Wall Switches	48 inches AFF	Center	

Receptacles (General Purpose)	18 inches AFF	Center
Wall Mounted Electrical Panel	80 inches AFF	Тор
Disconnect Switch	60 inches AFF	Тор

3.13 EQUIPMENT FURNISHED BY OTHERS

A. Consult and coordinate with all parties furnishing equipment requiring electrical connections as necessary. Verify exact requirements and component location. No extras will be allowed for relocation or replacement of electrical wiring or controls because of this Contractor's failure to coordinate with other Trades.

3.14 CLOSE OUT SUBMITTALS

- A. Project close out documents shall include the following:
 - 1. Provide (2) sets of product data sheets, spare parts list, and O&M manuals for equipment installed under this contract. The product data sheets, spare parts list, and O&M manuals shall include, but not be limited to light fixtures, lighting contactors, occupancy sensors, time clocks, panelboards, motor control centers, transformers, disconnects, motor starters and switches, generator, transfer switches, lightning protection system and components, data switches and patch panels, specialty systems and components (i.e. fire alarm, security, CCTV, intercom, sound reinforcement, nurse call, etc.)

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SECTION 26 05 19 LOW VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

PART 1 - GENERAL

1.01 GOVERNING STATEMENT

- A. This specification indicates the general scope of the project in terms of basic materials and methods. The specifications do not necessarily indicate or describe all work required for full performance and completion of the requirements of the Contract Documents. On the basis of the general scope indicated or described, the Contractor shall furnish all items and operations required for the proper execution and completion of the work.
- B. In general, all wiring shall be installed in a raceway system concealed below grade, below finished floor, above ceilings, or within walls. Furnish and install junction boxes, outlet boxes, devices, and cover plates.
- C. Coordinate with the Project Manager for a full review of systems prior to concealment or otherwise expose concealed systems for review prior to Project Acceptance.
- D. All wiring shall be installed in a concealed raceway system with outlet boxes, devices, and cover plates.
- E. Skilled craftsmen shall execute the work using current tools and techniques of the trade.

1.02 WORK BY OTHERS

- A. At various phases of the work it may be necessary for others to install wiring and components not covered by this contract. The Contractor shall cooperate with others performing such work.
- B. Unless specifically stated herein or on the plans to be by others, all components and work, which are required to make the system complete and operative, shall be furnished and installed by the Contractor and governed by the Contract Documents.
- C. All work necessary, but supplemental to the work described in Division 16, shall be complete as described elsewhere in the Contract Documents by divisional trades. Financial obligations for special services by other divisional trades which are required for Division 16 work shall be included in the Base Bid or appropriate bid alternate.

PART 2 - PRODUCTS

2.01 WIRE AND CABLE

- A. All wire and cable shall comply with the latest specifications and requirements of the NFPA and/or the Insulated Power Cable Engineers Association and shall be of the quality as manufactured by Triangle, Crescent, General Cable, or equal.
- B. All conductors for wire and cable shall be copper based on 98% conductivity according to Mattheisen's Standard, and shall be tinned or untinned in accordance with established standards for the type of insulation. Stranding and materials of conductors shall be in accordance with ASTM Designation B8 and B33. All wire and cable shall be stamped approximately every two feet to indicate voltage, type, temperature rating, etc.

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- C. Conductors #10 AWG and smaller may be solid, and those #8 AWG and larger shall be stranded.
- D. Armored Cable (AC) and Metal Clad (MC) may be used with special permission only. Request to use AC or MC shall be sent to the Professional in writing prior to the purchasing and installation of the cable. If written permission is not granted, then it shall be taken that the use of AC and MC cable is unacceptable for use with the exception of lighting whips and connections to equipment from the associated equipment disconnect. When approved by the Professional, the cable shall be Type ACT with an 'H' rating. Refer to Article 320 and 330 of the NEC for applicable requirements and restrictions.

2.02 APPLICATION OF WIRE AND CABLE

A. Insulation for all wire or cable less than 600 volts shall be as follows:

General Use Areas THHN

Wet or moist locations THWN

Panel Feeders THWN

Fixture compartments AF, TF

Special Rated for the purpose

- B. Wire sizes shown on the drawings have been selected using nominal equipment loads and assumed routing. Wire sizes shall be verified using actual equipment loads and true wire routing. Adjustments in wire sizes shall limit voltage drop to 2 percent for feeders and 3 percent for branch circuits. In no case shall the combined voltage drop exceed 5 percent.
- C. Refer to Article 310 of the NEC for applicable requirements and restrictions.

2.03 TERMINATION OF WIRE AND CABLE

- A. Power wiring less than 600 volts shall be terminated in listed compression type lugs and/or fittings. Coordinate temperature rating of conductor and termination device.
- B. Control and signaling wiring shall be terminated in listed compression type lugs and/or fittings.
- C. Where wiring is larger than lug terminals, wire terminal reducers shall be utilized. Trimming of sire to fit lugs is not permitted.

PART 3 - EXECUTION

3.01 PULLING CABLE

A. Wire and cables are to be carefully handled during installation. Kinking of wiring, insulation abrasion, exposure to harmful chemicals, etc. is to be avoided.

3.02 WIRE CONNECTIONS AND DEVICES

A. Connections and splices are to be made only in accessible boxes, gutters, or cabinets.

- B. Joints in conductors shall be kept to a minimum. Where joints are necessary, they shall be mechanically strong and well made so that the electrical resistance of a joint shall not exceed that of two feet of the conductor.
- C. Use soldered or approved mechanical splices on solid wire and pressure type solderless connectors on stranded wire. Use Scotch #88 or other approved tape to form an insulation thickness equivalent to that of the conductor insulation. Use double-backed rubber tape to cover any sharp burrs or wire ends prior to wrapping with Scotch #88. Manufacturer's recommendations as to sizing, stripping, twisting, etc. shall be strictly followed.

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SECTION 26 05 26 GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.01 SERVICE REQUIREMENTS

- A. The electrical service and system shall comply with all requirements of the National Electrical Code and local codes.
- B. Provide grounding electrode system.
- C. Provide bonding jumpers to the grounding electrode system for all conduits at each service entrance panel, domestic water piping (hot and cold), natural gas piping, fire suppression piping, and building steel.

1.02 RELATED SECTIONS

- A. Section 07 84 13 Penetration Firestopping
- B. Section 26 00 00 Electrical
- C. Section 26 05 19 Low Voltage Electrical Power Conductors and Cables
- D. Section 26 05 29 Hangers and Supports for Electrical Systems
- E. Section 26 05 33 Raceway and Boxes for Electrical Systems
- F. Section 26 05 53 Identification for Electrical Systems
- G. Refer to the Material Schedules on the Drawings

PART 2 - PRODUCTS

2.01 N/A

PART 3 - EXECUTION

3.01 BALANCING OF LOADS

A. This contractor shall balance all loads between phases in all panels around the neutral. Where a common neutral is run for branch circuits, the phase wires of the home run shall be connected to separate phase legs in order that the neutral shall carry only the unbalanced current of the phase circuits. Neutral conductors shall be the same size as the phase conductors unless specifically noted otherwise. Observe extra care for discharge lighting to prevent overheating caused by harmonic currents.

3.02 GROUNDING

- A. This shall be a completely grounded electrical system. All electrical equipment, conduits, supports, cabinets, switchgear, etc. shall be grounded in accordance with the latest edition of the NEC and/or as shown on the drawings. The intent is to provide a system and equipment ground.
- B. Grounding conductors shall be installed so as to permit shortest and most direct path from equipment to ground. Each end of the grounding conductor shall be bonded at each end with all connections accessible for inspection. If insulated the outer jacket shall be green. The grounding conductor shall be run in conduit with the power conductors or in the case of multi-conductor cable run inside the cable sheath.

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- C. Electrode clamps or lugs shall be as manufactured by Anderson, Buchanan, Thomas & Betts, Burndy or equal. Mechanical lugs or wire terminals shall be used to bond ground wires together or to junction and panel boxes.
- D. All contact surfaces shall be thoroughly cleaned before connections are made to insure good metal-to-metal contact.
- E. Provide bonding bushings and/or bonding lock nuts on each end of all service and feeder raceways.
- F. Where insulated grounding or bonding conductors are the sole conductor within a metallic raceway, each end of the raceway shall be connected to the conductor with approved fittings.

3.03 VENTILATION

A. Coordinate and arrange the installation of electrical equipment to allow for adequate air circulation. Excessive heat accumulation may require the equipment to be de-rated and/or forced ventilation to be installed.

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SECTION 26 05 29 HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.01 GOVERNING STATEMENT

A. Provide adequate support for electrical systems. Coordinate seismic requirements with local authority.

PART 2 - PRODUCTS

2.01 GENERAL

A. Provide necessary uni-strut, all-thread-rods, spacers, etc. for proper support of electrical system equipment, conduit, etc.

PART 3 - EXECUTION

3.01 CONDUIT SUPPORTS AND HANGERS

- A. All conduits shall be securely fastened in place on 10' maximum intervals for straight runs. Conduit supports shall be installed within 3 feet of each termination. Conduit shall be secured within 3 feet each way of each 90 degree bend. The use of perforated iron for supporting conduits will not be permitted. The required strength of the supporting equipment and size and type of anchors shall be based on the combined weight of conduit, hanger, and cables. One-hole steel or malleable iron straps, clamp-backs, or other approved devices with suitable bolts, expansion shields, or beam-clamps for mounting to building may support horizontal and vertical conduit runs.
- B. For other requirements and restrictions refer to Chapter 3 of the National Electrical Code.
- C. Where two or more conduits run parallel, trapeze hangers may be used, consisting of threaded rods, lock washers, nuts, and angle iron or 'Uni-strut' type cross member. These conduits shall be individually fastened to the cross member.
- D. All supports and hangers are to be installed and isolated to reduce the possibility of sound transmission.
- E. All supports and hangers shall be arranged to allow for adequate expansion and contraction.
- F. Special care is required for seismic bracing. Coordinate with local authority for specific requirements.

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SECTION 26 05 33 RACEWAY AND BOXES FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.01 GOVERNING STATEMENT

- A. In general, all wiring shall be installed in a raceway system concealed below grade, below finished floor, above ceilings, or within walls. Furnish and install junction boxes, outlet boxes, devices, and cover plates.
- B. Coordinate with the Project Manager for a full review of systems prior to concealment or otherwise expose concealed systems for review prior to Project Acceptance.

PART 2 - PRODUCTS

2.01 CONDUIT AND FITTINGS

- A. Except for connection to surface mounted devices, all conduit shall be concealed above finished ceilings, within walls, below finished floor, or below grade.
- B. All wiring required to be in conduit shall be in NEC approved raceways sized as shown on the drawings, or, if not sized on the drawings, in accordance with the National Electric Code.
- C. Provide proper seal fittings for hazardous locations and for conduits exposed to abrupt temperature differences. Such seal fittings shall be in accessible locations.
- D. Provide proper slip fittings to allow for expansion and contraction for conduits exposed to varying temperatures and/or to allow for building movement.
- E. Conduit installation shall conform to the following:
 - 1. Galvanized Rigid Conduit (GRC) shall be galvanized schedule 40 steel and meet UL Standard #6. Galvanizing shall be Zinc Hot-Dipped Galvanized in accordance with ASTM Standard A-153, and the galvanizing shall be after fabrication. All galvanizing shall be uniform in density, free from all fractures and dirt pockets, and shall present a neat appearance. Refer to Article 344 of the NEC for additional requirements and restrictions.
 - 2. Intermediate Metallic Conduit (IMC) shall conform to Underwriters Laboratories UL #1242 and Federal Specifications WW-C-581E or latest revision. Refer to Article 342 of the NEC for additional requirements and restrictions.
 - 3. Electrical Metallic Tubing (EMT) or "Thinwall" (TW) conduit shall be of openhearth, cold-rolled, strip-steel tubing of standard sizes and weights. Each standard length shall be stamped with manufacturer's name and trademark and bear U.L. stamp. All seams shall be electrically welded and have electrically galvanized or similar finish. Where exposed to corrosive environments, the conduit shall be further protected from these injurious agents. Join sections of EMT with steel compression couplings. Terminate EMT sections with insulated throat steel compression male adapter. Refer to Article 358 of the NEC for additional requirements and restrictions.

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- 4. Flexible conduit shall be 'Greenfield' type in dry locations with squeeze type connectors. In all wet, oily, or other adverse environments PVC jacketed 'Sealtite' flex is to be used with proper connectors. Terminate sections of flexible conduit with 'Tite-Bite' steel or malleable iron male adapters. Refer to Article 348 and Article 350 of the NEC for additional requirements and restrictions.
- 5. Plastic conduit or other non-metallic raceways (PVC) may be used for straight underground runs. All offsets and the last 10 feet (including 90 degree elbow and stub ups) shall be of GRC or IMC. The exposed portions of metallic raceway or conduit must be bonded at each end and, where exposed to corrosive environments, the GRC or IMC shall be further protected from these injurious agents. Refer to Article 352 of the NEC for additional requirements and restrictions.

2.02 PULL AND JUNCTION BOXES

- A. Pull boxes and junction boxes above grade shall be installed where shown on the plans or as required by the NEC. Boxes are to be fabricated of materials suitable for the environment and/or as described in the Materials Schedule on the Drawings. Boxes are to be securely mounted to structure independent of any conduit connected to them.
- B. Pull boxes and junction boxes below grade shall be installed where shown on the plans or as required by the NEC. Boxes shall be fabricated of materials suitable for the environment and/or as described in the Materials Schedule on the Drawings.
- C. Refer to Article 314 of the NEC for applicable requirements and restrictions.

2.03 OUTLET BOXES

- A. All boxes shall be Appleton, Steel City, Raco, or equal, be of stamped one piece galvanized steel construction, be of proper size and shape for conduits entering them, be U.L. and NEC approved, be installed so that device and/or cover plates shall be tight and plumb with wall finish, have unused openings closed with knock-out closures, have all exposed or surface-mounted boxes secured to construction by means of toggle bolts, lead expansion, Ramset or other approved means, and be weatherproof for exterior locations.
- B. Unused cable or raceway openings in boxes and conduit bodies shall be effectively closed to afford protection substantially equivalent to that of the wall of the box or conduit body. Metal plugs or plates used with nonmetallic boxes or conduit bodies shall be recessed at least ½ in. (6.35 mm) from the outer surface of the box.
- C. In walls or ceilings of concrete, tile, or other noncombustible material, boxes shall be installed so that the front edge of the box will not be set back off the finished surface more than ¼ in. (6.35 mm). In walls and ceilings constructed of wood or other combustible material, boxes shall be flush with the finished surface.

2.04 SLEEVES

- A. Sleeves through floors and rated walls shall be Schedule 40 zinc coated steel, shall project 1-1/2 inches beyond finished surface, and shall be built into walls and floor as work progresses.
- B. Furnish and install plastic bushings to prevent wire abrasion.

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C. Spaces between sleeves and raceway/wiring shall be sealed at both ends of the sleeve to provide an air tight acoustical barrier with approved fire stop material.

PART 3 - EXECUTION

3.01 CONDUIT

- A. Unless otherwise shown or indicated all conduits in finished areas shall be concealed in walls, ceiling, below floor, or below grade.
- B. Exposed and concealed conduit shall be installed parallel or at right angles to building lines both horizontally and vertically. Exposed conduit shall be painted to match adjacent surface.
- C. In wet locations the entire conduit system including all boxes and fittings used in the area shall be so installed and equipped as to prevent water from entering the conduit, and the conduit shall be so mounted so that there is at least 1/4" air space between the conduit and the wall or similar supporting surface. All supports, bolts, straps, screws, etc. in such locations shall be of corrosion-resistant materials.
- D. Hickey bends will not be acceptable for 1" conduit or larger. Either manufactured elbows or bends fabricated in a bending machine shall be used.
- E. Prior to roughing-in, Contractor shall consult with and coordinate the installation of conduit and outlets with other trades to avoid interference and changes.
- F. All empty conduits are to be provided with pull wire and identifying tags at each end (junction box & pull box included). Include the wire distance required for each conduit section.
- G. Conduits shall be continuous from outlet to outlet and from outlet to cabinet, pull or junction boxes and shall be secured to all boxes with lock nuts on both sides of the box wall unless hubs are provided. Bonding bushings or bonding locknuts shall be installed on service and feeder raceways. Conduit shall be installed in such a manner that it shall be electrically continuous throughout and all connections shall be wrench tight. Conduit ends shall be plugged to prevent entrance of foreign materials during construction.
- H. Conduit systems must be installed complete before conductors are pulled-in. Conduits shall be securely supported at proper intervals with steel clamps, conduit hangers, or by other supporting assemblies as indicated on the plans.
- I. When conduit is cut and fitted on site, it shall be reamed with a pipe reamer and all burrs, scale, trash, and foreign matter removed. All conduits shall be stored off the floor or ground so as to minimize its collecting dirt and debris.
- J. Where conduit is threaded on site, the dies shall be clean and sharp.
- K. Where sleeves or conduits terminate with out boxes or cabinets, the free ends of the conduits shall be provided with a plastic bushing to prevent wire abrasion.

3.02 OUTLET BOXES

A. All switch and receptacle boxes for over two devices shall be solid ganged boxes complete with plaster ring as required. Device covers shall be installed so that they are

- tight and plumb with wall finish. Raised galvanized device covers shall be provided for exposed boxes.
- B. All outlet boxes for recessed fixtures shall be square or octagonal attached to the building structure complete with blank cover. Install boxes above the fixture opening and connect to the fixture with 'Greenfield' of such length to service fixture but not more than 72 inches long. Further, the grounding path for any one circuit shall not contain more than 72 inches of flex without a dedicated grounding wire.
- C. All outlet boxes for surface mounted fixtures shall be square or octagonal. Attach boxes to the building structure for suspended ceilings with 3/4" minimum depth plaster rings. Provide deep concrete boxes for poured concrete ceilings. Provide four inch square or octagonal outlet boxes for all exposed conduit work with fixture extension pan or deep fixture canopy to enclose box.
- D. Bracket outlets shall be level and centered on columns or above doors when installed in these locations. Wall switch outlets at door locations shall be on the lock side of the door. The Contractor is responsible for determining lock side of doors regardless of how shown on electrical drawings.
- E. No thru-wall boxes will be allowed. In as much as possible, outlets in the common wall of production areas shall not be installed in a common stud space with outlets of an adjacent area.

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SECTION 26 05 53 IDENTIFICATION FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.01 GOVERNING STATEMENT

A. Provide identification for all equipment, panels, transformers, contactors, circuits, etc.

PART 2 - PRODUCTS

2.01 N/A

PART 3 - EXECUTION

3.01 IDENTIFICATION

- A. All equipment (such as switchboards, panels, cabinets, transformers, special outlets, etc.) shall be permanently labeled in an approved manner corresponding to the mark or name shown.
- B. Identification for the Service Entrance panel, panelboard, or switchboard shall be with engraved phenolic (black background with white letters) labels mounted outside the cover door. Branch and feeder circuits shall be individually labeled with engraved labels or with a typewritten panel schedule mounted inside the cover door.
- C. Identification for lighting and appliance electrical panels shall be with engraved phenolic (black background with white letters) labels mounted outside the cover door. Branch circuits shall be identified with a typewritten panel schedule mounted inside the cover door.
- D. Identification for other electrical components shall be with engraved phenolic Labels (black background with white letters) identifying the device (ex. 'LC1', 'CU-1', 'AHU-1', etc.). Further, when not obvious, the label shall include a description of the load (ex. for a lighting contactor, 'Lights-Kitchen'). Further, the label shall include the source panel and circuit (ex. for a lighting contactor, 'A-19, 21, 23' if the circuits are from panel A circuits 19, 21, and 23).
- E. All raceways provided for use by others shall be provided with pull cords and identification tags. The identification tags shall indicate the proposed function (ex. telephone), the location of the next junction or termination, and the approximate wire distance between pull points.
- F. Room numbers shown on drawings and indicated on control panel details, patch panels, etc. are architectural room numbers for identification only during the construction phase. Fabricated labels shall reflect the room numbers to be later assigned by the Owner and/or as designated by the Architect.
- G. All receptacles and light switches shall be labeled with clear adhesive labels. Labels shall indicate the circuit feeding the power or lighting circuit.

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SECTION 26 24 16 PANELBOARDS

PART 1 - GENERAL

1.01 SERVICE REQUIREMENTS

A. Furnish and install panelboards as indicated in drawings.

1.02 RELATED SECTIONS

- A. Section 07 84 00 Penetration Seals / Fire Protection
- B. Section 26 00 00 Electrical
- C. Section 26 05 19 Low Voltage Electrical Power Conductors and Cables
- D. Section 26 05 26 Grounding and Bonding for Electrical Systems
- E. Section 26 05 29 Hangers and Supports for Electrical Systems
- F. Section 26 05 33 Raceway and Boxes for Electrical Systems
- G. Section 26 05 53 Identification of Electrical Systems
- H. Refer to the Material Schedules on the Drawings

PART 2 - PRODUCTS

2.01 LIGHTING, POWER, AND DISTRIBUTION PANELBOARDS

- A. Each circuit breaker shall be operable in any position and removable from the front of the panel without disturbing adjacent units. Panel shall be designed so as to permit a combination of single or multi pole breakers to be readily assembled in one panel.
- B. Panelboards shall be of the type specified or as required by NEC for their location and application, and manufactured by Square D, General Electric, Siemens, or equal.
- C. Free standing equipment shall be provided with 3 inch high raised concrete pad.
- D. Each panel and circuit shall be clearly and permanently labeled. Spares shall be clearly marked with erasable media (lead pencil). Space only shall be left unmarked.

2.02 MOUNTING

A. Securely mount each panelboard to the building structure. Coordinate with local authority for seismic bracing requirements.

