PROJECT MANUAL

WOODFORD COUNTY PUBLIC SCHOOLS

SOUTHSIDE ES CAFETERIA / KITCHEN ADDITION

KDE Project: 18-329

Owner

Woodford County Board of Education

330 Pisgah Pike

Versailles, Kentucky 40383

T: (859)-879-4600

F: (859) 873-1614

Architect

Tate • Hill • Jacobs: Architects, Inc.

346 East Main Street

Lexington, Kentucky 40507

T: (859) 252-5994 F: (859) 253-1607

Landscape Architect

John L Carman & Associates

310 Old Vine Street

Lexington, Kentucky 40507

T: (859) 254-9803 F: (859) 255-8625

Structural Engineer

Poage & Associates

446 East High Street

Lexington, Kentucky 40507

T: (859) 255-9034 F: (859) 252-3130

Mechanical / Electrical Engineers

CMTA Consulting Engineers

2429 Members Way

Lexington, Kentucky 40504

T: (859) 253-0892 F: (859) 231-8357

Date: July 20, 2018

DOCUMENT 001000
TABLE OF CONTENTS

END OF TABLE OF CONTENTS

INVITATION TO BID

The Woodford County Board of Education will receive sealed bids at the Superintendent's office at 330 Pisgah Pike until **2:00 PM**. local time on **Tuesday, September 18, 2018** for the Southside Elementary School Cafeteria / Kitchen Addition located at 1300 Troy Pike, Versailles, KY. Specifications and Bid Documents may be obtained by contacting Lynn Imaging 328 East Vine Street Lexington, KY. 859-255-1021. A Pre-Bid Meeting will be held at 3:30 p.m. on Tuesday, August 21st at Southside Elementary School. Inquiries related to the project may be made by contacting Margaret Jacobs of Tate Hill Jacobs Architects at (859) 252-5994. Form of Proposal, Form of Contract, Plans and Specifications, and Forms of Bid Bond, Performance and Payment Bond and other contract documents may be examined at the following:

McGraw Hill Construction	3315 Central Avenue	Hot Springs AR 800.393.6343
Builders Exchange of KY	1035 Strader Drive	Lexington, KY 859.288.0011
Builders Exchange	2300 Meadow Drive	Louisville, KY 502.459.9800
Allied Construction Industries	3 Kovach Drive	Cincinnati, OH 513.221.8020
Reed Construction Data	30 Technology Parkway Suite 100	Norcross GA 800.424.3996
Tate Hill Jacobs: Architects	346 East Main Street	Lexington, KY 859.252.5994
Poage Engineers & Associates	446 East High Street	Lexington, KY 859.255.9034
CMTA Engineers	2429 Members Way	Lexington, KY 859.253-0892

Immediately following the scheduled closing time for receiving the bids, all proposals that have been completely filled out and have been properly submitted with the appropriate attachments in accordance with the Contract Documents will be publicly opened and read.

Plans and Specifications may be purchased from Lynn Imaging, 328 Old Vine Street Lexington, KY for a non-refundable amount of $120.00 per set. No partial sets will be issued. Documents may be obtained from the distribution department of Lynn Imaging, 859.255.1021 or on their website, <www.lynnimaging.com.> If documents are to be mailed, an additional non-refundable charge will apply; contact Lynn Imaging for the cost. **The successful bidder is responsible for all additional sets they may require.**

Bids must be accompanied by a certified check or bid bond, payable to the Owner in an amount of not less than 5% of the bid. The award of the contract shall be made on the basis of the lowest and best bid in the interest of Woodford County Public Schools. No bidder may withdraw his/her bid for a period of thirty (30) days after the date set for the bid opening. An 100% Performance and Payment Bond shall be provided by the successful Bidder at the time of Contracting. The Owner reserves the right to waive informalities and irregularities, and shall have the right to reject any and all bids.