PART 3 - EXECUTION

3.01 BALANCING OF LOADS

A. This contractor shall balance all loads between phases in all panels around the neutral. Where a common neutral is run for branch circuits, the phase wires of the home run shall be connected to separate phase legs in order that the neutral shall carry only the unbalanced current of the phase circuits. Neutral conductors shall be the same size as the phase conductors unless specifically noted otherwise. Observe extra care for discharge lighting to prevent overheating caused by harmonic currents.

3.02 GROUNDING

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- A. This shall be a completely grounded electrical system. All electrical equipment, conduits, supports, cabinets, switchgear, etc. shall be grounded in accordance with the latest edition of the NEC and/or as shown on the drawings. The intent is to provide a system and equipment ground.
- B. Grounding conductors shall be installed so as to permit shortest and most direct path from equipment to ground. Each end of the grounding conductor shall be bonded at each end with all connections accessible for inspection. If insulated the outer jacket shall be green. The grounding conductor shall be run in conduit with the power conductors or in the case of multi-conductor cable run inside the cable sheath.
- C. Electrode clamps or lugs shall be as manufactured by Anderson, Buchanan, Thomas & Betts, Burndy or equal. Mechanical lugs or wire terminals shall be used to bond ground wires together or to junction and panel boxes.
- D. All contact surfaces shall be thoroughly cleaned before connections are made to insure good metal-to-metal contact.
- E. Provide bonding bushings and/or bonding lock nuts on each end of all service and feeder raceways.
- F. Where insulated grounding or bonding conductors are the sole conductor within a metallic raceway, each end of the raceway shall be connected to the conductor with approved fittings.

3.03 VENTILATION

A. Coordinate and arrange the installation of electrical equipment to allow for adequate air circulation. Excessive heat accumulation may require the equipment to be de-rated and/or forced ventilation to be installed.

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SECTION 26 27 26 WIRING DEVICES

PART 1 - GENERAL

1.01 GOVERNING STATEMENT

A. Furnish and install wiring devices as stated in specifications and shown in drawings.

1.02 RELATED SECTIONS

- A. Section 07 84 13 Penetration Firestopping
- B. Section 26 00 00 Electrical
- C. Section 26 05 19 Low Voltage Electrical Power Conductors and Cables
- D. Section 26 05 26 Grounding and Bonding for Electrical Systems
- E. Section 26 05 29 Hangers and Supports for Electrical Systems
- F. Section 26 05 33 Raceway and Boxes for Electrical Systems
- G. Section 26 05 53 Identification for Electrical Systems
- H. Refer to the Material Schedules on the Drawings

PART 2 - PRODUCTS

2.01 DISCONNECTS

- A. Furnish and install disconnects within sight and within 50 feet of each electrical appliance.
- B. Coordinate overcurrent selection with equipment nameplate.
- C. Disconnects shall be enclosed and rated for the application.
- D. Each disconnect shall be permanently identified as to panel, circuit, and load controlled.

2.02 MANUAL MOTOR STARTERS

- A. Furnish and install manual motor starters for motor loads that are not remotely controlled.
- B. Coordinate overcurrent selection with equipment nameplate.
- C. Manual motor starters shall be enclosed and rated for the application.
- D. Each manual motor starter shall be permanently identified as to panel, circuit, and load controlled.

2.03 MOUNTING

A. Securely mount each and disconnect to the building structure. Coordinate with local authority for seismic bracing requirements.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Install wiring devices in accordance with manufacturer's written instruction and NEC.

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SECTION 26 43 13 SURGE PROTECTIVE DEVICE (SPD)

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 CODES AND REFERENCE

- A. Qualification Data: Products shall be tested and listed by a Third Party testing lab or U.S.
 Department of Labor/OSHA approved NRTL
 Agency Approval/Testing Agency Qualifications: An independent testing agency, with
 - the experience and capability to conduct the testing indicated, that is a Nationally Recognized Testing Laboratory (NRTL) as defined by OSHA in 29 CFR 1910.7.
 - 1. All SPDs shall be tested and listed to ANSI/UL 1449-2006 (UL 1449 3rd Edition) & Complimentary Listed to UL 1283 by a Nationally Recognized Testing Laboratory (NRTL) (i.e. CSA, UL, etc)

B. Applicable Documents:

- 1. ANSI/IEEE Std C62.41.1TM-2002, IEEE Guide on the Surge Environment in Low- Voltage (1000 V and Less) AC Power Circuits
- 2. ANSI/IEEE Std C62.41.2TM-2002,IEEE Recommended Practice on Characterization of Surges in Low-Voltage (1000 V and Less) AC Power Circuits
- 3. ANSI/IEEE Std C62.45TM -2002, IEEE Recommended Practice on Surge Testing for Equipment Connected to Low-Voltage (1000 V and Less) AC Power Circuits
- 4. ANSI C84.1, American National Standard for Electric Power Systems and Equipment Voltage Ratings (60 Hertz)
- 5. IEEE Standard 1100-2005, IEEE Recommended Practice for Power and Grounding Electronic Equipment Clause 8.6.1
- 6. National Fire Protection Association (NFPA) 70 (N.E.C.) –2002 Article 285
- 7. ANSI/UL 1449-2006 Surge Protective Devices
- 8. IEEE Std C62.72TM-2007 IEEE Guide for the Application of Surge-Protective Devices for Low-Voltage (1000 V or less) AC Power Circuits

1.03 SUMMARY

A. Section includes field installed SPDs for low-voltage power distribution equipment.

1.04 GLOSSARY AND ACRONYMS

- A. **SPD:** Surge Protective Device(s), both singular and plural.
- B. **NEC/CEC:** National Electrical Code / Canadian Electric Code

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- C. Sinewave Tracking (a.k.a. Frequency Responsive Circuitry): Voltage independent, dedicated circuitry intended to mitigate the effects of switching or ringing surges that is specifically designed so that it can survive the surge environment. The performance of sinewave tracking circuitry is defined by the level to which it mitigates Ring Wave transients and can be demonstrated in the test results of IEEE C62.41.2-2002, Category A Ring Wave (2kV).
- D. **Voltage Protection Rating (VPR)** A rating selected from a list of preferred values as detailed in ANSI/UL 1449-2006 and assigned to each mode of protection. The value of VPR is determined as the nearest highest value taken from a list of preferred values as detailed in ANSI/UL 1449-2006 to the measured limiting voltage determined during the transient-voltage surge suppression test using the combination wave generator at a setting of 6 kV, 3 kA.
- E. **Maximum Continuous Operating Voltage (MCOV)** The maximum designated root mean-square (rms) value of the power frequency voltage that may be continuously applied to the mode of protection of an SPD.
- F. **Nominal Discharge Current (I_n)** Peak value of the current, selected by the manufacturer from a list of values specified in ANSI/UL 1449-2006, through the SPD having a current waveshape of 8/20 where the SPD remains functional after 15 surges using the test procedure described in ANSI/UL 1449-2006.
- G. **Type 1 SPD** Permanently connected SPDs intended for installation between the secondary of the service transformer and the line side of the service equipment overcurrent device, as well as the load side, including watt-hour meter socket enclosures and intended to be installed without an external overcurrent protective device.
- H. **Type 2 SPD** Permanently connected SPDs intended for installation on the load side of the service equipment overcurrent device; including SPDs located at the branch panel.
- I. **Type 4 SPD** Recognized Component SPDs, including discrete components as well as component assemblies, which bear specific conditions of acceptability.
- J. **Modes Of Protection:** Electrical paths where the SPD offers defense against transient overvoltages. e.g. Each Line to Neutral (L-N), Line to Ground (L-G), Line to Line (L-L) and Neutral to Ground (N-G).
- K. **Per Phase Ratings:** 'Per-Phase' ratings for a three-phase Wye-connected SPD are determined by multiplying the kA per mode times the number of **discrete modes of protection (directly connected suppression components)**, minus the value for the Neutral to Ground mode, divided by the number of phases.
 - Per-Phase = (((kA per mode) X (# of modes))-(N-G mode kA)) / (# of phases)

1.05 SUBMITTALS FOR REVIEW

A. Product Data: For each type of product indicated, include all required testing and pertinent manufacturer information described herein section 1.6, rated capacities, maximum continuous operating voltage, weights and dimensions, electrical characteristics interconnecting wiring requirements, accessories, and ANSI/UL 1449-2006 VPRs.

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- B. Letter from manufacturer stating products are in strict compliance with the recommendations of IEEE Std 1100-2005, Clause 8.6.1. and incorporate 10 individual dedicated discrete modes of protection for three-phase wye systems, including direct Line-to-Line components. (Reduced-Mode variations will not be accepted).
- C. Warranty duration and replacement policy.
- D. Manufacturer's installation instructions
- E. Provide a table indicating which panel/switchboard/equipment each SPD will serve. Table shall include project name, panel name, voltage/phase, and SPD model number to be provided, submittals will not be approved without this table.

Panel/Switchboard Name	Volts, Phase	SPD Model Number

1.06 SUBMITTALS FOR INFORMATION

A. IEEE Std C62.41.2TM-2002 test reports. Include complete let-through voltage/measured limiting voltage test data, test graphs and scope traces for each and every mode for each product submitted for Category's C, B, A (including Cat A, 2 kV, 67 A, 100 kHz ring wave at both 90 & 270 degree electrical phase angles). Testing shall be conducted as follows:

Test Parameters: Positive Polarity, Net voltages are peak ($\pm 10\%$). All tests are static (unpowered) except 150 V MCOV modes. Let-through voltages on static tests calculated by subtracting sinewave peak from let-through measured from zero. 150 V MCOV mode let-through voltages measured from the insertion point on the sinewave. Each phase is the average of the 3 modes. In order to duplicate the results, the specified mode must be tested for all three phases (except N-G) and averaged together. (Individual mode or shot results may not vary by more than 10%. Scope Settings: Time Base = 10 microseconds, Sampling Rate = 250 Megasamples/sec. These settings assure Let-through voltages test results are accurate). All tests performed with 6" lead length (external to the enclosure), simulating actual installed performance per the ANSI/UL 1449-2006 standard.

B. Let-through voltages furnished within this testing *must not exceed* the following to be considered for approval, no exceptions:

Service Entrance 120/208 V 3Ph Wye (IEEE Cat C High Current Driven Surge Test Results (10 kA)) (L-N 1075 V) (L-L 1400 V) (L-G 1050 V) (N-G 1450 V)

Service Entrance 277/480 V 3Ph Wye (IEEE Cat High Current Driven Surge Test Results (10 kA))) (L-N 1335 V) (L-L 2000 V) (L-G 1310 V) (N-G 1725 V)

Distribution 120/208 V 3Ph Wye (ANSI/UL 1449-2006 VPRs): (L-N 600 V) (L-G 600 V) (L-L 1000 V) (N-G 600 V)

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Distribution 277/480 V 3Ph Wye (ANSI/UL 1449-2006 VPRs): (L-N 1200 V) (L-G 1200 V) (L-L 1800 V) (N-G 1200 V)

Branch 120 V (IEEE Cat A Ringwave (2 kV)) Test Results (@ 270° phase angle)): (L-N 40 V) (L-L 40 V) (L-G 60 V) (N-G 60 V)

Branch 277 V (IEEE Cat A Ringwave (2 kV)) Test Results (@ 270° phase angle)): (L-N 60 V) (L-L 110 V) (L-G 80 V) (N-G 60 V)

- C. Certificates of Conformity: For SPDs, certifying compliance with an NRTL listing/certification to the following standards:
 - 1. ANSI/UL 1449-2006 (UL 1449 3rd Edition)
 - 2. UL 1283 (Type 2 SPDs Only)

1.07 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: Closeout Submittal shall include operation, installation and specification data in closeout submittals.
- B. Certification: By Electrical Contractor (Installer) that installation complies with manufacturer's instructions (SEE FINAL INSPECTION SECTION OF THIS SPECIFICATION).
- C. Warranty duration and replacement policy

1.08 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a NRTL testing agency, and marked for intended location and application.
- B. Manufacturer's Qualifications: Manufacturer must have at least 10 years experience in the engineering, design and manufacture of permanently connected SPDs. Manufacturer operates a Quality System Certified manufacturing facility as ISO 9001:2000 Compliant

1.09 COORDINATION

- A. Coordinate location of field installed SPDs to allow adequate clearances for maintenance.
- B. SPDs shall be rated for the class and category of service necessary for the application per the ANSI/IEEE Std C62.41.2TM-2002 and IEEE Std C62.72TM-2007 (Categories C, B, A)

1.10 FUSING

- A. Provide as a minimum, over-current, over temperature protection in the form of component-level thermal fusing to ensure safe failure and mitigate thermal runaway. This component-level fusing shall be an integral part of the MOV itself, and not silver wire (or other) independently layed across each MOV.
- B. Provide integral short circuit current fusing with each device. The fusing will be independent of the "component-level" fusing and specifically for over-current protection and shall be constructed utilizing surge rated, cartridge fuses and not rated 'silver-fuse-wire' (or other).

C. The fusing mechanisms employed must effectively coordinate their performance in conjunction with the high current abnormal over-voltage testing under ANSI/UL 1449-2006 (a.k.a. UL 1449 3rd Edition).

1.11 WARRANTY

- A. The manufacturer shall provide unlimited free replacement of the entire SPD (not just modules, components or sub-assemblies) for all inoperable SPDs during the warranty period. Acceptable manufacturers listed below that do not meet the warranty as standard shall submit a letter extending the warranty with the product submittal
 - 1. Warranty Period: Minimum warranty shall be Twenty-Five (25) years from date of installation.
 - 2. Maintenance Restrictions: No SPD shall be supplied which requires scheduled preventative-maintenance or replaceable parts (other than replaceable LEDs or batteries for diagnostic circuits). Units requiring functional testing, special test equipment, or special training to monitor SPD status are not acceptable. SPDs shall require no routine maintenance. SPDs are considered non-repairable items and shall be fully replaced upon failure.

PART 2 - PRODUCTS

2.01 SERVICE ENTRANCE SPDS

- A. All SPDs on the entire project must be provided by the same SPD manufacturer to ensure commonality and ease of Owner maintenance.
- B. Peak-Surge Current Shall be **240 kA per phase**
- C. SPDs shall be:
 - 1. Listed to ANSI/UL 1449-2006 (a.k.a. UL 1449 3rd Edition) by <u>BOTH UL & CSA</u>. Those not listed by both above agencies will not be accepted
 - 2. SPD shall be Type 1 SPD, Type 2 & 4 SPDs are not permitted
 - 3. SPD shall have a Nominal Discharge Current Rating of 20 kA per mode for all modes.
 - 4. The Maximum Continuous Operating Voltage (MCOV) shall be as follows:

Nominal System Voltage	Mode	MCOV
	L-N	150 V
120/200 Ware	08 Wye L-L L-G	300 V
120/208 Wye	L-G	150 V
	N-G	150 V
	L-N	320 V
277/480 Wye	L-L	550 V
	L-G	320 V
	N-G	320 V

5. The SPD shall have Voltage Protection Ratings (VPRs) as follows:

Nominal System Voltage	Mode		VPR
120/208 Wye	L-N	150 V	600 V
	L-L	300 V	1000 V
	L-G	150 V	600 V
	N-G	150 V	600 V
277/480 Wye	L-N	320 V	1200 V
	L-L	550 V	1800 V
	L-G	320 V	1200 V
	N-G	320 V	1200 V

- 6. LED indicator lights for power and protection status.
- 7. Permanently-mounted, parallel connected.
- 8. Solid-state clamping components to limit the surge voltage and divert the surge current. SPD components that "crowbar" (e.g. spark gaps, gas tubes, SCR's, etc.) are not allowed.
- 9. Self-restoring and fully automatic.
- 10. Capable of sustaining 115% of nominal RMS voltage continuously without degrading.
- 11. The SPD shall be tested and listed by an NRTL as a complete assembly to a symmetrical fault current rating greater than or equal to the available fault current at the location of installation at the connected panel, in accordance with NEC Article 285 and shall be marked with the short circuit current rating (SCCR). If the available fault current is unknown, then the SCCR of the SPD shall be 200 kAIC.
- 12. Bi-directional, thermal stress reducing, encapsulated, custom parallel and solid state circuit configuration.
- 13. SPD system shall provide discrete protection for all 10 modes for a three-phase Wye-connected SPD. Distinct and independent protection circuitry for each mode is required. Reduced mode SPDs with only 3, 4 or 7 dedicated, distinct, independent protection modes in its voltage configuration are not acceptable and are not to be submitted.

2.02 DISTRIBUTION PANELBOARD SPDS (400 A & LARGER)

- A. All SPDS on the entire project must be provided by the same SPD manufacturer to ensure commonality and ease of Owner maintenance.
- B. Peak-Surge Current Shall be 180 kA per phase
- C. SPDs shall be:
 - 1. Listed to ANSI/UL 1449-2006 (UL 1449 3rd Edition) by <u>BOTH UL & CSA</u>. Those not listed by both above agencies will not be accepted.
 - 2. SPD shall be Type 2 SPD, Type 1 and Type 4 SPDs are not permitted.

- 3. SPD shall have a Nominal Discharge Current Rating of 20 kA per mode for all modes.
- 4. The Maximum Continuous Operating Voltage (MCOV) shall be as follows:

Nominal System Voltage	Mode	MCOV
120/208 Wye	L-N	150 V
	L-L	300 V
	L-G	150 V
	N-G	150 V
	L-N	320 V
277/490 Wwo	L-L	550 V
277/480 Wye	L-G	320 V
	N-G	320 V

5. The SPD shall have Voltage Protection Ratings (VPRs) as follows:

Nominal System Voltage	Mode	VPR
120/208 Wye	L-N	600 V
	L-L	1000 V
	L-G	600 V
	N-G	600 V
	L-N	1200 V
277/490 W	L-L	1800 V
277/480 Wye	L-G	1200 V
	N-G	1200 V

- 6. LED indicator lights for power and protection status.
- 7. Permanently-mounted, parallel connected.
- 8. Solid-state clamping components to limit the surge voltage and divert the surge current. SPD components that "crowbar" (e.g. spark gaps, gas tubes, SCR's, etc.) are not allowed.
- 9. Self-restoring and fully automatic.
- 10. Capable of sustaining 115% of nominal RMS voltage continuously without degrading.
- 11. The SPD shall be tested and listed by an NRTL as a complete assembly to a symmetrical fault current rating greater than or equal to the available fault current at the location of installation at the connected panel, in accordance with NEC Article 285 and shall be marked with the short circuit current rating (SCCR). If the available fault current is unknown, then the SCCR of the SPD shall be 200 kAIC.

- 12. Bi-directional, thermal stress reducing, encapsulated, custom parallel and solid state circuit configuration.
- 13. SPD system shall provide discrete protection for all 10 modes for a three-phase Wye-connected SPD. Distinct and independent protection circuitry for each mode is required. Reduced mode SPDs with only 3, 4 or 7 dedicated, distinct, independent protection modes in the voltage configuration are not acceptable and are not to be submitted.

2.03 BRANCH PANELBOARD SUPPRESSORS (LESS THAN 400 A)

- A. All SPDs on the entire project must be provided by the same SPD manufacturer to ensure commonality and ease of Owner maintenance.
- B. Peak-Surge Current Shall be 120 kA per phase w/Sine-wave tracking (see section 1.6 for sinewave tracking compliance requirements)
- C. SPDs shall be:
 - 1. Listed to ANSI/UL 1449-2006 (a.k.a. UL 1449 3rd Edition) by <u>BOTH UL & CSA</u>. Those not listed by both above agencies will not be accepted
 - 2. SPD shall be Type 2 SPD. Type 1 SPDs & Type 4 SPDs are permitted.
 - 3. SPD shall have a Nominal Discharge Current Rating of 20 kA per mode for all modes.
 - 4. The Maximum Continuous Operating Voltage (MCOV) shall be as follows:

Nominal System Voltage	Mode	MCOV
120/208 Wye	L-N	150 V
	L-L	300 V
	L-G	150 V
	N-G	150 V
277/480 Wye	L-N	320 V
	L-L	550 V
	L-G	320 V
	N-G	320 V

5. The SPD shall have Voltage Protection Ratings (VPRs) as follows:

Nominal System Voltage	Mode	VPR
120/208 Wye	L-N	600 V
	L-L	1000 V
	L-G	600 V
	N-G	700 V
	L-N	1200 V
277/490 Wwa	L-L	1800 V
277/480 Wye	L-G	1200 V
	N-G	1200 V

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- 6. LED indicator lights for power and protection status.
- 7. Incorporate "True" sine-wave tracking based on the results of the Category A (2kV) Ring Wave Measured Limiting Voltages. Products utilizing basic EMI/RFI filter performance or tracking circuits in the L-N mode only are not allowed (see section 1.6 of this specification for specific requirements).
- 8. Permanently-mounted, parallel connected.
- 9. Solid-state clamping components to limit the surge voltage and divert the surge current. SPD components that "crowbar" (e.g. spark gaps, gas tubes, SCR's, etc.) are not allowed.
- 10. Self-restoring and fully automatic.
- 11. Capable of sustaining 115% of nominal RMS voltage continuously without degrading.
- 12. SPD system shall provide discrete protection for all 10 modes for a three-phase Wye-connected SPD. Distinct and independent protection circuitry for each mode is required. Reduced mode TVSS with only 3, 4 or 7 dedicated, distinct, independent protection modes in the voltage configuration are not acceptable and are not to be submitted.
- 13. The SPD shall be tested and listed by an NRTL as a complete assembly to a symmetrical fault current rating greater than or equal to the available fault current at the location of installation at the connected panel, in accordance with NEC Article 285 and shall be marked with the short circuit current rating (SCCR). If the available fault current is unknown, then the SCCR of the SPD shall be 200 kAIC
- 14. Bi-directional, thermal stress reducing, encapsulated, custom parallel and solid state circuit configuration.

2.04 ENCLOSURES

- A. Indoor Enclosures: NEMA 1 or better.
- B. Outdoor Enclosures: NEMA 4 or better for outdoor/wet locations.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Install SPDs in strict accordance with manufacturer's instructions and the NEC.
- B. Install SPDs at service entrance on load side, with ground lead bonded to service entrance ground.
- C. Install SPDs with conductors between SPD and the branch circuit breaker as short and straight as possible. When possible do not exceed manufacturer's recommended lead length. In the case where the lead length exceeds 18 inches the installer must contact the SPD manufacturer for installation assistance. If needed, breakers may be rearranged to

- allow for the shortest distance from the branch circuit breaker serving the SPD to the SPD.
- D. Install the SPDs immediately adjacent to the switchboard or panelboard being protected.
- E. SPDs must be installed to a disconnecting switch or breaker rated for (minimum) 30-amps in the panel per manufacturer's installation instructions to ensure a means of disconnecting the SPD from the service without de-energizing the panel or the connected loads. The use of direct bus bar connected SPDs is expressly prohibited and will be rejected.
- F. Do not energize service entrance equipment or panelboards until SPDs are properly installed and connected.
- G. Do not perform insulation resistance tests of the distribution wiring equipment with the SPDs installed. Disconnect all SPDs (all Phase, Neutral and Ground connections) before conducting insulation resistance tests, and reconnect immediately after the testing is over.

3.02 FIELD QUALITY CONTROL

- A. Field Service: Electrical Contractor shall inspect, test, and adjust components, assemblies, and equipment installations, including connections to strictly comply with this specification.
 - 1. Verify that electrical wiring installation complies with manufacturer's written installation requirements and NEC requirements
 - 2. After installing SPD devices but before electrical circuitry has been energized, test for compliance with requirements.
 - 3. Complete startup checks according to manufacturer's written instructions, if applicable.
- B. The SPD installation shall be certified by a licensed electrician that the installation is in accordance with the manufacturer's recommendations, **NEC** requirements and the requirements of the specification above. Any deficiencies noted shall be corrected by the Contractor. Provide written documentation of this inspection as part of the closeout documents/manual.

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SECTION 26 50 00 LIGHTING

PART 1 - GENERAL

1.01 GENERAL

- A. This Contractor shall carefully examine the complete area as well as each individual room in which fixtures are to be installed for interference with piping, beams, ducts, etc., and where any such interference occurs, shall provide approved fixtures of proper length, design, and suspension to overcome such interference.
- B. Where the catalog number of a fixture requires the specific type of ceiling to be called out, the Contractor shall verify the compatibility of the fixture and the ceiling. Include all necessary mounting and trim hardware.
- C. Furnish and install all necessary items for a complete, operational system to fulfill the intent of this specification.

1.02 EXIT LIGHTING

A. This Contractor is responsible for furnishing and installing a complete exit lighting system as shown on the drawings and meeting all requirements of local, state, federal, NEC, and NFPA codes.

1.03 EMERGENCY LIGHTING

A. This Contractor is responsible for furnishing and installing a complete emergency lighting system as shown on the drawings and meeting all requirements of local, state, federal, NEC, and NFPA codes.

1.04 FUNCTIONAL TESTING

- A. Contractor shall employ an independent third party testing agency or a manufacturer's representative that will be involved in certification of the system and to ensure compliance with the contract documents and all applicable codes.
- B. Lighting control devices and control systems shall be tested to ensure that control hardware and software are calibrated, adjusted, programmed, and in proper working condition in accordance with the construction documents and manufacturer's installation instructions. When occupant sensors, time switches, programmable schedule controls, or photosensors are installed, at a minimum, the following procedures shall be performed:
 - 1. Confirm that the placement, sensitivity and time-out adjustments for occupant sensors yield acceptable performance, lights turn off only after space is vacated and do not turn on unless space is occupied.
 - 2. Confirm that the time switches and programmable schedule controls are programmed to turn the lights off.
 - 3. Confirm that photosensor controls reduce electric light levels based on the amount of usable daylight in the space as specified.

1.05 CONTROLS

A. Lighting control systems and controls have been designed around a specific lighting

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control system. This design denotes specific components and operations of the lighting controls. Substituted systems with components that meet or exceed the components and/or operations of the specified system will be acceptable; however, systems that require additional components (i.e. dimming panels, etc.) will not be acceptable unless the basis of design included dimming panels. All control systems shall be of the same manufacturer. No mixing of manufacturers will be accepted.

1.06 RELATED SECTIONS

- A. Section 07 84 13 Penetration Firestopping
- B. Section 26 00 00 Electrical
- C. Section 26 05 19 Low Voltage Electrical Power Conductors and Cables
- D. Section 26 05 26 Grounding and Bonding for Electrical Systems
- E. Section 26 05 29 Hangers and Supports for Electrical Systems
- F. Section 26 05 33 Raceway and Boxes for Electrical Systems
- G. Section 26 05 53 Identification for Electrical Systems
- H. Refer to the Material Schedules on the drawings

1.07 SUBSTITUTIONS

A. Light fixtures that meet or exceed the quality and performance of the light fixtures specified will be considered equal; however, if the Contractor substitutes the light fixtures, the Contractor shall submit lighting calculations using the proposed lights throughout the building. The light loss factor for the substituted lights shall be 0.90.

PART 2 - PRODUCTS

2.01 FIXTURES

- A. All fixtures shall be UL approved and furnished complete with lamps of proper size and type required.
- B. Furnish and install proper outlet boxes at each fixture location. Securely fasten each outlet box to the building structure.
- C. Furnish and install proper supports, pendants, canopy extensions, etc. for each light fixture. Securely fasten/support each light fixture to the building structure.
- D. Furnish and install plaster frames, light tight gaskets, and other accessories for proper installation of light fixtures.
- E. Coordinate the exterior finish of light fixtures and accessories with the Owner.
- F. Furnish and install light fixtures with UL and NEMA ratings for the application.

2.02 LAMPS AND BALLAST

- A. Unless otherwise specified, all incandescent lamps shall be heavy duty, 130 volt, and inside frosted.
- B. Unless otherwise specified, all LED lamps shall have color characteristics as shown on the fixture schedule.

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C. Long-life LEDs, coupled with high-efficiency drivers shall be provided as standard with each LED fixture. Fixture shall provide 90% LED lumen maintenance at 60,000 hours (L90/60,000).

PART 3 - EXECUTION

3.01 FINISH

A. The finished appearance of the workmanship on all fixtures installed under this contract shall have the approval of the Architect before final acceptance is made.

3.02 MOUNTING

- A. Each light fixture shall be securely mounted to the structure by approved means. Coordinate with local authority for required seismic bracing.
- B. The Contractor shall coordinate with Division 9 trades for grid type ceilings. Troffer type light fixtures shall be mounted between and securely fastened to the structural ceiling grid members. If the structural ceiling grid members are not placed correctly for the lighting placement, the light fixture shall be securely fastened to the structure above.
- C. The Contractor shall coordinate the mounting of pendent and surface mounted light fixtures. Where the light fixture placement does not correspond with structural framing members, supplemental supporting structures and/or additional brackets and braces shall be furnished and installed.
- D. The Contractor shall coordinate the mounting of wall mounted light fixtures. Nominal mounting heights have been included in the Material Schedules on the drawings; however, these mounting heights shall be adjusted in the field to correspond to other building features (ex. exterior roof gutter down pipes, canopies, etc.).

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SECTION 27 00 00 COMMUNICATIONS

PART 1 - GENERAL

1.01 GOVERNING STATEMENT

- A. The General Conditions, Supplementary General Conditions, Information to Bidders, General Requirements and other pertinent documents issued by the Architect are to be considered as a part of these specifications and shall be complied with in every respect.
- B. This specification indicates the general scope of the project in terms of the electrical systems. The specifications do not necessarily indicate or describe all work required for full performance and completion of the Contract Documents. Based on the general scope indicated or described, the Contractor shall furnish all items required for the proper execution and completion of the work with no revision to the contract price or contract time of completion of the work.
- C. Examine and become familiar with the requirements of the other trades, alternates, and bid packages for this project. Coordinate with each for specific requirements.
- D. Examine the site, mechanical, general construction, structural, electrical, and other pertinent drawings. Plan, install, and coordinate all work with other trades. The Contractor shall become familiar with local building codes and serving utility requirements. The final product is to be free of hazard and fully functional.
- E. Furnish all material, equipment, labor and all incidentals necessary to install electrical systems shown on the drawings and as specified herein in a manner acceptable to the Architect. Install and adjust all equipment and material as shown on the plans, specified, or hereinafter mentioned or implied in such manner as to accomplish the general intent of the plans and specifications. The current editions of the applicable codes apply to this project and take precedence over any of the project documents (specifications and drawings).
- F. Coordinate seismic bracing requirements with applicable building codes and the local authority.
- G. Submit only written requests to the Architect for interpretation or clarification of the Contract Documents.

1.02 SCOPE

- A. The work to be performed under these specifications shall include all labor, materials, equipment, transportation, construction, facilities, and incidentals necessary for the proper execution, installation, testing, adjustments, and completion of all electrical work shown and indicated in the Contract Documents. The intent is that the installation shall be 'complete' in every respect, pleasant in appearance, and ready for use.
- B. The work under these specifications shall in general include, but is not limited to, furnishing and installing the following:
 - 1. Section 01 11 00 Summary of Work
 - 2. Section 01 18 04 Project Utility Sources

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- 3. Section 01 21 00 Allowances
- 4. Section 01 23 00 Alternates
- 5. Section 03 30 00 Cast In Place Concrete
- 6. Section 07 84 13 Penetration Firestopping
- 7. Division 08 Doors and Windows
- 8. Section 09 91 00 Painting
- 9. Section 21 13 13 Wet Pipe Sprinkler System
- 10. Section 26 05 19 Low Voltage Electrical Power Conductors and Cables
- 11. Section 26 05 26 Grounding and Bonding for Electrical Systems
- 12. Section 26 05 29 Hangers and Supports for Electrical Systems
- 13. Section 26 05 33 Raceway and Boxes for Electrical Systems
- 14. Section 26 05 53 Identification for Electrical Systems
- 15. Section 31 23 00 Excavation and Fill

1.03 WORK BY OTHERS

- A. Review the descriptions of Utility and Owner requirements for specific responsibilities. The Contractor shall coordinate the work of each local service provider to ensure that all the work required is included in the Base Bid or applicable alternate.
- B. Review the descriptions of each trade for specific responsibilities. The Contractor shall coordinate the work of each trade to ensure that all the work required is included in the Base Bid or applicable alternate.
- C. Equipment with electric components provided under other Divisions of this Contract, unless otherwise specified or shown, shall be furnished and set in place by the Divisional Trade.
- D. The Owner will furnish and install some equipment, components, and appliances that will require electrical connections by Division 26 and 28 Trades. The Contractor shall coordinate and cooperate with the Owner and other trades to avoid conflicts.

1.04 COORDINATION

A. It shall be the responsibility of the Contractor to fully examine mechanical, structural, architectural, electrical, etc. plans and coordinate his work and shop drawings with other trades, and the particular requirements of the spaces involved. The Contractor shall make changes in the work occasioned by conflicts with other building trades with no revision to the contract price.

1.05 DRAWINGS

A. The drawings are generally diagrammatic, and outlets, switches, motors, etc. shown on the drawings do not indicate that such items shall be placed at the exact location as scaled on the drawings. All building dimensions are to be taken from the architectural drawings.

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- B. The drawings and specifications shall be considered as cooperative. Work and material included in either, though not mentioned in both, shall be part of the project to be accomplished and shall be carried out completely.
- C. The drawings indicate the extent and general arrangement of the various systems. Electrical circuits shall have the indicated load connected, but location of conduit may be arranged to best fit building conditions. If any departure from these drawings is necessary, descriptions of these departures and a statement of the reason shall be submitted to the Construction Manager for approval.
- D. The drawings and specifications shall be considered a part of this Contract. Should an error or omission occur in either or both the drawings and specifications, or conflict with the other, the Contractor shall not avail himself of such unintentional error, omission, or conflict, but shall have same explained to him and adjusted before signing the Contract or proceeding with the work.

1.06 QUALITY ASSURANCE

- A. The materials, components, and installation shall comply with the appropriate sections and articles of:
 - 1. National Electrical Code
 - 2. National Electrical Safety Code
 - 3. National Fire Protection Association Standards
 - 4. Local Building Ordnance
- B. The local authority shall be the interpreter of any code requirements. In the absence of a local enforcing authority the Architect shall interpret the code and his decision shall govern.

1.07 TESTING

- A. It shall be the responsibility of this Contractor to furnish all testing equipment and labor necessary to perform the following tests:
 - 1. Any wiring device, lighting fixture, communications component, signaling component, or electrical apparatus in this contract, if grounded, shorted, or opened shall be removed and the trouble corrected.
 - 2. Each system and sub-system shall be fully tested and certified as functional and operational prior to project acceptance.

1.08 CLEAN-UP

- A. The site shall be continuously clean, neat, and orderly. Do not let debris accumulate or become scattered. Maintain the site in a safe, secure, hazard-free condition.
- B. Materials stored on the site must be well organized, protected from the weather, and physically secure.

1.09 WARRANTY

A. Provide full one (1) year guarantee of the work to include materials, parts, labor, and transportation for repair and/or replacement of defects in material and/or workmanship.

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The Contractor shall replace any defective materials or remedy other defects without cost to the Owner during the guarantee period.

B. Provide written statement to the Owner with words to the effect:

"We hereby guarantee that all Work performed by us on the above captioned project to be free from defective and/or nonconforming materials and workmanship and that for a period of one (1) year from the date of Substantial Completion, or such period of time as may be called for in the Contract Documents for such portions of the Work. During this period, we will repair and/or replace any defective and/or nonconforming materials and workmanship in accordance with the requirements of the Contract Documents."

1.10 FEES AND PERMITS

- A. Make all arrangements and pay all costs and assessments by municipalities, utilities, or other regulatory bodies for building permits, inspection fees, etc. Such costs and assessments required for Division 27 work shall be included in the Base Bid or appropriate bid alternate.
- B. Coordinate with all local utility providers. 'Aid to Construction' and/or connection fees shall be as outlined in Section 01 18 04 Project Utilities or fees and assessments associated with Division 16 trades shall be fully included in the Base Bid.

1.11 ALTERNATES

A. Refer to Section 01 23 00 - Architects instructions for alternates.

1.12 ALLOWANCES

A. Refer to Section 01 21 00 - Architects instructions for cash allowances.

PART 2 - PRODUCTS

2.01 GENERAL

- A. All materials (not indicated existing to be re-used) are to be new and of current design for which replacement parts are available.
- B. All new materials shall be listed and labeled by UL or ETL for application and use as installed.
- C. All materials shall be properly stored and protected. Materials damaged due to improper storage and/or handling shall be repaired or replaced at the Owner's option.

2.02 SUBSTITUTIONS OF MATERIALS

- A. Where material or equipment is specified or shown on the drawings by name of manufacturer or by accepted trade designation, it denotes the quality desired. The material of other manufacturers may be used, provided the construction, arrangement, finish, voltage, and safe load carrying capacity equals that specified or shown. Where two or more items are furnished under the same specifications, all are to be of the same manufacture and shall be identical and inter-changeable.
- B. It shall be the responsibility of the Contractor to ascertain if the substitute items will fit into the space allotted as conveniently as the items specified. Any changes to the

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building or system design necessary shall be arranged for in writing before material is ordered. All costs involved in making such changes shall be borne by the Contractor. If the Architect deems such changes inadvisable, the Contractor shall install items specified even though substitute item had been previously reviewed. Architect's review of a substitute is for performance and/or design only.

2.03 COMPONENTS INCLUDED

A. An attempt has been made to identify the major components of each system. Incidental materials and/or operations required to complete the installation shall be furnished without further mention. The intent is to provide a complete, safe, and operable system. Such incidental components and/or operations are to be in keeping with the quality established for the Work.

PART 3 - EXECUTION

3.01 GENERAL

- A. The Work as described in the Contract Documents is technical in nature. Skilled craftsmen shall perform this work. Trainees and labors shall work only under the supervision of the skilled craftsmen.
- B. A Foreman or Leadsman shall be designated for work involving Division 27 trades. The Foreman or Leadsman shall be on site to participate in or supervise others performing Division 27 Work.
- C. All systems and components shall be installed in strict accordance with the manufacturer's recommendations by technicians skilled with tools and techniques of the trade. Where such recommendations are not routinely published the systems and components shall be installed with tools and techniques of the trade and to traditional industry standards.

3.02 COORDINATION

- A. Make provisions for the delivery and safe storage of all materials, and arrange with other trades on the job for the installation of equipment too large to pass through finished openings.
- B. Arrange to have materials delivered to the job at such stages of the work as will expedite the work as a whole. Mark and store all materials in such a manner as to be easily checked, inspected, and issued.
- C. Locations of all outlets, fixtures, receptacles, etc. are to be verified with other trades, millwork, and specific equipment suppliers prior to roughing in. Cost of relocating such items because of failure to do so shall be at the Contractor's expense.
- D. Provide new conduits, junction boxes, wiring, etc as required to maintain services and/or systems with components that conflict with the work of this project. Unless specifically identified all existing electrical power, lighting, signaling, and communications circuits must be maintained.
- E. Avoid interference with structure and the work of other trades, preserving adequate headroom and clearing all doors and passageways to approval of the Architect.

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3.03 FINAL CONNECTIONS TO EQUIPMENT

- A. Certain items of existing equipment are to be re-used, to be furnished by the Owner, or to be furnished by other trades. The Contractor shall be responsible for providing all labor, wire, conduit, incidentals, and final connections to such items. Also where applicable, the Contractor shall relocate and/or reinstall such equipment.
- B. Provide power and final connections to mechanical equipment as indicated. This is to include providing disconnect and wiring to the controller and to the load. Components of pre-packaged/pre-wired systems such as air conditioning systems are to be utilized as provided by the manufacturer. Power wiring to loads such as pumps, fans, etc., which are not pre-wired, shall be completed by Division 26 trades and shall be included in the Base Bid or appropriate Bid Alternate.

3.04 EXCAVATION AND BACKFILLING

- A. The Contractor shall do all excavating and backfilling required for all Division 27 work. Fill, compaction, surface, etc. to meet all the requirements as applicable for the area and shall be governed by Division 02 of these specifications.
- B. The Contractor is to determine the presence and location of any underground service such as telephone, electrical, water, gas, sewage, etc. whether previously existing or as installed by other trades. The Contractor is to bear full consequences for the interference of any such systems.
- C. Backfill containing large rock, paving materials, cinders, large or sharply angular substance, or corrosive material shall not be placed in an excavation where materials may damage raceways, cables, or other substructures or prevent adequate compaction of fill or contribute to corrosion of raceways, cables, or other substructures. Where necessary to prevent physical damage to the raceway or cable, protection shall be provided in the form of granular or selected material, suitable running boards, suitable sleeves, or other approved means.

3.05 FIRE STOP

- A. Electrical installations in hollow spaces, vertical shafts, and ventilation of air-handling ducts shall be so made that the possible spread of fire or products of combustion will not be substantially increased. Openings around electrical penetrations through fire-resistant-rated walls, partitions, floors, or ceilings shall be fire stopped using approved methods to maintain the fire resistance rating. Refer to Division 07 of these specifications.
- B. Refer to the Architectural Drawings for fire rated partitions and ceilings.

3.06 PAINTING AND PATCHING

- A. All exposed panels, boxes, and raceways in finished areas are to be painted. Components provided with pre-painted finishes shall have this finish protected during installation and through out the project. Any portion of the building structure or other equipment that incurs damage to its painted surface from the installation of the electrical equipment shall have this surface repainted.
- B. All openings required for electrical components, panels, boxes, conduits, etc. shall be properly patched and sealed. Trim must conceal all rough openings.

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- C. Painting and patching shall be governed by the requirements of Division 09 of these specifications. The Contractor shall arrange and coordinate with Division 09 trades to ensure all expenses are included in the Base Bid or appropriate bid alternate.
- D. Exposed conduits in habitable areas shall be painted to compliment the adjacent surface.

3.07 INSTALLATION DIRECTIONS

A. Obtain manufacturer's printed installation directions to aid in properly executing work on equipment requiring such directions as directed by the Architect. Submit such directions to the Architect for approval prior to time of installation of equipment.

3.08 STARTING AND INSTRUCTION

- A. All equipment and systems shall be tested before being placed in operation.
- B. Furnish a competent technician to supervise the starting, adjusting, and testing of all equipment and to train the operator in the operation of the system. Where required, certain major items of equipment shall be installed under the supervision of and tested by a specialist furnished by the manufacturer of the equipment. Such specialist shall train the operator in the use of the equipment.
- C. Furnish (2) duplicate sets of operating and maintenance instructions for each and every piece of equipment supplied by him together with spare parts lists. This information shall be neatly bound in (3) ring binders, indexed and labeled for each system.
- D. The Contractor shall spend sufficient time with the Owner to acquaint him with the complete operation of the systems furnished under Division 27 of these specifications.

3.09 PROTECTION OF EQUIPMENT AND MATERIALS

A. The Contractor is responsible for care and protection of equipment and material furnished and/or installed under this contract until Final Acceptance of the project

3.10 EQUIPMENT FOUNDATIONS AND SUPPORT

- A. Install equipment and fixtures in locations shown on the drawings, except where specifically otherwise approved.
- B. Unless noted otherwise on the drawings, provide all support required for equipment specified under this division. Concrete pads shall be reinforced and shall be troweled smooth. Steel supports shall be standard structural channels or angles of the proper sizes to support equipment.
- C. All equipment and components shall be securely fastened in place. Take special care where seismic bracing is required.
- D. All ferrous metal supports and braces shall be finished to prevent corrosion and to present a pleasing appearance. Refer to Division 05 and Division 09 of these specifications.

3.11 INSPECTION

- A. Check each system component for defects, verifying that all parts are properly furnished and installed, that all items function properly, and all adjustments have been made.
- B. Coordinate with authority having jurisdiction for all required inspections before proceeding with other work.