END OF DOCUMENT

SECTION 011000
SUMMARY

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. The Contract Documents.
2. Contract description
3. Times of Completion
4. Pre-Bid Meeting
5. Contractor's use of Site and premises.
6. Owner occupancy.
7. Specification conventions.

1.2 THE CONTRACT DOCUMENTS

A. The drawings and specifications are intended to be fully explanatory and supplementary. However, should anything be shown, indicated or specified on one and not the other, it shall be done the same as if shown, indicated or specified in both.

B. It shall be the responsibility of all Contractors and Subcontractors to carefully examine all Drawings, Specifications and Contract Documents pertaining to the construction in order that Contractor and Subcontractors may foresee all requirements for coordination of their work. Submission of a bid shall be construed as evidence that such an examination has been made. Claims based on unforeseen requirements will not be considered.

C. Should any error or inconsistency appear in Drawings or Specifications, the Contractor, before proceeding with the work, must make mention of the same to the Architect for proper adjustment, and in no case proceed with the work in uncertainty or with insufficient drawings.

D. Bidders, subcontractors and suppliers, before submitting proposals, shall visit and examine the sites to satisfy themselves as to the nature and scope of the work. Requests for additional compensation resulting from any difficulties encountered, which could have been foreseen had such an examination been made, will not be recognized.

E. The Contractor and each Subcontractor shall be responsible for verification of all measurements at the buildings before ordering any materials or doing any work. No additional compensation shall be allowed due to differences between actual dimensions and dimensions indicated on the Drawings. Any such discrepancy in dimensions, which may be found, shall be submitted to the Architect for consideration before the Contractor proceeds with the work in the affected areas.

F. Contractors shall follow sizes in Specifications or figures on Drawings, in preference to scale measurements and follow detail drawings in preference to general drawings.

G. Where it is obvious that a drawing illustrates only part of a given work or of a number of items, the remaining shall be deemed repetitious and so constructed.

1.3 CONTRACT DESCRIPTION

A. Work of the Project includes all materials, labor, and equipment required to complete new construction for the expansion of the existing Cafeteria and Kitchen and limited renovation of existing areas necessary to accommodate the new construction. The work includes all cutting and patching of existing construction assemblies and interior finishes necessary to complete the work.

B. Perform Work of Contract under stipulated sum Contract with Owner according to Conditions of Contract.

1.4 TIMES OF COMPLETION

A. Work shall begin upon execution of the Owner-Contractor agreement which is scheduled to occur on or before Monday, October 1, 2018.

B. All work must be substantially complete on or before July 15, 2019.

C. The date of Substantial Completion shall be the date certified by the Owner when the work is sufficiently complete, in accordance with the Contract Documents, so that the Owner may conditionally accept, and beneficially use all of the improvements provided under this Construction Contract.

D. Final Completion: The total work to be done under this Contract shall be fully completed within 30 calendar days following the Contractor's receipt of a punch list. The Date of Final Completion shall be the date that the work is complete and all Contract requirements have been fulfilled by the Contractor.

E. Liquidated Damages will be assessed in the amount of $200.00 per calendar day for failure to meet the substantial completion deadlines identified in Article 1.3 Contract Description. Liquidated Damages will be assessed in the amount of $100.00 per calendar day for failure to meet the Final Completion deadline.

1.5 PRE-BID MEETING

A. A Pre-Bid Meeting will be held on the date and at the time identified in the Invitation to Bid. Interested bidders should enter the building through the front doors and register as a "guest" and proceed to the Library/Media Center.

1.6 CONTRACTOR'S USE OF SITE

A. Limit use of Site to allow:
   1. Owner Occupancy:
      a. Normal school operations will continue in all areas of the building and on the playground for the entire 2018-2019 school year.
   2. Work by Others: TBD

B. Construction Operations: Limited to areas indicated on Drawings.

C. Utility Outages and Shutdown – Coordinate with Owner 48 hours in advance of each occurance.

1.7 WORK SEQUENCE

A. Construct Work to accommodate Owner's occupancy requirements of the building and

surrounding site during the construction period.