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C. Have all systems reviewed by the Project Manager and proper officials prior to concealing or otherwise expose concealed systems for review prior to Final Acceptance.

3.12 OUTLET BOXES

- A. All outlet boxes for recessed components shall be square or octagonal attached to the building structure complete with blank cover. Install boxes above the device opening and connect to the fixture with 'Greenfield' of such length to service fixture but not more than 72 inches long. Further, the grounding path for any one circuit shall not contain more than 72 inches of flex without a dedicated grounding wire.
- B. All outlet boxes for surface mounted components shall be square or octagonal. Attach boxes to the building structure for suspended ceilings with 3/4" minimum depth plaster rings. Provide deep concrete boxes for poured concrete ceilings. Provide four inch square or octagonal outlet boxes for all exposed conduit work with fixture extension pan or deep fixture canopy to enclose box.
- C. Bracket outlets shall be level and centered on columns or above doors when installed in these locations.
- D. No thru-wall boxes will be allowed. In as much as possible, outlets in the common wall of production areas shall not be installed in a common stud space with outlets of an adjacent area.

3.13 MOUNTING HEIGHTS OF OUTLETS

- A. Where devices of the same mounting height are shown in close proximity on the wall it is intended that they be ganged under one cover plate. If the size of a device prohibits ganging, this device shall be located close to the single or ganged devices even though the scale prevents them from being shown close together on the drawings.
- B. The exact height of each switch, receptacle, light fixture, outlet, etc. shall be determined on the premises in conference with Architect, General Contractor, and Equipment supplier. The following is a list of normal mounting heights. Unless otherwise noted, specified, or required, these heights shall apply.

Device	Mounting Height	To
Desk Telephone (General Purpose)	18 inches AFF	Center
Desk Telephone (at millwork)	4 inches above backsplash	Center
Wall Telephone	48 inches AFF	Center
TV Outlet (General Purpose)	18 inches AFF	Center
TV Outlet (Special)	12 inches BFC	Center
Computer Outlet (General Purpose)	18 inches AFF	Center
Computer Outlet (at millwork)	4 inches above backsplash	Center

3.14 CLOSE OUT SUBMITTALS

- A. Project close out documents shall include the following:
 - 1. Provide (2) sets of product data sheets, spare parts list, and O&M manuals for equipment installed under this contract. The product data sheets, spare parts list, and O&M manuals shall include, but not be limited to light fixtures, lighting contactors, occupancy sensors, time clocks, panelboards, motor control centers, transformers, disconnects, motor starters and switches, generator, transfer switches, lightning protection system and components, data switches and patch panels, specialty systems and components (i.e. fire alarm, security, CCTV, intercom, sound reinforcement, nurse call, etc.)

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SECTION 27 20 00 DATA COMMUNICATIONS

PART 1 - GENERAL

1.01 GOVERNING STATEMENT

- A. The Owner will furnish and install a networked computer system under a separate contract.
- B. Coordinate with the Owner's representative for specific requirements.

1.02 SCOPE

- A. Furnish and install a service conduit for incoming data service. Coordinate with local provider and include all costs in base bid or appropriate bid alternate. Furnish and install pull cord in service conduit.
- B. Furnish and install isolated ground receptacle and power wiring at the computer equipment rack location.
- C. Furnish and install blanked outlet boxes with conduits routed as shown on the plans. Include plastic bushings on the open ends of all conduits. Include pull cords with identification tags in all empty conduits.
- D. Furnish and install metal sleeves for routing data cables through walls, ceilings, and floors. Refer to the Architectural plans for fire rated barriers. Provide fire stop only to the sleeve penetration (do not plug the sleeve).

1.03 RELATED SECTIONS

- A. Section 01 18 04 Project Utilities
- B. Section 07 84 13 Penetration Firestopping
- C. Section 26 00 00 Electrical
- D. Section 26 05 19 Low Voltage Electrical Power Conductors and Cables
- E. Section 26 05 29 Hangers and Supports for Electrical Systems
- F. Section 26 05 33 Raceway and Boxes for Electrical Systems
- G. Section 26 05 53 Identification for Electrical Systems
- H. Refer to Material Schedules on the Drawings

PART 2 - PRODUCTS

2.01 EQUIPMENT LISTING

- A. The following items are to establish the minimum system components to be furnished by the Owner under separate contract:
 - 1. Equipment racks
 - 2. Patch panels
 - 3. Data switches

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- 4. Data jacks and cover plates
- 5. Wiring between system components

PART 3 - EXECUTION

3.01 INSTALLATION

- A. All house wiring shall be furnished and installed by the Owner under separate contract. The Contractor shall cooperate and coordinate with the Owner to eliminate conflicts.
- B. Furnish and install pull cords with identification tags for all empty conduits and sleeves. The identification tag shall indicate data service, the location of the other end, and the length of the conduit/sleeve.
- C. The Contractor shall furnish a point-to-point wiring diagram as record drawings showing conduit routing to all junction boxes, devices, cabinets, etc.

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SECTION 27 30 00 VOICE COMMUNICATIONS

PART 1 - GENERAL

1.01 GOVERNING STATEMENT

- A. The Owner will furnish and install a voice switch and related telephone equipment under a separate contract.
- B. Coordinate with the Owner's representative for specific requirements.

1.02 SCOPE

- A. Furnish and install a service conduit for incoming telephone service. Coordinate with local provider and include all costs in base bid or appropriate bid alternate. Furnish and install pull cord in service conduit.
- B. Furnish and install equipment mounting boards with electrical power and electrical ground for the telephone system control equipment.
- C. Furnish and install blanked outlet boxes with conduits routed as shown on the plans. Include plastic bushings on the open ends of all conduits. Include pull cords with identification tags in all empty conduits.
- D. Furnish and install metal sleeves for routing telephone cables through walls, ceilings, and floors. Refer to the Architectural plans for fire rated barriers. Provide fire stop only to the sleeve penetration (do not plug the sleeve).

1.03 RELATED SECTIONS

- A. Section 01 18 00 Project Utilities
- B. Section 07 84 13 Penetration Firestopping
- C. Section 26 00 00 Electrical
- D. Section 26 05 19 Low Voltage Electrical Power Conductors and Cables
- E. Section 26 05 29 Hangers and Supports for Electrical Systems
- F. Section 26 05 33 Raceway and Boxes for Electrical Systems
- G. Section 26 05 53 Identification for Electrical Systems
- H. Refer to Material Schedules on the Drawings

PART 2 - PRODUCTS

2.01 EQUIPMENT LISTING

- A. The following items are to establish the minimum system components to be furnished by the Owner under separate contract:
 - 1. Terminal blocks/patch panels
 - 2. Telephone jacks and cover plates
 - 3. Wiring between system components

PART 3 - EXECUTION

3.01 INSTALLATION

- A. The service wiring and its surge protection shall be furnished and installed by the local provider. The Contractor shall cooperate and coordinate with the local provider to eliminate conflicts.
- B. All house wiring shall be furnished and installed by the Owner under separate contract. The Contractor shall cooperate and coordinate with the Owner to eliminate conflicts.
- C. Furnish and install pull cords with identification tags for all empty conduits and sleeves. The identification tag shall indicate telephone service, the location of the other end, and the length of the conduit/sleeve.
- D. The Contractor shall furnish a point-to-point wiring diagram as record drawings showing conduit routing to all junction boxes, devices, cabinets, etc.
- E. The Contractor shall coordinate the complete installation with the local provider to ensure compatibility with the local service.

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SECTION 28 00 00 ELECTRONIC SAFETY AND SECURITY

PART 1 - GENERAL

1.01 GOVERNING STATEMENT

- A. The General Conditions, Supplementary General Conditions, Information to Bidders, General Requirements and other pertinent documents issued by the Architect are to be considered as a part of these specifications and shall be complied with in every respect.
- B. This specification indicates the general scope of the project in terms of the electrical systems. The specifications do not necessarily indicate or describe all work required for full performance and completion of the Contract Documents. Based on the general scope indicated or described, the Contractor shall furnish all items required for the proper execution and completion of the work with no revision to the contract price or contract time of completion of the work.
- C. Examine and become familiar with the requirements of the other trades, alternates, and bid packages for this project. Coordinate with each for specific requirements.
- D. Examine the site, mechanical, general construction, structural, electrical, and other pertinent drawings. Plan, install, and coordinate all work with other trades. The Contractor shall become familiar with local building codes and serving utility requirements. The final product is to be free of hazard and fully functional.
- E. Furnish all material, equipment, labor and all incidentals necessary to install electrical systems shown on the drawings and as specified herein in a manner acceptable to the Architect. Install and adjust all equipment and material as shown on the plans, specified, or hereinafter mentioned or implied in such manner as to accomplish the general intent of the plans and specifications. The current editions of the applicable codes apply to this project and take precedence over any of the project documents (specifications and drawings).
- F. In general, all wiring shall be installed in a raceway system concealed below grade, below finished floor, above ceilings, or within walls. Furnish and install junction boxes, outlet boxes, devices, and cover plates.
- G. Coordinate with the Project Manager for a full review of systems prior to concealment or otherwise expose concealed systems for review prior to Project Acceptance.
- H. Skilled craftsmen shall execute the work using current tools and techniques of the trade.
- I. Coordinate seismic bracing requirements with applicable building codes and the local authority.
- J. Submit only written requests to the Architect for interpretation or clarification of the Contract Documents.

1.02 SCOPE

A. The work to be performed under these specifications shall include all labor, materials, equipment, transportation, construction, facilities, and incidentals necessary for the proper execution, installation, testing, adjustments, and completion of all electrical work

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shown and indicated in the Contract Documents. The intent is that the installation shall be 'complete' in every respect, pleasant in appearance, and ready for use.

- B. The work under these specifications shall in general include, but is not limited to, furnishing and installing the following:
 - 1. Section 01 11 00 Summary of Work
 - 2. Section 01 18 04 Project Utility Sources
 - 3. Section 01 21 00 Allowances
 - 4. Section 01 23 00 Alternates
 - 5. Section 03 30 00 Cast In Place Concrete
 - 6. Section 07 84 13 Penetration Firestopping
 - 7. Division 08 Doors and Windows
 - 8. Section 09 91 00 Paint
 - 9. Section 21 13 13 Wet Pipe Sprinkler System
 - 10. Section 26 00 00 Electrical
 - 11. Section 26 05 19 Low Voltage Electrical Power Conductors and Cables
 - 12. Section 26 05 26 Grounding and Bonding for Electrical Systems
 - 13. Section 26 05 29 Hangers and Supports for Electrical Systems
 - 14. Section 26 05 33 Raceway and Boxes for Electrical Systems
 - 15. Section 26 05 53 Identification for Electrical Systems
 - 16. Section 31 23 00 Excavation and Fill

1.03 WORK BY OTHERS

- A. Review the descriptions of each trade for specific responsibilities. The Contractor shall coordinate the work of each trade to ensure that all the work required is included in the Base Bid or applicable alternate.
- B. Equipment with electric components provided under other Divisions of this Contract, unless otherwise specified or shown, shall be furnished and set in place by the Divisional Trade.
- C. The Owner will furnish and install some equipment, components, and appliances that will require electrical connections by Division 26 Trades. The Contractor shall coordinate and cooperate with the Owner and other trades to avoid conflicts.
- D. At various phases of the work it may be necessary for others to install wiring and components not covered by this contract. The Contractor shall cooperate with others performing such work.
- E. Unless specifically stated herein or on the plans to be by others, all components and work, which are required to make the system complete and operative, shall be furnished and installed by the Contractor and governed by the Contract Documents.

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F. All work necessary, but supplemental to the work described in Division 26, shall be complete as described elsewhere in the Contract Documents by divisional trades. Financial obligations for special services by other divisional trades which are required for Division 26 work shall be included in the Base Bid or appropriate bid alternate.

1.04 COORDINATION

A. It shall be the responsibility of the Contractor to fully examine mechanical, structural, architectural, electrical, etc. plans and coordinate his work and shop drawings with other trades, and the particular requirements of the spaces involved. The Contractor shall make changes in the work occasioned by conflicts with other building trades with no revision to the contract price.

1.05 DRAWINGS

- A. The drawings are generally diagrammatic, and outlets, switches, motors, etc. shown on the drawings do not indicate that such items shall be placed at the exact location as scaled on the drawings. All building dimensions are to be taken from the architectural drawings.
- B. The drawings and specifications shall be considered as cooperative. Work and material included in either, though not mentioned in both, shall be part of the project to be accomplished and shall be carried out completely.
- C. The drawings indicate the extent and general arrangement of the various systems. Electrical circuits shall have the indicated load connected, but location of conduit may be arranged to best fit building conditions. If any departure from these drawings is necessary, descriptions of these departures and a statement of the reason shall be submitted to the Construction Manager for approval.
- D. The drawings and specifications shall be considered a part of this Contract. Should an error or omission occur in either or both the drawings and specifications, or conflict with the other, the Contractor shall not avail himself of such unintentional error, omission, or conflict, but shall have same explained to him and adjusted before signing the Contract or proceeding with the work.

1.06 QUALITY ASSURANCE

- A. The materials, components, and installation shall comply with the appropriate sections and articles of:
 - 1. National Electrical Code
 - 2. National Electrical Safety Code
 - 3. National Fire Protection Association Standards
 - 4. Local Building Ordnance
- B. The local authority shall be the interpreter of any code requirements. In the absence of a local enforcing authority the Architect shall interpret the code and his decision shall govern.

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1.07 TESTING

- 1. Any wiring device, lighting fixture, communications component, signaling component, or electrical apparatus in this contract, if grounded, shorted, or opened shall be removed and the trouble corrected.
- 2. Each system and sub-system shall be fully tested and certified as functional and operational prior to project acceptance.

1.08 CLEAN-UP

- A. The site shall be continuously clean, neat, and orderly. Do not let debris accumulate or become scattered. Maintain the site in a safe, secure, hazard-free condition.
- B. Materials stored on the site must be well organized, protected from the weather, and physically secure.

1.09 WARRANTY

- A. Provide full one (1) year guarantee of the work to include materials, parts, labor, and transportation for repair and/or replacement of defects in material and/or workmanship. The Contractor shall replace any defective materials or remedy other defects without cost to the Owner during the guarantee period.
- B. Provide written statement to the Owner with words to the effect:

"We hereby guarantee that all Work performed by us on the above captioned project to be free from defective and/or nonconforming materials and workmanship and that for a period of one (1) year from the date of Substantial Completion, or such period of time as may be called for in the Contract Documents for such portions of the Work. During this period, we will repair and/or replace any defective and/or nonconforming materials and workmanship in accordance with the requirements of the Contract Documents."

1.10 ALTERNATES

A. Refer to Section 01 23 00 - Architects instructions for alternates.

1.11 ALLOWANCES

A. Refer to Section 01 21 00 - Architects instructions for cash allowances.

PART 2 - PRODUCTS

2.01 GENERAL

- A. All materials (not indicated existing to be re-used) are to be new and of current design for which replacement parts are available.
- B. All new materials shall be listed and labeled by UL or ETL for application and use as installed
- C. All materials shall be properly stored and protected. Materials damaged due to improper storage and/or handling shall be repaired or replaced at the Owner's option.

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2.02 SUBSTITUTIONS OF MATERIALS

- A. Where material or equipment is specified or shown on the drawings by name of manufacturer or by accepted trade designation, it denotes the quality desired. The material of other manufacturers may be used, provided the construction, arrangement, finish, voltage, and safe load carrying capacity equals that specified or shown. Where two or more items are furnished under the same specifications, all are to be of the same manufacture and shall be identical and inter-changeable.
- B. It shall be the responsibility of the Contractor to ascertain if the substitute items will fit into the space allotted as conveniently as the items specified. Any changes to the building or system design necessary shall be arranged for in writing before material is ordered. All costs involved in making such changes shall be borne by the Contractor. If the Architect deems such changes inadvisable, the Contractor shall install items specified even though substitute item had been previously reviewed. Architect's review of a substitute is for performance and/or design only.

2.03 COMPONENTS INCLUDED

A. An attempt has been made to identify the major components of each system. Incidental materials and/or operations required to complete the installation shall be furnished without further mention. The intent is to provide a complete, safe, and operable system. Such incidental components and/or operations are to be in keeping with the quality established for the Work.

PART 3 - EXECUTION

3.01 GENERAL

- A. The Work as described in the Contract Documents is technical in nature. Skilled craftsmen shall perform this work. Trainees and labors shall work only under the supervision of the skilled craftsmen.
- B. A Foreman or Leadsman shall be designated for work involving Division 28 trades. The Foreman or Leadsman shall be on site to participate in or supervise others performing Division 28 Work.
- C. All systems and components shall be installed in strict accordance with the manufacturer's recommendations by technicians skilled with tools and techniques of the trade. Where such recommendations are not routinely published the systems and components shall be installed with tools and techniques of the trade and to traditional industry standards.

3.02 COORDINATION

- A. Make provisions for the delivery and safe storage of all materials, and arrange with other trades on the job for the installation of equipment too large to pass through finished openings.
- B. Arrange to have materials delivered to the job at such stages of the work as will expedite the work as a whole. Mark and store all materials in such a manner as to be easily checked, inspected, and issued.

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- C. Locations of all outlets, fixtures, receptacles, etc. are to be verified with other trades, millwork, and specific equipment suppliers prior to roughing in. Cost of relocating such items because of failure to do so shall be at the Contractor's expense.
- D. Avoid interference with structure and the work of other trades, preserving adequate headroom and clearing all doors and passageways to approval of the Architect.

3.03 FINAL CONNECTIONS TO EQUIPMENT

A. Certain items of existing equipment are to be re-used, to be furnished by the Owner, or to be furnished by other trades. The Contractor shall be responsible for providing all labor, wire, conduit, incidentals, and final connections to such items. Also where applicable, the Contractor shall relocate and/or reinstall such equipment.

3.04 EXCAVATION AND BACKFILLING

- A. The Contractor shall do all excavating and backfilling required for all Division 28 work. Fill, compaction, surface, etc. to meet all the requirements as applicable for the area and shall be governed by Division 02 and Division 31 of these specifications.
- B. The Contractor is to determine the presence and location of any underground service such as telephone, electrical, water, gas, sewage, etc. whether previously existing or as installed by other trades. The Contractor is to bear full consequences for the interference of any such systems.
- C. Backfill containing large rock, paving materials, cinders, large or sharply angular substance, or corrosive material shall not be placed in an excavation where materials may damage raceways, cables, or other substructures or prevent adequate compaction of fill or contribute to corrosion of raceways, cables, or other substructures. Where necessary to prevent physical damage to the raceway or cable, protection shall be provided in the form of granular or selected material, suitable running boards, suitable sleeves, or other approved means.

3.05 FIRE STOP

- A. Electrical installations in hollow spaces, vertical shafts, and ventilation of air-handling ducts shall be so made that the possible spread of fire or products of combustion will not be substantially increased. Openings around electrical penetrations through fire-resistant-rated walls, partitions, floors, or ceilings shall be fire stopped using approved methods to maintain the fire resistance rating. Refer to Division 07 of these specifications.
- B. Refer to the Architectural Drawings for fire rated partitions and ceilings.

3.06 PAINTING AND PATCHING

- A. All exposed panels, boxes, and raceways in finished areas are to be painted. Components provided with pre-painted finishes shall have this finish protected during installation and through out the project. Any portion of the building structure or other equipment that incurs damage to its painted surface from the installation of the electrical equipment shall have this surface repainted.
- B. All openings required for electrical components, panels, boxes, conduits, etc. shall be properly patched and sealed. Trim must conceal all rough openings.

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- C. Painting and patching shall be governed by the requirements of Division 09 of these specifications. The Contractor shall arrange and coordinate with Division 09 trades to ensure all expenses are included in the Base Bid or appropriate bid alternate.
- D. Exposed conduits in habitable areas shall be painted to compliment the adjacent surface.

3.07 INSTALLATION DIRECTIONS

A. Obtain manufacturer's printed installation directions to aid in properly executing work on equipment requiring such directions as directed by the Architect. Submit such directions to the Architect for approval prior to time of installation of equipment.

3.08 STARTING AND INSTRUCTION

- A. All equipment and systems shall be tested before being placed in operation.
- B. Furnish a competent technician to supervise the starting, adjusting, and testing of all equipment and to train the operator in the operation of the system. Where required, certain major items of equipment shall be installed under the supervision of and tested by a specialist furnished by the manufacturer of the equipment. Such specialist shall train the operator in the use of the equipment.
- C. Furnish (2) duplicate sets of operating and maintenance instructions for each and every piece of equipment supplied by him together with spare parts lists. This information shall be neatly bound in (3) ring binders, indexed and labeled for each system.
- D. The Contractor shall spend sufficient time with the Owner to acquaint him with the complete operation of the systems furnished under Division 28 of these specifications.

3.09 PROTECTION OF EQUIPMENT AND MATERIALS

A. The Contractor is responsible for care and protection of equipment and material furnished and/or installed under this contract until Final Acceptance of the project

3.10 EQUIPMENT FOUNDATIONS AND SUPPORT

- A. Install equipment and fixtures in locations shown on the drawings, except where specifically otherwise approved.
- B. Unless noted otherwise on the drawings, provide all support required for equipment specified under this division. Concrete pads shall be reinforced and shall be troweled smooth. Steel supports shall be standard structural channels or angles of the proper sizes to support equipment.
- C. All equipment and components shall be securely fastened in place. Take special care where seismic bracing is required.
- D. All ferrous metal supports and braces shall be finished to prevent corrosion and to present a pleasing appearance. Refer to Division 05 and Division 09 of these specifications.

3.11 INSPECTION

- A. Check each system component for defects, verifying that all parts are properly furnished and installed, that all items function properly, and all adjustments have been made.
- B. Coordinate with authority having jurisdiction for all required inspections before proceeding with other work.

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C. Have all systems reviewed by the Project Manager and proper officials prior to concealing or otherwise expose concealed systems for review prior to Final Acceptance.

3.12 MOUNTING HEIGHTS OF OUTLETS

- A. Where devices of the same mounting height are shown in close proximity on the wall it is intended that they be ganged under one cover plate. If the size of a device prohibits ganging, this device shall be located close to the single or ganged devices even though the scale prevents them from being shown close together on the drawings.
- B. The exact height of each switch, receptacle, light fixture, outlet, etc. shall be determined on the premises in conference with Architect, General Contractor, and Equipment supplier. The following is a list of normal mounting heights. Unless otherwise noted, specified, or required, these heights shall apply.

Device	Mounting Height	To
Fire Alarm Pull Station	48 inches AFF	Center
Fire Alarm Audible, Visible (General)	90 inches AFF	Center
Fire Alarm Audible/Visible (Exterior)	As noted	Center
CCTV Outlets (interior)	12 inches BFC	Center
CCTV Outlets (exterior)	As Noted	Center

3.13 EQUIPMENT FURNISHED BY OTHERS

A. Consult and coordinate with all parties furnishing equipment requiring electrical connections as necessary. Verify exact requirements and component location. No extras will be allowed for relocation or replacement of electrical wiring or controls because of this Contractor's failure to coordinate with other Trades.

3.14 CLOSE OUT SUBMITTALS

- A. Project close out documents shall include the following:
 - 1. Provide (2) sets of product data sheets, spare parts list, and O&M manuals for equipment installed under this contract. The product data sheets, spare parts list, and O&M manuals shall include, but not be limited to light fixtures, lighting contactors, occupancy sensors, time clocks, panelboards, motor control centers, transformers, disconnects, motor starters and switches, generator, transfer switches, lightning protection system and components, data switches and patch panels, specialty systems and components (i.e. fire alarm, security, CCTV, intercom, sound reinforcement, nurse call, etc.)

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SECTION 28 31 00 FIRE DETECTION AND ALARM

PART 1 - GENERAL

1.01 GOVERNING STATEMENT

A. Furnish and install an automatic fire detection and alarm system. Fire alarm system shall be a fully functional voice evacuation system.

1.02 SCOPE

- A. Furnish and install power wiring for fire alarm system control cabinet.
- B. Furnish and install wall/ceiling outlet boxes with conduits routed as shown on the plans. Include plastic bushings on the open ends of all conduits.
- C. Furnish and install wiring between system components.
- D. Furnish and install metal sleeves for routing fire detection and alarm cables through walls, ceilings, and floors. Refer to the Architectural plans for fire rated barriers. Provide fire stop only to the sleeve penetration (do not plug the sleeve).
- E. Include the first 12 months remote monitoring in the base bid.

1.03 SUBMITTALS

- A. The Contractor shall provide submittal data for all fire alarm system components, wiring, and surge suppression where applicable.
- B. The Contractor shall provide drawing(s) showing device locations with one line conduit and wiring requirements.
- C. The Contractor shall provide schedules indicating connected devices on initiation and notification circuits, quantity of devices, amp draw of devices in standby and alarm, wire size used, circuit lengths, voltage drop calculations, and battery calculations.

1.04 RELATED SECTIONS

- A. Section 07 84 13 Penetration Firestopping
- B. Section 21 13 13 Wet Pipe Sprinkler System
- C. Section 26 00 00 Electrical
- D. Section 26 05 19 Low Voltage Electrical Power Conductors and Cables
- E. Section 26 05 26 Grounding and Bonding for Electrical Systems
- F. Section 26 05 29 Hangers and Supports for Electrical Systems
- G. Section 26 05 33 Raceway and Boxes for Electrical Systems
- H. Section 26 05 53 Identification for Electrical Systems
- I. Refer to the Material Schedules on the drawings

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PART 2 - PRODUCTS

2.01 EQUIPMENT LISTING

- A. The following items are to establish the minimum system components to be furnished by the Contractor under this contract:
 - 1. Local control panel with power supply with transient voltage surge suppression
 - 2. Battery power pack with condition indicator sized to support the system for 24 hours and then maintain fifteen (15) minutes of alarm signal power
 - 3. Battery charging circuit with operation indicator
 - 4. Digital communicator for alarm and trouble transmission to remote monitoring station
 - 5. Modules for initiating and signaling devices
 - 6. Manual stations (key reset)
 - 7. Audio signal module
 - 8. Visual signal module
 - 9. All wiring to be 16 AWG minimum (wiring for audible and audible/visible alarms shall be adjusted for voltage drop)
 - 10. Drill sequence module
 - 11. Lamp test switches
 - 12. Adjustable pre-signal timer module
 - 13. Adjustable alarm signal time-out module
 - 14. Remote annunciator
 - 15. Photoelectric smoke detectors
 - 16. Carbon monoxide detectors
 - 17. Heat detectors
 - 18. Voice/visible signaling devices (interior and exterior)
 - 19. Visible signaling devices
 - 20. Tamper and flow switches for fire sprinkler system
 - 21. Addressable modules and/or control relays for:
 - a. Tamper switches
 - b. Flow switches
 - c. Factory installed duct detectors

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PART 3 - EXECUTION

3.01 INSTALLATION

- A. All system wiring shall be furnished and installed by or under the supervision of the system vendor.
- B. All system components shall be installed by or under the direct supervision of the authorized franchised distributor of the products used. Upon completion of the installation, the vendor shall provide a trained technician authorized by the Manufacturer to perform all necessary tests and adjustments and furnish the Architect a letter of certification indicating that the system functions and conforms to the requirements of these specifications.
- C. Outlet locations shall be clearly and permanently identified as shown on the plans.
- D. Wiring shall be installed continuous from component to component without splices.
- E. Where open wiring is allowed, the Contractor shall provide metal sleeves for routing system cables through walls, ceilings, and floors.
- F. Where open wiring is allowed above accessible ceilings to connect system components, all wiring shall be grouped, bundled, and secured to the structure with 'J' hooks on ± 5 ' centers.
- G. Furnish and install transient voltage surge suppression for the central equipment and at each entry into the building and exit from the building.
- H. The Contractor shall furnish a point-to-point wiring diagram as record drawings showing conduit routing and wiring to all junction boxes, devices, cabinets, etc.

3.02 SYSTEM PROGRAMMING

- A. The following system responses shall be pre-programmed:
 - 1. On any short or open in the initiating device or alarm device circuit the system shall:
 - a. Activate a trouble signal at the main panel
 - b. Activate a trouble signal at the remote annunciator panel
 - c. Transmit a trouble code to the remote monitoring station
 - 2. On the activation of any initiating device the system shall activate the general alarm which shall include the following:
 - a. Activate all audible alarms
 - b. Activate all visible alarms
 - c. Activate an alarm signal at the main panel
 - d. Activate an alarm signal at the remote annunciator panel
 - e. Transmit alarm code to remote monitoring station

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- 3. On activation of the wet sprinkler system the Fire Detection and Alarm System shall activate the general alarm.
- 4. On activation of any tamper switch the system shall:
 - a. Activate a trouble signal at the main panel
 - b. Activate a trouble signal at the remote annunciator panel
 - c. Transmit a trouble code to the remote monitoring station
- 5. On activation of any Duct Detector the system shall activate the general alarm and stop the fan in the associated air handling unit.

3.03 TRAINING

- A. The Contractor shall provide system training in the operation and maintenance of the system for the Owner's staff.
- B. The Contractor shall furnish complete operation data, maintenance data, and trouble shooting guides.

3.04 WARRANTY

A. The Contractor shall warrant the complete system against defects in workmanship and materials for a period of one year from the date of final acceptance of the project.

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SECTION 31 10 00 SITE CLEARING

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Provide all labor, materials, equipment, and incidentals required to perform all clearing and grubbing of the site as shown on the drawings and as specified herein.

B. Related Sections:

- 1. Section 31 22 13 Rough Grading
- 2. Section 31 23 00 Excavation and Fill
- 3. Section 31 25 00 Erosion and Sedimentation Control

1.02 QUALITY ASSURANCE

- A. Conform to applicable federal, state, and local codes for removal and disposal of debris.
- B. On-site burning is prohibited.
- C. Burial of debris is prohibited.

1.03 PROTECTION

A. The protection of ingress and egress points and routes will be the responsibility of the Contractor. Heavy Equipment shall be routed so as to not damage the existing parking lots or walkways.

1.04 WARRANTY

A. The Contractor shall guarantee that work performed under this section will not permanently damage trees, shrubs, turf, or plants designated to remain or other adjacent work or facilities. If damage resulting from the Contractor's operations appears during the period up to twelve (12) months after the completion of the project, he shall replace the damaged items at no additional expense to the Owner.

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PART 2 - PRODUCTS

2.01 NOT USED

PART 3 - EXECUTION

3.01 PROTECTION

- A. Identify and protect existing utilities.
- B. Streets, roads, adjacent property, and other works and structures shall be protected throughout the duration of the project. The Contractor shall return to their original condition any facilities damaged by the Contractor's operations.
- C. Trees, shrubs, and grassed areas which are to remain shall be protected by fences, barricades, wrapping, or other methods approved by the Architect. No activity shall be permitted within the tree branch spread of any tree scheduled to remain.

3.02 CLEARING AND GRUBBING

- A. Except as noted below, the Contractor shall remove from the site and satisfactorily dispose of all trees, shrubs, stumps, roots, brush, masonry, rubbish, scrap, debris, pavement, curbs, fences, and miscellaneous other structures as shown, specified, or otherwise required to permit construction of the new work.
- B. Remove roots that are larger than ½" diameter.
- C. Remove debris and rock larger than 0.5 cubic feet.
- D. Trees, stumps, and other cleared and grubbed material may not be disposed on site.
- E. The Contractor shall make a reasonable effort to channel merchantable material into the commercial market to make beneficial use of materials resulting from clearing and grubbing operations.
- F. Burning on site is not permitted.
- G. All burning off the site shall be in complete accordance with the rules and regulations of local authorities having jurisdiction.
- H. Trees and shrubs shall be trimmed when doing so will avoid removal or damage.

 Trimmed or damaged trees shall be treated and repaired by persons who have experience in this specialty and who are approved by the Architect. Trees and shrubs intended to remain which are removed or damaged beyond repair shall be replaced by the Contractor at no additional expense to the Owner.
- I. Control dust, dirt, and other particulate air pollution and comply with governing regulations.

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SECTION 31 22 13 ROUGH GRADING

PART 1 - GENERAL

1.01 WORK INCLUDED

- A. Execute grading operations in strict accordance with the Geotechnical Report, if supplied.
- B. Remove topsoil at locations of building slabs, drives, and parking; stockpile for later reuse.
- C. Remove vegetation as required for proposed construction.
- D. Coordinate with utility companies the installation of new underground utilities:
 - 1. Electricity.
 - 2. Water/sewer.
 - 3. Telephone.
 - 4. Gas.
- E. Remove fencing as required.
- F. Remove existing paving as required.
- G. Take special care to include work shown on the site plans.
- H. Testing of soils.
- I. Sediment control.

1.02 RELATED WORK

- A. Section 31 23 00 Excavation and Fill
- B. Section 31 22 19 Finish Grading
- C. Section 03 30 05 Cast-In-Place Concrete (paving only)

1.03 PROTECTION

- A. Protect features remaining as a portion of the final landscaping. Avoid damaging trees that do not conflict with new construction.
- B. Take necessary precautions to avoid damaging existing utilities.
- C. Repair any damage caused by the rough grading process.

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D. Grade the site to drain during the construction process. Maintain excavations free of water. Provide and operate pumping equipment to keep excavations free of water.

1.04 COORDINATION

- A. Coordinate rough grading work with underground site utilities. Take special care to protect below-grade utilities. It is the responsibility of the rough grading contractor to confirm underground utility locations prior to initiation of grading work.
- B. Proposed below-grade utilities are to be installed after rough grading is complete.

1.05 CONTRACTOR'S RESPONSIBILITIES

- A. It is the responsibility of the Contractor to provide all engineering work associated with lay-out. Written verification of lay-out by a Mississippi-registered engineer or land surveyor is required.
- B. It is the responsibility of the Contractor to provide all engineering work associated with establishing design elevations. Written verification of design elevations by a Mississippiregistered engineer or land surveyor is required.
- C. The Contractor is responsible for work related to sediment control during the construction process and until an established vegetation cover is in place. Sediment control shall be in accordance with the Mississippi Department of Environmental Quality Storm Water Pollution Control Program. The Contractor is responsible for implementation of a storm water pollution prevention plan which complies with pertinent state regulations. Sediment control shall include at a minimum silt fences, drainage control, and the maintenance of threshed straw over all disturbed areas of the site. Minimum requirements:
 - 1. The Contractor shall limit exposure of disturbed areas to the shortest amount of time practicable and divert surface water around disturbed areas of the site whenever possible.
 - 2. The Contractor shall remove sediment from storm water before it leaves the site by appropriate methods.
 - 3. The Contractor shall implement and maintain controls as needed to prevent erosion and sediment from adversely affecting downstream property throughout construction of the project. When work is not being performed in a disturbed area, the Contractor shall install appropriate temporary and/or vegetative and structural practices to ensure that erosion and sediment from the construction site does not flow onto adjoining properties. Other controls shall minimize off-site vehicle tracking of sediments.
 - 4. Controls and management practices used to mitigate adverse impacts from storm water runoff may include, but are not limited to, silt fencing, sediment traps, hay bales, brush, barriers, interceptor dikes, and swales.

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PART 2 - PRODUCTS

2.01 MATERIALS

- A. Topsoil: Excavated material, graded free of roots, subsoil, debris, and large weeds. Reuse existing topsoil. Stockpile for re-use.
- B. Subsoil: Excavated material, graded free of lumps larger than 6", rocks larger than 3", and debris.

PART 3 - EXECUTION

3.01 PREPARATION

- A. The Contractor shall lay out the rough grading work from the drawings and furnish, set, and maintain all necessary stakes, bench marks, and batter boards for determining clearly all required lines and levels. Verification is required; see 1.05.
- B. The Contractor shall be responsible for his lay-out and shall correct any errors and verify measurements and elevations.
- C. Identify all below-grade utilities. Stake and flag locations. The Contractor is responsible for contacting city, county, and utility officials to ensure that all below-grade utilities are located and flagged.
- D. Identify and flag all above-grade utilities. The Contractor is responsible for contacting city, county, and utility officials to ensure that all above-grade utilities are located and flagged

3.02 EXCAVATION

- A. Remove all rubbish, concrete, and any remaining topsoil or humus matter prior to construction.
- B. Excavate the site in accordance with the grading plans in an organized manner.
- C. Prior to construction, the in-situ soils shall be scarified to a minimum depth of 8" and compacted to a minimum of 95% of standard proctor.
- D. Prior to filling any area of the site, proof-roll the site under the direction of an approved geotechnical engineer.
- E. Undercut and backfill wet or soft areas of the site with select material as required to achieve compaction to a minimum of 95% of standard proctor. NO UNAUTHORIZED OVER-EXCAVATION SHALL BE PERMITTED.
- F. The receiving subgrade shall be maintained in a moist (above optimum moisture) condition prior to filling.
- G. Relocated and imported materials shall be compacted to 95% of maximum dry density (standard proctor), achieved in maximum loose lifts of 8" at a moisture content 2% to 4%

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above the optimum moisture content established in the laboratory, or as specified in the Geotechnical Report.

3.03 GRADING AND CONTOURING

- A. The Contractor is responsible for all engineering services required to establish grading elevations.
- B. Grade and contour the site in accordance with the grading plans.

3.04 TESTING

A. A commercial testing laboratory employing a Mississippi-registered geotechnical engineer approved by the Architect and the Owner shall be hired by the Contractor to make all necessary tests. A minimum of one (1) density is required per 4,000 s.f. of lift under parking and drives. These requirements should be considered a minimum requirement and shall be adjusted as necessary by the geotechnical engineer. Test reports shall be signed by the Mississippi-registered engineer.

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SECTION 31 22 19 FINISH GRADING

PART 1 - GENERAL

1.01 WORK INCLUDED

- A. Finish grade subsoil.
- B. Place, level, and compact topsoil.
- C. Landscape grading required in all areas affected by construction.

1.02 RELATED WORK

- A. Section 31 22 13 Rough Grading
- B. Section 31 23 00 Excavation and Fill

1.03 PROTECTION

- A. Protect landscaping and trees remaining as final work.
- B. Protect roads and curbs.

PART 2 - PRODUCTS

2.01 MATERIAL

A. Provide and install new topsoil to ensure a minimum depth of two inches of topsoil over entire filled or disturbed area of site. (Refer to Section 32 92 19 for topsoil requirements.)

PART 3 - EXECUTION

3.01 INSPECTION

- A. Verify site conditions and note irregularities affecting the work of this Section. Ensure that all below-grade utilities are in place and tested prior to initiating landscape grading work.
- B. Beginning work of this Section means acceptance of existing conditions.

3.02 SUBSOIL PREPARATION

- A. Eliminate uneven areas and low spots. Remove debris, roots, branches, gravel, and dirt clods.
- B. Scarify subgrade to depth of 6 inches where topsoil is scheduled. Scarify in areas where equipment used for hauling and spreading topsoil has compacted subsoil.

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3.03 PLACING TOPSOIL

- A. Place topsoil in areas where topsoil thickness requires additional soil. A minimum of two (2) inches of topsoil is required over all site areas affected by construction.
- B. Use topsoil in a relatively dry state. Place during good weather.
- C. Fine grade topsoil eliminating rough or low areas. Maintain levels, profiles, and contours of subgrade.
- D. Remove gravel, roots, grass, weeds, debris, and foreign material while spreading.
- E. Break up or remove dirt clods which are larger than one inch in diameter.
- F. Manually spread topsoil around trees and buildings to prevent damage. Take special care not to damage the building.
- G. Lightly compact placed topsoil.
- H. Leave stockpile area and site clean and raked, ready to receive seeding.
- I. Grade site in vicinity of buildings and paved areas to ensure drainage away from buildings and paved areas.

3.04 TOLERANCES

A. Top of Topsoil: Plus or minus 1/2-inch.

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SECTION 31 23 00 EXCAVATION AND FILL

PART 1 - GENERAL

1.01 WORK INCLUDED

Execute grading operations in strict accordance with the accompanying Geotechnical Investigation, if supplied.

- A. Site-filling and compaction.
- B. Fill under slabs-on-grade, drives, and parking areas.

1.02 RELATED WORK

- A. Section 31 22 13 Rough Grading
- B. Section 31 22 19 Finish Grading

1.03 COORDINATION

- A. Coordinate fill operations with installation of underground utilities.
- B. Coordinate fill operations with installation of the foundation system.
- C. Coordinate fill operations with installation of the storm drainage system.

1.04 CONTRACTOR'S RESPONSIBILITIES

- A. It is the responsibility of the Contractor to provide all engineering work associated with lay-out. Written verification of lay-out by a Mississippi-registered engineer or land surveyor is required.
- B. It is the responsibility of the Contractor to provide all engineering work associated with establishing design elevations. Written verification of design elevations by a Mississippiregistered engineer or land surveyor is required.
- C. The Contractor is responsible for testing and verifying compaction requirements by engaging the services of an approved Mississippi-registered geotechnical engineer to execute a sufficient number of density tests. Promptly submit copies of all field density tests to the Architect.

PART 2 - PRODUCTS

2.01 FILL MATERIALS

A. Relocated material shall be free of rubbish, concrete, topsoil, and humus matter.

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- B. Imported soils required beneath structures and paving should consist of select lean silty or sandy clay materials conforming to Unified Soil Classifications SC or CL and exhibiting a plasticity index (PI) of 7 to 22, or as specified in the Geotechnical Report.
- C. Receiving subgrade shall be scarified, compacted, proof-rolled, and maintained in a moist (above optimum moisture) condition prior to filling.
- D. Provide 4" of washed gravel under building slabs, size 57 (1" smaller) concrete gravel or approved equal.
- E. At all paving surfaces:
 - 1. Compact the subgrade to 95% standard proctor at a moisture content 2% to 4% above optimum, or as specified in the Geotechnical Report.
 - 2. At standard duty asphalt paving: Provide and install 6" crushed limestone conforming to Mississippi State Highway Department specifications and compacted to minimum of 98% of standard proctor (see ASTM D698).
 - 3. At rigid concrete paving: Provide and install 6" crushed limestone conforming to Mississippi State Highway Department specifications and compacted to minimum of 98% of standard proctor (see ASTM D698).

PART 3 - EXECUTION

3.01 INSPECTION

- A. Verify that areas to be filled are free of debris, snow, ice, or water and that ground surfaces are not frozen.
- B. Any unsuitable material found after the site has been stripped and proof-rolled shall be removed and replaced by the Contractor.

3.02 PREPARATION

- A. Prior to construction, all rubbish, concrete, and any remaining topsoil or humus matter shall be removed and the in-situ soils scarified to the specified depth and compacted to a minimum of 95% of standard proctor.
- B. Proof-roll the site. Any excessively wet or soft areas shall be undercut and backfilled with select material as directed. No unauthorized over-excavation shall be permitted.
- C. Maintain the receiving subgrade in a moist (above optimum moisture) condition prior to filling.
- D. Prior to construction, the Contractor shall furnish and install drainage ditches to facilitate run-off. Operate pumps and pumping equipment as required.
- E. The Contractor is responsible for lay-out of areas to be filled and all engineering services required to ensure that fill is installed to the required elevations. Written verification is required.

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F. The Contractor is responsible for all engineering testing services as required to verify and confirm that fill under buildings and paving is compacted as specified.

3.03 FILLING

- A. Fill areas to required contours and elevations. Use unfrozen materials.
- B. Fill systematically, as early as possible, to allow maximum time for natural settlement. Do not fill over porous, wet, or spongy subgrade surfaces.
- C. Compaction shall be achieved in maximum loose lifts of 8".
- D. Make changes in grade gradually. Blend slopes into level areas.
- E. All fill under buildings, drives, and parking areas shall be compacted to 95% of maximum dry density (standard proctor), achieved in maximum loose lifts of 8" at a moisture content comparable to the optimum moisture content established in the laboratory.
- F. All fill placed outside building and parking areas shall be compacted to 90% of maximum dry density (standard proctor).
- G. Clay gravel or crushed limestone under concrete/asphalt/gravel or crushed stone paving shall be compacted to a minimum of 98% of standard proctor (see ASTM D698).
- H. The Contractor is responsible for testing and verifying compaction requirements by engaging the services of an approved Mississippi-registered geotechnical engineer to execute a sufficient number of density tests. Promptly submit copies of all field density tests to the Architect.

3.04 TESTING

- A. A commercial testing laboratory employing a Mississippi-registered geotechnical engineer and approved by the Architect and the Owner shall be hired by the Contractor to make all necessary tests. These requirements should be considered minimum requirements and shall be adjusted as necessary by the geotechnical engineer. Test reports shall be signed by the Mississippi-registered engineer.
- B. Field moisture-density tests should be performed utilizing a nuclear device in accordance with ASTM D2922 at a frequency of:
 - 1. One (1) test per 2,500 s.f. per 8" loose lift of relocated or imported fill beneath structures or paving [minimum three (3) tests per lift beneath structures].

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SECTION 31 25 00

EROSION AND SEDIMENTATION CONTROLS

PART 1 - GENERAL

1.01 SUMMARY

- A. Work included:
 - 1. Provide and install measures to prevent and control erosion and sedimentation during construction.
- B. Related sections:
 - 1. Section 31 22 13 Rough Grading
 - 2. Section 31 22 19 Finish Grading
 - 3. Section 31 23 00 Excavation and Fill
 - 4. Section 32 92 19 Seeding
 - 5. Section 33 40 00 Storm Drainage Utilities

1.02 QUALITY ASSURANCE

- A. Establish sediment control barriers prior to the beginning of clearing and maintain during the entire period of construction.
- B. Clean out and dispose of any sediment that inhibits the proper functioning of erosion control measures or when the storage capacity of any sediment facility is reduced by one-half.
- C. The sedimentation control measures specified herein are minimum requirements. It is the Contractor's responsibility to take necessary measures to prevent and control erosion and sedimentation. Additional requirements to meet local, state, or federal erosion and sediment control ordinances shall be designed, installed, and maintained by the Contractor.

PART 2 - PRODUCTS

2.01 SEDIMENT CONTROL

- A. Straw bales: Wire-bound or string-tied bales.
- B. Silt fence:
 - 1. Silt Stop by American Excelsior Company of Arlington, Texas.
 - 2. Envirofence by Mirafi of Charlotte, North Carolina.

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3. Exxon GTF 100S by Exxon of Atlanta, Georgia.

2.02 PERMANENT EROSION CONTROL

A. Rip-rap: 8" to 12" diameter stones, having an average weight of 120 pounds.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Provide and install grass, silt fences, and straw bale barriers as required to prevent and control the loss of soil from the construction site and to prevent erosion of soil into local receiving waters or onto adjacent property.

B. Inlet Protection:

- 1. Provide and install silt fence, wattles or other approved around each storm drain, catch basin, area drain, or curb inlet to prevent sediment from entering underground storm drains. Place each bale in a 4" trench and backfill to anchor and prevent undermining.
- 2. Anchor each bale with two (2) #3 x 36" reinforcing bars.
- 3. Fill gaps between bales with loose straw to prevent sediment from escaping between the bales.

C. Silt fence:

- 1. Install silt fence in ditches and swales as necessary to prevent sedimentation.
- 2. Install silt fence in accordance with the manufacturer's recommendations.

D. Rip-rap:

- 1. Compact subgrade to 85% density.
- 2. Begin placement of stones at lowest point of depression. Fit stones tight to form friction bond.
- 3. For slopes greater than 1:1, set stones in cement mortar bed and work mortar between joints.
- 4. Completely cover surface of area scheduled to receive rip-rap with stones.
- 5. Finished installation shall be tight and stable. Stones shall not turn or roll under foot traffic.

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SECTION 31 31 16 TERMITE CONTROL

PART 1 - GENERAL

1.01 WORK INCLUDED

- A. Treatment below all slabs for subterranean insects.
- B. Treatment of crawl spaces and foundations systems for subterranean insects.
- C. Treatment of horizontal barriers at perimeter of structure.

1.02 REGULATORY REFERENCES

- A. EPA Federal Insecticide, Fungicide and Rodenticide Act.
- B. Regulations Governing Pest Control Operators, Mississippi Department of Agriculture and Commerce, Bureau of Plant Industry.

1.03 QUALITY ASSURANCE

- A. Applicator: Company specializing in soil treatment for termite control with three (3) years documented experience.
- B. Materials: Provide certification that toxicants comply with EPA requirements.
- C. Material packaging: Manufacturer's labels and seals identifying content.

1.04 REGULATORY REQUIREMENTS

- A. Comply with State of Mississippi requirements for application licensing and authority to use toxicant chemicals.
- B. Specific license/permit category requirements: Control of Termites and Other Structural Pests, Control of Pests in Homes, Businesses and Industries.
- C. Comply with the requirements of the EPA.

1.05 PRODUCT DATA

- A. Submit product data.
- B. Indicate toxicants to be used, composition by percentage, dilution schedule, and intended application rate.
- C. Submit the manufacturer's installation instructions.
- D. Submit warranty document for approval.
- E. Submit copy of the applicator's license.

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1.06 BOND AND INSURANCE REQUIREMENTS

- A. Minimum surety bond sum:
 - 1. \$5,000.00.
 - 2. As required by the regulations listed in 1.02, if greater.
- B. Minimum insurance:
 - 1. \$100,000.00 per occurrence or aggregate of \$200,000.00.
 - 2. As required by the regulations listed in 1.02, if greater.

1.07 WARRANTY

- A. Provide five-year warranty for material and installation.
- B. Warranty: Cover against invasion or propagation of subterranean termites, damage to building or building contents caused by termites, and repairs to building or building contents so caused.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Chemicals used must be those acceptable to the Division of Forest Insect Research, Forest Service, USDA, or proprietary products registered with the Pesticide Regulation Section, Agricultural Research Service, USDA, under the Federal Insecticide, Fungicide and Rodenticide Act, for use as a termite toxicant for which prolonged effectiveness may by anticipated. The following chemicals and concentration in water solution shall be used:
 - 1. Termidor by BASF.
- B. Proprietary material may be used:
 - 1. If they meet a U.S. Forest Service five-year field test;
 - 2. If they contain one or more of the above named chemicals in the concentration given;
 - 3. If proof is provided that no toxic effects to humans or beneficial plant and animal life will result from their use.

PART 3 - EXECUTION

3.01 INSPECTION

A. Verify that the substrate is in friable condition with moisture content low enough to permit absorption of the toxicant solution.

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B. Do not begin work until all preparatory work for slab placement has been completed.

3.02 APPLICATION

A. Location:

- 1. Apply soil treatment to areas beneath concrete slabs.
- 2. Additional termiticide is required if fill is gravel or other coarse aggregate.
- 3. Additional termiticide is required at bath traps and other openings in the slab.

B. Rates of application:

- 1. Apply in strict accordance with the chemical manufacturer's written instructions.
- 2. Apply at concentrations or volume as specified on the label of the approved pesticide product.
- 3. Strictly comply with EPA requirements and regulations.

C. Application technique:

- 1. Treatment shall <u>not</u> be made when the substrate is wet or immediately after heavy rains; avoid surface flow of toxicant from the application area.
- 2. Unless the substrate is promptly covered with fill and vapor barrier, precautions shall be taken to prevent disturbance of the treatment and human or animal contact with treatment and treated soil.
- D. All pretreats shall be made in strict accordance with label directions as specified on the label of the pesticide being applied.
- E. All perimeter treatments must be performed within one (1) year of treatment of the horizontal barrier. Perimeter treatments include the vertical barrier around the perimeter of the structure.
- F. Pretreatments shall include all structures built adjacent to the foundation, such as porches and patios.
- G. Reapply treatment if rainfall follows initial treatment or if slab is not poured within twenty-four (24) hours of treatment.

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SECTION 32 92 20 SEEDING

PART 1 - GENERAL

1.01 WORK INCLUDED

- A. Preparation of soil for seeding disturbed areas. Seeding and straw mulching are required at all areas of the site affected by construction activity.
- B. Seeding and fertilizing to establish permanent common Bermuda grassing at all areas of the site affected by construction activity which are not paved, built on, or sodded.

1.02 RELATED WORK

A. Section 31 22 19 – Finish Grading

1.03 DELIVERY, STORAGE AND HANDLING

- A. Deliver grass seed in original containers showing analysis of seed mixture, percentage of pure seed, year of production, net weight, date of packaging and location of packaging. Damaged packages are not acceptable.
- B. Deliver fertilizer in waterproof bags showing weight, chemical analysis, and name of manufacturer.

1.04 EXISTING CONDITIONS

A. Beginning work of this Section means acceptance of existing conditions.

PART 2 - PRODUCTS

2.01 GROWING MEDIA

- A. Topsoil: Natural, fertile agricultural soil capable of sustaining vigorous plant growth, not in frozen or muddy condition, containing not less than 6 percent organic matter, and corrected to pH value of 5.9 to 7.0. Free from subsoil slag, clay, stones, lumps, live plants, roots, sticks, crabgrass, coughgrass, noxious weeds, and foreign matter.
- B. Fertilizer: Grade 13-13-13 commercial type with 50 percent of the elements derived from organic sources.
- C. Threshed Straw: Free of Johnson grass, weed seed and noxious materials. Rate of spread: 40 bales per acre (or equivalent). Threshed straw required over all site areas where seeding is required. Minimum 1" thick, blown or spread and then watered down.
- D. Sand: Hard, granular natural beach sand, washed, free of impurities, chemical or organic matter.

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2.02 SEED

A. The seed shall be of the best grade and of known vitality, purity and germination and shall be delivered in bags as required by law, each bag being tagged showing the percent of germination and purity of the seed, also, the percent of noxious weeds and inert litter. All seed shall be free of wild onion, Canada Thistle and Johnson Grass. One pound of seed shall not contain more than 300 noxious seeds. No seed more than one year old will be accepted. Seeding shall be done with grasses which will germinate in the season planted, as shown in the following table: (unless specified otherwise)

May - August 15

August 16 - Sept. 15

Sept. 16 - Feb. 15

Feb. 16 - May 1

Bermuda Grass

Mix Bermuda/Rye

Rye

Mix Bermuda/Rye

Bermuda grass seed shall be hulled; mixtures shall be 1.1 ratio by weight.

Note: Common Bermuda grass is considered permanent grass; rye grass is considered winter grass only. Permanent grass cover is required at site.

PART 3 - EXECUTION

3.01 PREPARATION

- A. Protect existing underground improvements from damage.
- B. Remove foreign materials, plants, roots, stones, and debris from site. Do not bury foreign material.
- C. Remove contaminated subsoil.
- D. Cultivate all areas affected by construction to depth of 6-inches. Repeat cultivation areas where equipment has compacted subgrade.
- E. Execute grassing work as early as possible in the construction process to avoid erosion and to insure that a good stand of grass is present upon substantial completion of the work.

3.02 SPREADING TOPSOIL

- A. Spread topsoil to a depth of 2" over area to be seeded. Place during dry weather, and on dry unfrozen subgrade.
- B. Cultivate topsoil with mechanical tiller. Cultivate inaccessible areas by hand. Rake until the surface is smooth. Break-up dirt clods that are larger than one inch in diameter.
- C. Remove from site foreign materials collected during cultivation.
- D. Grade to eliminate rough spots and low areas where ponding may occur. Maintain smooth, uniform grade.

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E. Assure positive drainage away from buildings. Assure positive drainage towards drainage ditches and catch basins.

3.03 FERTILIZER

- A. Apply fertilizer at a rate of 10 lbs. per 1,000 sq. ft. (4.5 kg per 100 sq. m).
- B. Do not apply grass seed and fertilizer at same time, in same machine.
- C. Lightly water to aid breakdown of fertilizer and to provide moist soil for seed.

3.04 SEEDING

- A. Apply seed at a rate of 6 lbs. per 1,000 sq. ft. evenly in two intersecting directions. Rake in lightly.
- B. Do not sow immediately following rain, when the ground is too dry, or during windy period.
- C. Roll seeded area with roller not exceeding 112 lbs. Apply materials to control erosion at banks scheduled to be seeded.
- D. Apply water with fine spray immediately after each area has been sown.
- E. Mulch all grassed areas with straw.

3.05 MAINTENANCE PERIOD

A. Maintenance period: Contractor shall maintain site until the project is accepted by the Architect and Owner as substantially complete.

3.06 MAINTENANCE

- A. Maintain surfaces and supply additional topsoil where necessary, including areas affected by erosion. Furnish and install straw or hay to control erosion.
- B. Water to ensure uniform seed germination and to keep surface of soil damp.
- C. Apply water slowly so that surface of soil will not puddle and crust.
- D. Cut grass first time when it reaches height of 2 ½ inches and maintain to minimum height of 2 inches. Do not cut more than 1/3 of blade at anyone mowing.
- E. After first mowing, water grass sufficiently to moisten soil from 3 inches to 5 inches.
- F. Apply weed killer (when weeds start developing) during calm weather when air temperature is above 50 degrees F.
- G. Replant damaged grass areas showing root growth failure, deterioration, bare or thin spots, or eroded areas.

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3.07 ACCEPTANCE

A. Seeded areas will be accepted at end of maintenance period when seeded areas are properly established and otherwise acceptable.

3.08 REPAIRING

- A. Unaccepted areas requiring reseeding shall be designated by the Architect. Reseeding shall be in compliance with the specifications herein and in accordance with the planting schedule.
- B. When grassed areas have become eroded, or otherwise damaged during the period of this contract, the affected areas shall be repaired to re-establish the surface and condition of the soil as provided for in these specifications. Such areas shall be reseeded as specified. Placing and reshaping of all earthwork shall be in accordance with the direction of the Architect.
- C. No additional payment will be made for refertilizing, reseeding or repairing eroded areas.

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SECTION 33 30 00 SANITARY SEWERAGE UTILITIES

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. Pipe and fittings.
 - 2. Cleanouts.
 - 3. Manholes.

1.3 SUBMITTALS

- A. Shop Drawings: For manholes. Include plans, elevations, sections, details, and frames and covers.
- B. Coordination Drawings: Show pipe sizes, locations, and elevations. Show other piping in same trench and clearances from sewer system piping. Indicate interface and spatial relationship between manholes, piping, and proximate structures.
- C. Profile Drawings: Show system piping in elevation. Draw profiles to horizontal scale of not less than 1 inch equals 50 feet and to vertical scale of not less than 1 inch equals 5 feet. Indicate manholes and piping. Show types, sizes, materials, and elevations of other utilities crossing system piping.
- D. Field quality-control reports.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Do not store plastic manholes, pipe, and fittings in direct sunlight.
- B. Protect pipe, pipe fittings, and seals from dirt and damage.
- C. Handle manholes according to manufacturer's written rigging instructions.

Addition at Career and Technical Center (Itawamba County School District)

1.5 PROJECT CONDITIONS

A. Interruption of Existing Sanitary Sewerage Service: Do not interrupt service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary service according to requirements indicated:

PART 2 - PRODUCTS

2.1 PVC PIPE AND FITTINGS

- A. PVC Type PSM Sewer Piping:
 - 1. Pipe: ASTM D 3034, SDR 26, PVC Type PSM sewer pipe with bell-and-spigot ends for gasketed joints.
 - 2. Fittings: ASTM D 3034, PVC with bell ends.
 - 3. Gaskets: ASTM F 477, elastomeric seals.

2.2 NONPRESSURE-TYPE TRANSITION COUPLINGS

- A. Comply with ASTM C 1173, elastomeric, sleeve-type, reducing or transition coupling, for joining underground nonpressure piping. Include ends of same sizes as piping to be joined and corrosion-resistant-metal tension band and tightening mechanism on each end.
- B. Sleeve Materials:
 - 1. For Plastic Pipes: ASTM F 477, elastomeric seal or ASTM D 5926, PVC.
 - 2. For Dissimilar Pipes: ASTM D 5926, PVC or other material compatible with pipe materials being joined.
- C. Ring-Type, Flexible Couplings:
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Fernco Inc.
 - 2. Description: Elastomeric compression seal with dimensions to fit inside bell of larger pipe and for spigot of smaller pipe to fit inside ring.

2.3 CLEANOUTS

A. PVC Cleanouts:

1. Description: PVC body with PVC threaded plug. Include PVC sewer pipe fitting and riser to cleanout of same material as sewer piping.

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2.4 MANHOLES

A. As shown below or shown on the supplied detail.

B. Standard Precast Concrete Manholes:

- 1. Description: ASTM C 478, precast, reinforced concrete, of depth indicated, with provision for sealant joints.
- 2. Diameter: 48 inches minimum unless otherwise indicated.
- 3. Ballast: Increase thickness of precast concrete sections or add concrete to base section, as required to prevent flotation.
- 4. Base Section: 6-inch minimum thickness for floor slab and 4-inch minimum thickness for walls and base riser section; with separate base slab or base section with integral floor
- 5. Riser Sections: 4-inch minimum thickness, of length to provide depth indicated.
- 6. Top Section: Eccentric-cone type unless concentric-cone or flat-slab-top type is indicated; with top of cone of size that matches grade rings.
- 7. Joint Sealant: ASTM C 990, bitumen or butyl rubber.
- 8. Resilient Pipe Connectors: ASTM C 923, cast or fitted into manhole walls, for each pipe connection.
- 9. Steps: Individual FRP steps or FRP ladder; wide enough to allow worker to place both feet on one step and designed to prevent lateral slippage off step. Cast or anchor steps into sidewalls at 12- to 16-inch intervals. Omit steps if total depth from floor of manhole to finished grade is less than 60 inches.
- 10. Adjusting Rings: Interlocking HDPE rings, with level or sloped edge in thickness and diameter matching manhole frame and cover, and with height as required to adjust manhole frame and cover to indicated elevation and slope. Include sealant recommended by ring manufacturer.
- 11. Grade Rings: Reinforced-concrete rings, 6- to 9-inch total thickness, with diameter matching manhole frame and cover, and with height as required to adjust manhole frame and cover to indicated elevation and slope.

C. Manhole Frames and Covers:

- 1. Description: Ferrous; 24-inch ID by 7- to 9-inch riser, with 4-inch-minimum-width flange and 26-inch-diameter cover. Include indented top design with lettering cast into cover, using wording equivalent to "SANITARY SEWER."
- 2. Material: ASTM A 536, Grade 60-40-18 ductile iron unless otherwise indicated.

2.5 CONCRETE

- A. General: Cast-in-place concrete complying with ACI 318, ACI 350/350R, and the following:
 - 1. Cement: ASTM C 150, Type II.
 - 2. Fine Aggregate: ASTM C 33, sand.
 - 3. Coarse Aggregate: ASTM C 33, crushed gravel.
 - 4. Water: Potable.

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- B. Portland Cement Design Mix: 4000 psi minimum, with 0.45 maximum water/cementitious materials ratio.
 - 1. Reinforcing Fabric: ASTM A 185/A 185M, steel, welded wire fabric, plain.
 - 2. Reinforcing Bars: ASTM A 615/A 615M, Grade 60 (420 MPa) deformed steel.
- C. Manhole Channels and Benches: Factory or field formed from concrete. Portland cement design mix, 4000 psi minimum, with 0.45 maximum water/cementitious materials ratio. Include channels and benches in manholes.
 - 1. Channels: Concrete invert, formed to same width as connected piping, with height of vertical sides to three-fourths of pipe diameter. Form curved channels with smooth, uniform radius and slope.
 - a. Invert Slope: 1 percent through manhole.
 - 2. Benches: Concrete, sloped to drain into channel.
 - a. Slope: 4 percent.
- D. Ballast and Pipe Supports: Portland cement design mix, 3000 psi minimum, with 0.58 maximum water/cementitious materials ratio.
 - 1. Reinforcing Fabric: ASTM A 185/A 185M, steel, welded wire fabric, plain.
 - 2. Reinforcing Bars: ASTM A 615/A 615M, Grade 60 (420 MPa) deformed steel.

PART 3 - EXECUTION

3.1 EARTHWORK

A. Excavating, trenching, and backfilling are specified in Division 31 Section "Earthwork."

3.2 PIPING INSTALLATION

- A. General Locations and Arrangements: Drawing plans and details indicate general location and arrangement of underground sanitary sewer piping. Location and arrangement of piping layout take into account design considerations. Install piping as indicated, to extent practical. Where specific installation is not indicated, follow piping manufacturer's written instructions.
- B. Install piping beginning at low point, true to grades and alignment indicated with unbroken continuity of invert. Place bell ends of piping facing upstream. Install gaskets, seals, sleeves, and couplings according to manufacturer's written instructions for using lubricants, cements, and other installation requirements.
- C. Install manholes for changes in direction unless fittings are indicated. Use fittings for branch connections unless direct tap into existing sewer is indicated.

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- D. Install proper size increasers, reducers, and couplings where different sizes or materials of pipes and fittings are connected. Reducing size of piping in direction of flow is prohibited.
- E. When installing pipe under streets or other obstructions that cannot be disturbed, use pipe-jacking process of microtunneling.
- F. Clear interior of piping and manholes of dirt and superfluous material as work progresses. Maintain swab or drag in piping, and pull past each joint as it is completed. Place plug in end of incomplete piping at end of day and when work stops.

3.3 PIPE JOINT CONSTRUCTION

- A. Join gravity-flow, nonpressure, drainage piping according to the following:
 - 1. Join PVC Type PSM sewer piping according to ASTM D 2321 and ASTM D 3034 for elastomeric-seal joints or ASTM D 3034 for elastomeric-gasket joints.
 - 2. Join PVC gravity sewer piping according to ASTM D 2321 and ASTM D 3034 for elastomeric-seal joints or ASTM D 3034 for elastomeric-gasket joints.
 - 3. Join dissimilar pipe materials with nonpressure-type, flexible couplings.

3.4 MANHOLE INSTALLATION

- A. General: Install manholes complete with appurtenances and accessories indicated.
- B. Install precast concrete manhole sections with sealants according to ASTM C 891.
- C. Install FRP manholes according to manufacturer's written instructions.
- D. Form continuous concrete channels and benches between inlets and outlet.
- E. Set tops of frames and covers flush with finished surface of manholes that occur in pavements. Set tops 3 inches above finished surface elsewhere unless otherwise indicated.

3.5 CONCRETE PLACEMENT

A. Place cast-in-place concrete according to ACI 318.

3.6 CLEANOUT INSTALLATION

- A. Install cleanouts and riser extensions from sewer pipes to cleanouts at grade. Use cast-iron soil pipe fittings in sewer pipes at branches for cleanouts, and use cast-iron soil pipe for riser extensions to cleanouts. Install piping so cleanouts open in direction of flow in sewer pipe.
 - 1. Use Light-Duty, top-loading classification cleanouts in earth or unpaved foot-traffic areas.
 - 2. Use Medium-Duty, top-loading classification cleanouts in paved foot-traffic areas.
 - 3. Use Heavy-Duty, top-loading classification cleanouts in vehicle-traffic service areas.

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- 4. Use Extra-Heavy-Duty, top-loading classification cleanouts in roads.
- B. Set cleanout frames and covers in earth in cast-in-place-concrete block, 18 by 18 by 12 inches deep. Set with tops 1 inch above surrounding grade.
- C. Set cleanout frames and covers in concrete pavement and roads with tops flush with pavement surface.

3.7 CONNECTIONS

- A. Connect nonpressure, gravity-flow drainage piping to building's sanitary building drains specified in Division 22 Section "Sanitary Waste and Vent Piping."
- B. Make connections to existing piping and underground manholes.
 - 1. Use commercially manufactured wye fittings for piping branch connections. Remove section of existing pipe, install wye fitting into existing piping, and encase entire wye fitting plus 6-inch overlap with not less than 6 inches of concrete with 28-day compressive strength of 3000 psi.
 - 2. Make branch connections from side into existing piping, NPS 4 to NPS 20. Remove section of existing pipe, install wye fitting into existing piping, and encase entire wye with not less than 6 inches of concrete with 28-day compressive strength of 3000 psi.
 - a. Use concrete that will attain a minimum 28-day compressive strength of 3000 psi unless otherwise indicated.
 - b. Use epoxy-bonding compound as interface between new and existing concrete and piping materials.
 - 3. Protect existing piping and manholes to prevent concrete or debris from entering while making tap connections. Remove debris or other extraneous material that may accumulate.
- C. Connect to grease, oil and sand interceptors specified in Division 22 Section "Sanitary Waste Interceptors."

3.8 CLOSING ABANDONED SANITARY SEWER SYSTEMS

- A. Abandoned Piping: Close open ends of abandoned underground piping indicated to remain in place. Include closures strong enough to withstand hydrostatic and earth pressures that may result after ends of abandoned piping have been closed. Use either procedure below:
 - 1. Close open ends of piping with at least 8-inch thick, brick masonry bulkheads.
 - 2. Close open ends of piping with threaded metal caps, plastic plugs, or other acceptable methods suitable for size and type of material being closed. Do not use wood plugs.
- B. Abandoned Manholes: Excavate around manhole as required and use either procedure below:
- 1. Remove manhole and close open ends of remaining piping.

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- 2. Remove top of manhole down to at least 36 inches below final grade. Fill to within 12 inches of top with stone, rubble, gravel, or compacted dirt. Fill to top with concrete.
- C. Backfill to grade according to Division 31 Section "Earthwork."

3.9 IDENTIFICATION

- A. Materials and their installation are specified in Division 31 Section "Earthwork." Arrange for installation of green warning tapes directly over piping and at outside edges of underground manholes.
 - 1. Use warning tape over ferrous piping.
 - 2. Use detectable warning tape over nonferrous piping and over edges of underground manholes.

3.10 FIELD QUALITY CONTROL

- A. Inspect interior of piping to determine whether line displacement or other damage has occurred. Inspect after approximately 24 inches of backfill is in place, and again at completion of Project.
 - 1. Submit separate report for each system inspection.
 - 2. Defects requiring correction include the following:
 - a. Alignment: Less than full diameter of inside of pipe is visible between structures.
 - b. Deflection: Flexible piping with deflection that prevents passage of ball or cylinder of size not less than 92.5 percent of piping diameter.
 - c. Damage: Crushed, broken, cracked, or otherwise damaged piping.
 - d. Infiltration: Water leakage into piping.
 - e. Exfiltration: Water leakage from or around piping.
 - 3. Replace defective piping using new materials, and repeat inspections until defects are within allowances specified.
 - 4. Re-inspect and repeat procedure until results are satisfactory.
- B. Test new piping systems, and parts of existing systems that have been altered, extended, or repaired, for leaks and defects.
 - 1. Do not enclose, cover, or put into service before inspection and approval.
 - 2. Test completed piping systems according to requirements of authorities having jurisdiction.
 - 3. Schedule tests and inspections by authorities having jurisdiction with at least 24 hours' advance notice.
 - 4. Submit separate report for each test.
 - 5. Hydrostatic Tests: Test sanitary sewerage according to requirements of authorities having jurisdiction and the following:

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- a. Fill sewer piping with water. Test with pressure of at least 10-foot head of water, and maintain such pressure without leakage for at least 15 minutes.
- b. Close openings in system and fill with water.
- c. Purge air and refill with water.
- d. Disconnect water supply.
- e. Test and inspect joints for leaks.
- 6. Air Tests: Test sanitary sewerage according to requirements of authorities having jurisdiction, UNI-B-6, and the following:
 - a. Option: Test plastic gravity sewer piping according to ASTM F 1417.
- 7. Manholes: Perform hydraulic test according to ASTM C 969.
- C. Leaks and loss in test pressure constitute defects that must be repaired.
- D. Replace leaking piping using new materials, and repeat testing until leakage is within allowances specified.

3.11 CLEANING

A. Clean dirt and superfluous material from interior of piping. Flush with potable water.

END OF SECTION

Addition at Career and Technical Center (Itawamba County School District)

SECTION 33 40 00

STORM DRAINAGE UTILITIES

PART 1 - GENERAL

1.01 GENERAL

- A. Furnish tools, equipment, labor, and materials and perform operations necessary for complete construction of the work of this section in strict accordance with these specifications and requirements of the drawings.
- B. Work included:
 - A. Subsurface storm drainage system.
 - B. Pre-cast concrete splash basins.

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 31 22 13 Rough Grading
- B. Section 31 22 19 Finish Grading
- C. Section 31 23 00 Excavation and Fill

1.03 COORDINATION

A. Check and confirm elevations of project drainage system components prior to initiating work. Coordinate with grading work of general sitework construction and underground utilities.

PART 2 - PRODUCTS

- 2.01 MANUFACTURERS (PRE-CAST CONCRETE PRODUCTS)
 - A. Custom Precast Products.
 - B. Hanson Pipe & Products.
 - C. Other manufacturers with similar experience and expertise.

2.02 MATERIALS

- A. PVC PIPE AND FITTINGS
 - a. PVC Type PSM Sewer Piping:
 - 1) Pipe: ASTM D 3034, SDR 26, PVC Type PSM sewer pipe with bell-and- spigot ends for gasketed joints.
 - 2) Fittings: ASTM D 3034, PVC with bell ends.

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- 3) Gaskets: ASTM F 477, elastomeric seals.
- B. Reinforced concrete pipe (RCP):
 - A. Reinforced concrete pipe shall be equal to ASTM C76, Class III, wall type B, minimum.
 - B. Concrete pipe joint material for storm sewers shall be either rubber gaskets conforming to ASTM C443 or polymer-modified concrete joint sealers conforming to ASTM C990, U.S. Federal Specifications SS-S-210A, Type 1, Rope Form and AASHTO Designation M-198 75 I, Type B.

C. Manholes:

A. Shall be as shown on the detail sheet of the plan set.

PART 3 - EXECUTION

3.01 LAY-OUT AND GRADE STAKES

- A. The Contractor shall lay out the drainage system from the drawings and shall furnish, set, and maintain all necessary stakes, bench marks, and batter boards for determining clearly all required lines and levels. Verify positive flow and coordinate with all other trades.
- B. The Contractor shall be responsible for his lay-out and shall correct and make adjustments to the system to compensate for conflicts with other trades and site conditions.

3.02 SAFETY REQUIREMENTS

- A. The Contractor shall provide and maintain warning barricades, flags, torches, etc., and shall conduct his work so as to create a minimum amount of inconvenience to other traffic, construction, etc. Temporary suspension of work does not relieve the Contractor of responsibility for the above requirements.
- B. All excavations shall be made and kept in strict compliance with OSHA regulations.

3.03 EXCAVATION

- A. Excavations shall be kept free from water while construction therein is in progress.
- B. Excavation for pipe trenches shall be excavated along straight lines and, unless indicated otherwise, the width of the trench shall provide a minimum of 6" between the outside of the pipe bell or the outermost portion of the pipe or coupling and the sides of the trench or bracing. Mechanical excavation shall be held at least 2" above final invert grade. The remainder of the excavation soil shall be removed by hand immediately before the pipe is laid.

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3.04 LAYING STORM DRAINAGE PIPE

- A. Lay drain pipe in a trench bedding of approved fill material, starting from the discharge end and laying uphill. Lay sections of pipe abutting and closely jointed, true to line and grade.
- B. All pipe ends shall be smooth, concentric, and free of any voids or other imperfections which might reduce the sealing efficiency. Complete joints in accordance with the pipe manufacturer's instructions.
- C. At subsurface drain piping that serves downspouts, provide and install downspout boots for proper connection to downspouts. Coordinate elevations of finish grade drains with landscape grading work; adjust as required.
- D. Take care to compact soil in backfilling operation in 6" lifts to insure that all backfill materials are compacted to a minimum of 95% of standard proctor.
- E. Grout all catch basin and headwall connections tight.
- F. Provide and install flush grade cleanouts at 50'-0" o.c.

END OF SECTION

Addition at Career and Technical Center (Itawamba County School District)

SECTION 33 4 15 DOWNSPOUT BOOTS

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. Furnish all labor, materials, equipment, and incidentals required to provide cast iron downspout boots at each downspout as specified.
- B. Related Sections:
 - 1. Section 09 91 00 Painting
 - 2. Section 13 34 19 Metal Building System
 - 3. Division 32 Exterior Improvements

1.02 SUBMITTALS

- A. Submit shop drawings for approval for the fabrication and erection of all casting assemblies.
 - 1. Include plans, elevations, and details of sections and connections. Show anchorage and accessory items.
 - 2. Include setting drawings for location and installation of castings and anchorage devices.
- B. Submit copies of the manufacturer's specifications, dimension diagrams, anchor details, and installation instructions.

1.03 QUALITY ASSURANCE

- A. Reference Standards: Comply with applicable provisions and recommendations of ASTM A48-83, Class 35B iron minimum.
- B. Shop Assembly:
 - 1. Pre-assemble items in the shop to the greatest extent possible so as to minimize field-splicing and assembly of units at the site.
 - 2. Disassemble units only to the extent necessary for shipping and handling limitations. Clearly mark units for re-assembly and coordinated installation.

1.04 DELIVERY, STORAGE, AND HANDLING

A. Castings which are cracked, chipped, distorted, or otherwise damaged will not be acceptable.

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PART 2 - PRODUCTS

2.01 MANUFACTURER

A. Equal to Neenah Foundry

2.02 DOWNSPOUT BOOT

- 1. Model: R-4929-018C
- 2. 5" x 5" top bell
- 3. 4-7/8" bottom outlet
- 4. 40" length

2.03 DESIGN AND FABRICATION

- A. Fabricate castings true to pattern so that component parts fit together.
- B. Provide downspout adapter as required. Fill voids at connection with grout

2.04 FINISH

- A. Cast Iron: powder coated
- B. Finish: Dark Bronze (match downspout)

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Follow the manufacturer's printed instructions and approved shop drawings.
- B. Set castings accurately to required location, alignment, and elevation, plumb, level, true and free of rack, measured from established lines and levels.
- C. Connect to storm drainage system with watertight connections.

END OF SECTION

2023111 Addition at Career and Technical Center (Itawamba County School District)

APPENDIX NO. 1 GEOTECHNICAL REPORT

(PERFORMED BY PRITCHARD ENGINEERING, INC.)

(DATED MAY 8, 2024)

GEOTECHNICAL REPORT

Proposed:

CAREER & TECHNICAL CENTER ADDITION ITAWAMBA COUNTY SCHOOL DISTRICT

FULTON, MISSISSIPPI

Prepared For:

PRYOR MORROW

COLUMBUS, MISSISSIPPI

Prepared by:



Project Number: 7173

CLYDE L. PRITCHARD, P.E.

MAX 2024



5227 South Frontage Road Columbus, MS 39701 (662) 324-2205 pritchardengineeringinc.com

MAY 8, 2024

PRYOR MORROW MR. BEN KAVALSKY P.O. BOX 167 COLUMBUS, MS 39703

VIA EMAIL: bkavalsky@pryor-morrow.com

RE: GEOTECHNICAL REPORT

CAREER & TECHNICAL CENTER ADDITION ITAWAMBA COUNTY SCHOOL DISTRICT FULTON, MISSISSIPPI

Dear Mr. Kavalsky:

Pritchard Engineering, Inc. appreciates the opportunity to participate as geotechnical consultant for the project captioned above. The accompanying report presents field and laboratory methods employed in accumulating data for assessment of the subsurface soils and conditions encountered. All field and laboratory procedures were accomplished in accordance with applicable ASTM standard specifications to ensure quality assurance. A description of the generalized soil stratigraphy is provided. Data generated from this effort was utilized in conjunction with site development information to formulate geotechnical recommendations for site preparation, foundation design, and construction phase testing.

The recommendations issued are based upon preliminary project information provided by Pryor Morrow. Should the scope of work be altered, we respectfully request an opportunity to assess this geotechnical report in light of the proposed revisions. Feel free to contact us should you have any questions or comments concerning the contents of this report or if we may be of additional service.

(1 copy

Document transmittals:

Pryor Morrow

Respectfully,

Clyde L. Pritchard, P.E.

Pritchard Engineering, Inc.

via: E-Mail

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GEOTECHNICAL REPORT

PROPOSED

CAREER & TECHNICAL CENTER ADDITION ITAWAMBA COUNTY SCHOOL DISTRICT FULTON, MISSISSIPPI

PROMPT / AUTHORIZATION

The proposed project involves construction of a new educational building at the Itawamba County Career & Technical Center. The purpose of the geotechnical investigation is to assess the general and physical characteristics of the surface and subsurface soils within the zone of influence and to make recommendations for foundation design and related construction based upon the results of the investigation. Authorization to proceed was issued by Itawamba County Schools in accordance with the Geotechnical Services Proposal offered to Pryor Morrow (project architect), April 8, 2024.

SITE CHARACTERISTICS

The Itawamba Career & Technical Center is located at physical address 200 VoTech Road, Fulton, Mississippi. The proposed project location and site investigated is situated west and adjacent to the existing facility. Handheld GPS coordinates obtained by the driller on the property are N 34° 17' 05.1" and W 88° 24' 54.0". Ground cover within the area designated for construction consists primarily of routinely mowed grasses. The topography is relatively flat and surface drainage appears marginal. Photos depicting the property at the time of field exploration are presented as Appendix (D).

FIELD INVESTIGATION

Prior to drilling, utility locations were identified through the services of the Mississippi One Call System and representatives of Itawamba County Schools.

Four (4) borings were performed at locations selected by Pritchard Engineering with consideration of the conceptual plan provided by Pryor Morrow. Field staking of boring locations was accomplished utilizing GPS coordinates. Appendix (C) provides a site schematic illustrating boring locations with respect to the project limits.

Drilling was accomplished by the dry auger method utilizing continuous flight auger advanced by a tractor mounted Giddings Model TS-35 hydraulic boring rig. Borings performed in proximity of the future structure were terminated at a depth of fifteen (15) feet below the existing site elevation. Shelby tubes were advanced (See ASTM D-1587) at selected depths to provide "undisturbed" specimens for visual classification and determination of shear strength by testing in unconfined compression. Standard penetration tests (See ASTM D-1586) were also conducted at locations and intervals specified by the geotechnical engineer. The standard penetration resistance (N) value is the number of blows required to drive a standard 18-inch split-barrel samples the final 12 inches utilizing a 140-pound hammer and a freefall height of 30 inches. Standard penetration values provide an indication of soil consistency and are utilized in formulating design recommendations through empirical relations including but not limited to bearing capacity and potential settlement under loading conditions. "N" values are depicted by depth and location on the boring logs.

Representative specimens of the various soils encountered were retrieved at changes in strata and at intervals not exceeding 2 feet in depth. Samples retrieved during the field investigation were immediately placed in sealed containers to preserve their physical characteristics for transportation and future analysis in the laboratory.

The depth at which highly saturated soils or free water was first detected during drilling is indicated on the boring logs. Prior to closure, the depth to ground water and/or borehole caving was determined. This information is also recorded on the boring logs and was obtained after an elapsed period of approximately 1 to 2 hours.

LABORATORY ANALYSIS

Procedures employed in performing laboratory analysis were accomplished in general accordance with applicable American Society for Testing and Materials (ASTM) standard specifications for quality assurance. Tests were conducted on representative samples of the various soils encountered as designated by the Engineer. A synopsis of the tests performed including a summary of the results obtained is presented as follows:

(Soil Classification) – ASTM D-2487

All soil samples were classified both visually and in accordance with criteria stipulated by the Unified Soil Classification System. (See boring logs.) Under the Unified Soil Classification System, coarse-grained soils (gravels and sands) are classified based upon grain-size. Fine-grained materials (silts and clays) are classified on the basis of plasticity (PI) as related to the Casagrande "A" line. For your convenience, a description of the symbols employed by the

Unified Soil Classification and their meaning is presented as Appendix (A). Where appropriate, dual symbols are employed to signify borderline soils.

(Water Content) - ASTM D-2216

In-situ (or field) moisture contents were determined by placing extracted samples in sealed containers immediately upon removal from the drill cavity. Field moisture contents are valuable in assessing the general subsurface conditions and in evaluating the magnitude of volume change, which might be anticipated in soils having a high shrink-swell potential. Also, the degree of wetting or drying which may be required to achieve moisture contents approaching optimum for soils involved in site grading may be estimated. Information generated from the analysis performed indicates in-situ moisture contents are within the anticipated range for the soil types encountered and climatic season. Moisture content data is presented on the boring logs as W (%).

(Liquid and Plastic Limits) - ASTM 4318

Liquid and plastic limits, commonly referred to as Atterburg Limits, were performed on representative samples of the cohesive soils encountered. The plastic limit (PL) is the moisture content representing the lower boundary range of plastic behavior of a soil. The liquid limit (LL) is the moisture content representing the upper range of plastic behavior; above which a soil will essentially have the shear strength of a fluid. Both values are expressed as percent (%) moisture. The plasticity index (PI) is the numerical difference between the liquid limit and plastic limit and is utilized in soil classification and empirical relations developed regarding volume change, strength, and permeability. Typically, soils exhibiting a high PI are susceptible to significant changes in volume (i.e. shrinkage and swelling) with fluctuations in moisture content and

experience a severe loss of shear strength upon saturation. Low PI soils are relatively inactive with respect to moisture induced volume change and are normally suitable as a supporting subgrade soil. Data generated from this investigation indicates the plasticity index (PI) of the clays identified within the upper soil horizon ranges from 6 to 18. Based on this information these soils are considered to have a low shrink-swell potential which should not prove adverse to the proposed structure or related improvements. Liquid limit (LL) and PI results are also depicted by sample depth on the boring logs.

(Grain-Size Analysis) - ASTM D-422

Mechanical grain-size analysis provides the particle size distribution of the various constituents comprising the soil mass. Where necessary, this procedure may be complimented by the hydrometer test (ASTM D-422) to provide delineation of the silt and clay fractions. Results of these tests are used in classifying soils in accordance with the Unified Soil Classification System and in estimating the California Bearing Ratio (CBR), modulus of subgrade reaction (k), and permeability from empirical relations developed with respect to grain size. Specimens retrieved from the borings performed were classified visually and on the basis of plasticity and no grain-size analysis were required.

(Shear Strength)

Shear strength tests were performed on undisturbed and remolded specimens of the various soils encountered. Methods employed in assessing shear strength were designated by the geotechnical engineer and are briefly summarized as follows:

> (Pocket Penetrometer)

Selected cohesive soil specimens were tested utilizing a pocket penetrometer. This procedure allows for a quick approximation of the unconfined compressive strength of a soil through correlation of penetration of a calibrated plunger. Results are indicated as tons per square foot (tsf) by sample depth on the boring logs and represent the average of a minimum of four (4) readings per specimen.

(Unconfined Compression Test) – ASTM 2166

The unconfined compression test provides a relatively quick and economical approximation of the unconsolidated and undrained shear strength of a cohesive soil.

Testing involves subjecting an "undisturbed" cylindrical sample of the soil (usually extracted from a Shelby tube) to a uniformly increasing load under controlled stress or controlled strain conditions until failure is reached through shear or excessive strain. The cohesive shear strength (c) is equivalent to one-half of the maximum normal stress realized during the test effort. Specimens retrieved from the borings performed sustained maximum normal loads of 3.4 to 10.0 kips (1,000 pounds) per square foot of contact area. Test results are presented as unconfined compressive strength on the boring logs.

SOIL PROFILE

The generalized soil profile presented is based upon engineering interpretation of the boring logs and related laboratory analysis as presented in Appendix (B).

Prevalent near surface soils identified at the locations investigated consist of low to medium plasticity sandy silty clays. According to the criteria stipulated by the Unified Soil Classification System these soils are designated as CL or CL-ML type materials. The CL soils transition to a medium plasticity CH material at a depth of approximately 10 feet in boring (2). Particularly soft clay exhibiting a standard penetration resistance "N" value of 4 was identified at depths of approximately 2 to 4 feet in boring (3). Otherwise, consistency of the overburden as estimated by the driller and verified by standard penetration resistance "N" values of 15 to in excess of 50 ranges from medium stiff to hard. Cohesive soils exhibiting "N" values of 30 or greater are recognized as hard.

The soils described are underlain by poorly graded fine silty and/or clayey sands (Unified Classification SM or SC) which were initially intercepted at depths of 13 to 14 feet and extended to the limits of exploration. Consistency of the lower sands was described by the driller as medium dense to dense.

The International Building Code stipulates seismic analysis will be based upon a SITE CLASS DEFINITION in accordance with Section 1615.1.1. Based upon the information generated from this investigation and local geology, the subject property is assigned SITE CLASS D – (Stiff Soil Profile).

Free water was detected as borings (1) and (3) were advanced at depths of 14 feet and 17 feet, respectively. Examination of the drill cavities 1 to 2 hours subsequent to removal of the drill tool revealed groundwater at depths of 13 to 14 feet. (See boring logs). The reader is advised the field investigation was accomplished within a period of near normal precipitation. Migration of groundwater is common within the lower plasticity clays and permeable sands and the phreatic

surface is anticipated to fluctuate with the climatic season. Also, localized abnormalities in groundwater levels may result from random fill or subterranean utility installations.

FOUNDATION RECOMMENDATIONS

It is our understanding the project involves construction of an educational / training building having a footprint of approximately 14,490 square feet. The structure is anticipated to be premanufactured steel frame with cmu walls and brick veneer. Minimal grading is anticipated to be required to achieve a finish structure elevation compatible with the surrounding improvements and topography.

Soft surficial soils were identified in boring (3) the lateral extent of which is not yet determined. We recommend these soils be mitigated as outlined under EARTHWORK/GRADING and a unit price for over-excavation and backfill be established to cover the cost of same.

Having accomplished the above, it is our opinion the structure may be adequately supported by a slab on grade type shallow foundation system consisting of **stiff** reinforced concrete continuous beam type footings beneath the structure perimeter and load-bearing walls with reinforced concrete spread footings provided as necessary to support concentrated column loads.

Recommendations provided for this foundation system are contingent upon earthwork completed in strict accordance with Section EARTHWORK / GRADING.

(Continuous and Spread Footings)

Provided the earthwork is accomplished as specified, continuous foundation components may be designed for a maximum net allowable soil bearing pressure of 2800 pounds per square foot of

contact area (psf). Recommended depth of bearing for continuous foundation components is a minimum of 14 inches beneath the finish subgrade elevation. The maximum allowable soil pressure for reinforced concrete spread footings bearing a minimum of 14 inches beneath the finish subgrade elevation is 3200 psf. All foundation members should be adequately reinforced to resist differential movement and as stipulated by applicable American Concrete Institute (ACI) specifications.

The allowable pressures quoted herein are intended to provide a factor of safety of 2.4 to 3.7 with respect to ultimate or bearing capacity failure of the supporting soils with a maximum anticipated settlement of 0.4 inches which is contingent upon proper placement and compaction of soils imported or relocated during the grading process. (See EARTHWORK / GRADING.) Maximum anticipated differential settlement between adjacent columns is 0.25 inches. In the event the structural system will not tolerate the settlement conditions described, we respectfully request an opportunity to review the recommendations cited herein.

(Floor Slabs)

The floor slab is expected to be underlain by processed and compacted on-site soils or select imported fill. Preparation of the supporting subgrade and base as outlined herein should result in a modulus of subgrade reaction (k) of 110 pci. Floor slabs should be designed in accordance with ACI 302.1R-96 "Guide for Concrete Floor and Slab Construction." We recommend a minimum of 4 inches of coarse aggregate conforming to Mississippi Department of Transportation (MDOT) Size No. 57 or No. 67 gravel or stone be provided beneath the slab to serve as a capillary break and to provide for base tolerance "fine grading."

EARTHWORK / GRADING

All excavations should be performed under the direction of a designated competent person in strict accordance with applicable provisions of the OSHA Excavation Standard. Erosion control measures should be incorporated in accordance with an approved Stormwater Pollution Prevention Plan. At the outset of construction, we advise adequate weep and diversion ditches be installed to provide for storm water control during the grading process. Subsequent to clearing and demolition, any remaining grasses and humus matter should be removed with topsoil stockpiled as needed for future use. Receiving subgrades should be scarified to a minimum depth of 8 inches and compacted to a minimum of 95% of maximum dry density as determined by standard proctor (ASTM D-698).

Subgrade soils should be maintained in a moist condition prior to placement of fill materials. We advise the prepared subgrade to be inspected by a representative of the geotechnical engineer and that no unauthorized over-excavation be permitted. Should anomalies or differing conditions be revealed in site preparation the geotechnical engineer should be contacted immediately. Mitigation of any soft or unsuitable materials as identified in boring (3) revealed during construction should be at the expressed direction of the geotechnical engineer.

On site CL soils may be relocated to accomplish design elevations provided placement and compaction criteria are satisfied. Unless otherwise specified, imported soils required beneath the structure should consist of select lean clay or clayey sand materials conforming to Unified Soil Classifications SM, SC, or CL and exhibiting a plasticity index (PI) of 6 to 16. Relocated or imported soils should be placed in maximum loose lifts of 8 inches compacted to a minimum of

95% of maximum dry density established by standard proctor (ASTM D-698). Where compaction of fill or backfill cannot be accomplished utilizing conventional machinery such as for utility trenches or retaining walls the maximum loose lift thickness should not exceed 4".

Moisture content of all soils should be maintained compatible with the laboratory optimum.

Depending on the season in which grading is accomplished, it may be necessary to aerate and dry or supplement moisture into the soils utilized in construction to achieve the specified moisture levels.

The geotechnical design criteria and recommendations presented are contingent upon materials and workmanship compliant with specifications presented herein intended to ensure successful foundation and pavement performance. Quality assurance testing of earthwork, cast-in-place concrete, and asphalt is recommended to supplement Contractor quality control efforts. Pritchard Engineering, Inc. believes this service is best sponsored by the Owner or end user with reporting to the project professional. We advise field moisture-density tests be performed during construction to ensure compaction and moisture criteria are satisfied utilizing a nuclear device in accordance with ASTM D-2922. Construction phase testing should be conducted by certified technician(s) under the direction of a registered engineer. With consideration of the estimated volume of earthwork required, we advise all compaction reports to be identified with respect to location and lift sequence/elevation.

Recommended minimum test frequencies are:

1 test per 2500 square feet of prepared subgrade beneath structure

1 test per 2500 square feet per 8-inch loose lift of relocated or imported fill beneath structure

(minimum 6 tests / lift beneath building)

1 test per 50 linear feet per lift of utility trench backfill.

* Where construction activities disturb supporting subgrades, these areas should be re-evaluated or tested prior to final improvements.

LANDSCAPING

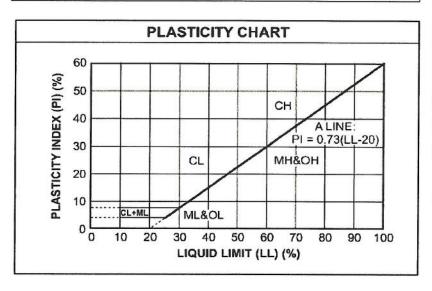
The designer should be aware that any condition that contributes to wetting and drying of the subgrade may prove detrimental to the foundation system. Expeditious removal of surface and stormwater is critical. Irrigation systems should be well-drained. Gutters are advised for removal of roof water. Also, the dripline of large water consuming trees and large variety evergreen shrubs should not be located within 30 feet of the proposed structure.

APPENDIX (A)

UNIFIED SOIL CLASSIFICATION SYSTEM

Appendix (A)

	Major Di	visions	Group Symbol	Typical Names	Classification fo	r Coarse-Gained Soils			
Coarse-Grained Soils (more than half of material is larger than No. 200 sieve)	alf of er than	Clean gravels (little or no fines)	GW	Well-graded gravels, gravel-sand mixtures, little or no fines		D ₆₀ / D ₁₀ > 4 30 / D ₁₀ x D ₆₀ < 3			
	than h is large ve size)	Cle gravel or no	GP	Poorly-graded gravels, gravel-sand mixtures, little or no fines	Not meeting all grad	ation requirements for GW			
	Gravels (more than half of oarse fraction is larger than No. 4 sieve size)	s with es ciable nt of	σм	Silty gravels, gravel-sand-silt mixtures	Atterburg limits below A line or I _p < 4	Above A line with 4 < I _p <			
than No. 200 sieve)	Gravels (more than half of coarse fraction is larger than No. 4 sieve size)	Gravels with fines (appreciable amount of	GC	Clayey gravels, gravel-sand-clay mixtures	Atterberg limits below A line or I _p > 7	are borderline cases requiri use of dual symbols			
more th n No. 20	f coarse No. 4	Clean sands (little or no fines)	sw	Well-graded sands, gravelly sands, little or no fines		D ₆₀ / D ₁₀ > 6 B ₀₀ / D ₁₀ x D ₆₀ < 3			
tha	half of er than ize)	Clean (little fin	SP	Poorly-graded sands, gravelly sands, little or no fines	Not meeting all grad	ation requirements for SW			
-Grained	ands (more than half of coarse fraction is smaller than No. 4 sieve size)	nds with fines (appreciable nount of fines)	SM	Silty sands, sand-silt mixtures	Atterburg limits below A line or I _p < 4	Limits plotting in hatched zone with 4 < I _p < 7 are			
500	Sands (more than half of coarse fraction is smaller than No. 4 sieve size)	Sands with fines (appreciable amount of fines)	sc	Clayey sands, sand-clay mixtures	Atterberg limits below A line or I _p > 7	borderline cases requiring u of dual symbols			
		ays < 50)	ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands, or clayey silts with slight plasticity	E-COMP				
eve)	Silts and clays (liquid limit < 50)		CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays	grain-size curve.	es of sand and gravel from			
. 200 si		<u>s</u> <u>e</u>]	OL	Organic silts and organic silty clays of low plasticity	Depending on percentages of fines (fraction small than 200 sieve size), coarse-grained soils are classified				
smaller than No. 200 sieve)		lays > 50)		Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic soils	as follows: Less than 5% - GW, GP, More than 12% - GM, G				
aller t		Silts and clays (liquid limit > 50)	СН	Inorganic clays of high plasticity, fat clays		cases requiring dual symbols			
smaller than No. 200 sieve)			он	Organic clays of medium to high plasticity, organic silts					
	Highly organic soils		Pt	Peat and other highly organic soils	Soil Consistency				



- 2. Depending on percentages of fines (fraction smaller
- than 200 sieve size), coarse-grained soils are classified

Soil Co	nsistency					
Clays						
Blows per foot (N)	Consistency					
0-2	Very Soft					
2-4	Soft					
4-8	Medium Stiff					
8-15	Stiff					
15-30	Very Stiff					
Over 30	Hard					
Sa	inds					
Blows per foot (N)	Density					
0-4	Very Loose					
4-10	Loose					
10-30	Medium Dense					
30-50	Dense					
Over 50	Very Dense					



APPENDIX (B) BORING LOGS



PROJECT NO.	7173 G-77
CAREER & TECHNIC	CAL CENTER ADDITO
ITAWAMBA COUNT	TY SCHOOL DISTRICT
FULTON.	MISSISSIPPI

BORING NO.
ELEVATION
DRILLED
DRILLER

05/01/24 SM

1

DEPTH (FT)	SAMP (FT)	SR	VISUAL CLASSIFICATION / REMARKS	CONSIST.	SPT (N)	w %	LL	PI	-200 %	UNIFIED CLASS	q _u (tsf)
0											(101)
1			Red-brown sandy silty CLAY	M. Stiff		16				CL	
2		9000									
3				M. Stiff		21	38	17		CL	1.7
4											
5				Stiff		24				CL	
6											
7				V. Stiff		24				CL	
8											
9				V. Stiff		21				CL	
10											
11				V. Stiff		22				CL	
12											
13				Stiff		24				CL	
14			*Hit water @ 14'								
15			Light brown & pale yellow fine silty SAND	M. Dense		23		NP		SM	
16											
17				M. Dense		23		NP		SM	
18											
19				M. Dense		24		NP		SM	
20			BORING TERMINATED								
AMPL.	E RETE	RIEV	AL (SR)	WATER OF	SERV	ATIO)N (S	0			(1)

DRY AUGER......ASTM D-1452

SHELBY TUBE.....ASTM D-1582

Y PENETRATION TEST....ASTM D-1586

NONE ENCOUNTERED

14 FT. AFTER

2 HRS.

BOREHOLE CAVED AT

FT.



PROJECT NO.	7173 G-77
CAREER & TECHNIC	CAL CENTER ADDITO
ITAWAMBA COUNT	TY SCHOOL DISTRICT
FILTON	MISSISSIPPI

BORING NO. ELEVATION DRILLED DRILLER

05/01/24 SM

2

DEPTH (FT)	SAMP (FT)	SR	VISUAL CLASSIFICATION / REMARKS	CONSIST.	SPT (N)	w %	LL	PI	-200 %	UNIFIED CLASS	q _u (tsf)
	(F1)				(4)	70			70	CLASS	(151)
0											
1			Red-light brown & light gray sandy silty CLAY	M. Stiff		16				CL	
2			*Trace lignite @ 2'								
3	2-3.5	X		V. Stiff	26	17	29	15		CL	5.0
4											
5	5-6.5	X		V. Stiff	29	13	32	18		CL	3.8
6											
7				V. Stiff		16				CL	
8											
9				V. Stiff		20				CL	
10											
11	10-11.5	X		Hard	43	19	51	34		СН	4.2
12											
13				V. Stiff		19				СН	
14											
15			Light brown & pale yellow fine silty SAND	M. Dense		19		NP		SM	
16											
17				M. Dense		17		NP		SM	
18											
19				M. Dense		21		NP		SM	
20			BORING TERMINATED								
AMPI	LE RETI	RIEV	VAL (SR)	WATER OI	BSERV	ATI	ON (S	5)	Silling		999

EE RETRIEVIE (OR)	Will bit Observer (b)	
DRY AUGERASTM D-1452	NONE ENCOUNTERED	X
SHELBY TUBEASTM D-1582	FT. AFTER	HRS.
PENETRATION TESTASTM D-1586	BOREHOLE CAVED AT	FT.



PROJECT NO. 7173 G-77
CAREER & TECHNICAL CENTER ADDITOR
ITAWAMBA COUNTY SCHOOL DISTRICT
FULTON, MISSISSIPPI

BORING NO. ELEVATION DRILLED DRILLER 3 05/01/24 SM

DEPTH (FT)	SAMP (FT)	SR	VISUAL CLASSIFICATION / REMARKS	CONSIST.	SPT (N)	w %	LL	PI	-200 %	UNIFIED CLASS	q _u (tsf)
	(1.1)				(4)	70			70	CLADO	(131)
0					-						
1			Red-brown & light gray sandy silty CLAY	Stiff		12				CL	
2											
3	2-3.5	X		Soft	4	15	19	6		CL-ML	2.1
4											
5	5-6.5	X		V. Stiff	15	18	25	11		CL	2.2
6											
7				Stiff		16				CL	
8											
9				Stiff		16				CL	
10											
11	10-11.5	X		Hard	54/8"	17	39	21		CL	3.4
12											
13				V. Stiff		18				CL	
14			Red-light brown fine silty clayey <u>SAND</u>	Dense		21				SC	
15											
16				Dense		26				SC	
17			*Hit water @ 17'								
18				Dense		28				SC	
19											
20			BORING TERMINATED	Dense		28				SC	
AMPI	E RET	RIEV	/AL (SR)	WATER O	BSERV	ATI	ON (S	5)			

DRY AUGERASTM D-1452	NONE ENCOUNTERED	
SHELBY TUBEASTM D-1582	13 FT. AFTER 2	HRS
PENETRATION TESTASTM D-1586	BOREHOLE CAVED AT	FT.



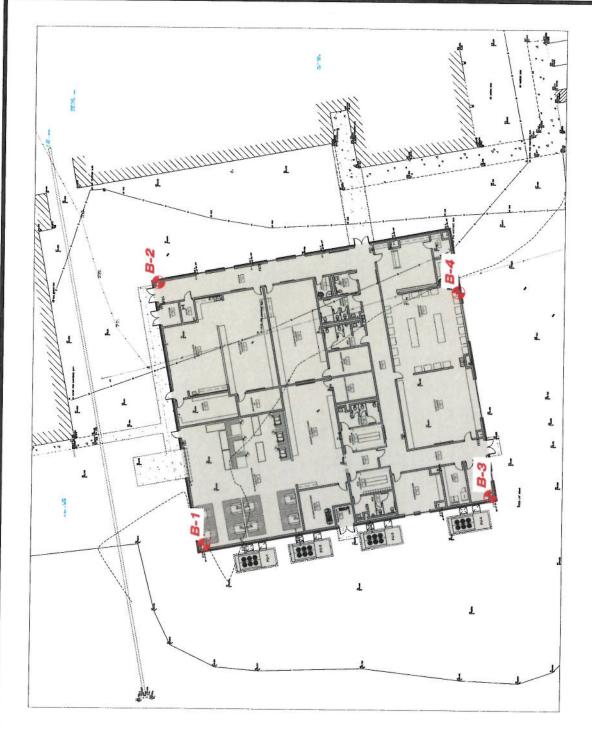
PROJECT NO.	/1/3 G-//
CAREER & TECHNIC	CAL CENTER ADDITO
ITAWAMBA COUNT	TY SCHOOL DISTRICT
FULTON	MISSISSIPPI

BORING NO. ELEVATION DRILLED DRILLER 05/01/24 SM

DEPTH (FT)	SAMP (FT)	SR	VISUAL CLASSIFICATION / REMARKS	CONSIST.	SPT (N)	w %	LL	PI	-200 %	UNIFIED CLASS	q _u (tsf)
	(* 1)				(,,)	,,,			70	S-RAI BIONS	(101)
0											
1			Red-brown & light gray sandy silty CLAY	Stiff		16				CL	
2											
3				V. Stiff		16				CL	
4											
5				Stiff		15				CL	
6											
7				Stiff		16				CL	
8											
9				Stiff		16				CL	
10											
11				Stiff		21				CL	
12											
13				Stiff		20				CL	
14											
15				Stiff		20				CL	
16											
17				Stiff		19				CL	
18											
19				Stiff		19				CL	
20			BORING TERMINATED								
AMDI	F DET	DIE	VAL (SR)	WATER OI	SCEDY	ATI	N /9	2			

AMPLE RETRIEVAL (SR)	WATER OBSERVATION (S)				
DRY AUGERASTM D-1452	NONE ENCOUNTERED	X			
SHELBY TUBEASTM D-1582	FT. AFTER	HRS.			
X PENETRATION TESTASTM D-1586	BOREHOLE CAVED AT	FT.			

APPENDIX (C) SITE SCHEMATIC / BORING PLAN



Know what's below.
Call before you dig.

SCALE: 1" = 40'

LEGEND

SOIL BORING LOCATION

ITAWAMBA COUNTY SCHOOL DISTRICT ADDITION AT CARRER & TECHNICAL CENTER FULTON, MISSISSIPPI	FOR
---	-----

COLUMBUS, MISSISSIPPI **PRYORMORROW**

COLUMBUS, MS 39701

662.324.2205

ENGINEERING

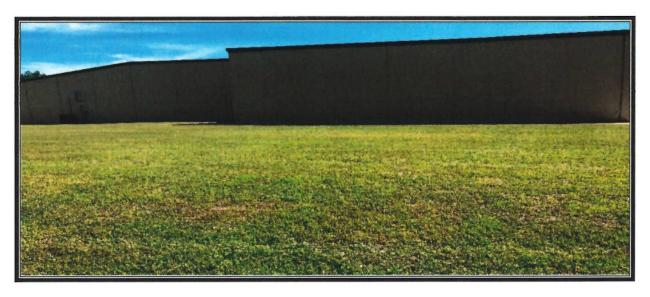
5227 S. FRONTAGE RD.

05/08/2024 71736-77-24 CLP 1" = 40CHECKED BY: PROJ. #: SCALE: DWG #: DATE:

CM

DRAWN BY:

APPENDIX (D) PHOTOS







2023111 Addition at Career and Technical Center (Itawamba County School District)

APPENDIX NO. 2 WATER FLOW TEST REPORT

(PERFORMED BY FIRELINE, INC.)

(DATED APRIL 30, 2024)



Flow Test Info

_{Job:} Career & Technical Center		er	4-30-2024			_{тіме:} 1:20pm		
Address: Vo Tech Road		Test Conducted by:		-	Keith Teeple (FL)			
Fulton MS.	MS.		Title/Affiliation: Test Witnessed by:		Brandon Sheffield (FWD)			
			Title/Affilia	tion:				
Source of Water Supply	Reason for Test				Water supply have PRV STA's?			
✓ Gravity	Bid Information				Yes			
Pump	Design Base			No				
Other:	<u> </u>	<u>✓</u> Other:			Setting:			
		Static	Residual	Pitot	Coeff.	Flow	(#) & size of butts	
Name of Water District	#1	95	42	17	.9	692	(1) 2.5" Butt	
Fulton Water Department	#2							
	'	PSI	PSI	PSI		GPM		

Site Schematic

(Show buildings with names, property location, streets and names, north arrow, hydrant locations and identification numbers (static & flowing), distances, elevation of hydrants and property grade, nearest water supply, dead-end or circulating mains, water mains, size, type and interconnection valves, etc.)