1.8 OWNER OCCUPANCY

A. The Owner will continue regular operations during the 2018-2019 school year. Programs during the summer of 2019 (if applicable) will be limited to accommodate final completion of the construction work.

B. Cooperate with Owner to minimize conflict, and to facilitate Owner's operations.

C. Schedule the Work to accommodate Owner occupancy.

1.9 SPECIFICATION CONVENTIONS

A. These Specifications are written in imperative mood and streamlined form. This imperative language is directed to Contractor unless specifically noted otherwise. The words "shall be" are included by inference where a colon (:) is used within sentences or phrases.

PART 2 PRODUCTS - Not Used

PART 3 EXECUTION - Not Used

END OF SECTION

SECTION 012000 - PRICE AND PAYMENT PROCEDURES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Alternates

B. Schedule of Values.

C. Application for Payment.

D. Change procedures.

E. Defect assessment.

1.2 ALTERNATES

A. Alternates quoted on Bid Forms will be reviewed and accepted or rejected at Owner's option. Accepted Alternates will be identified in Owner-Contractor Agreement. The Owner-Contractor Agreement may identify certain Alternates to remain an Owner option for a stipulated period of time.

B. Coordinate related Work and modify surrounding Work. Description for each Alternate is recognized to be abbreviated but requires that each change shall be complete for scope of Work affected.
   1) Coordinate related requirements among Specification Sections as required.
   2) Include as part of each Alternate: Miscellaneous devices, appurtenances, and similar items incidental to or necessary for complete installation.
   3) Coordinate Alternate with adjacent Work and modify or adjust as necessary to ensure integration.

C. Schedule of Alternates:
   1) Alternate No. 1: VRV Equipment
      a) Base Bid Item: Provide Daikin variable refrigerant flow HVAC equipment
      b) Alternate Item: Indicate cost difference & manufacturer to substitute either LG Systems or Samsung equipment.
   2) Alternate No. 2: HVAC Controls
      a) Base Bid Item: Provide Automated Logic HVAC temperature controls.
      b) Alternate Item: Indicate cost difference & manufacturer to substitute either Andover or Allerton controls.
   3) Alternate No. 3: 2&3 Compartment Sinks
      a) Base Bid Item: Move 3 compartment sink to Kitchen Addition room 224J.
      b) Alternate Item: Move 3 compartment sink to location where two compartment sink is currently located and move two compartment sink to Kitchen Addition room 224J
   4) Alternate No. 4: Underground Sanitary Piping
      a) Base Bid Item: Do not remove and replace existing underslab sanitary sewer at range hood cooking line.
      b) Alternate Item: Remove and replace existing underslab sanitary sewer at range hood cooking line in conformance with details shown on the plumbing drawings.
   5) Alternate No. 5: Existing Kitchen Ceiling & Fixtures
      a) Base Bid Item: No change to Ceilings in Existing Kitchen 224 and surrounding rooms.
      b) Alternate Item: Remove and replace suspended acoustical ceiling grid and panels in Kitchen 224 and surrounding rooms. Refer to Room Finish Schedule and Specification Section 095123.
   6) Alternate No. 6: Concrete Walk for Playground
      a) Base Bid Item: no change to existing paved walk between bus loop and playground.
      b) Alternate Item: remove existing asphalt paved walk and replace with concrete paving in conformance with details include in the site drawings.

7) Alternate No. 7 Kitchen Ice Machine Shelving & Tables
   a) Base Bid Item: Relocate existing ice machine; no additional shelving or tables.
   b) Alternate Item: Provide new ice machine and provide kitchen shelving and tables. Refer to Specification Section 114000.

1.3 SCHEDULE OF VALUES

A. Submit printed schedule on AIA Form G703 - Continuation Sheet for G702.

B. Submit Schedule of Values in duplicate within 7 days after date of Notice of Intent to Award.

C. Format: Utilize Table of Contents of this Project Manual. Identify each line item with number and title of major specification Section. Separate each line item into material and labor cost. Provide line items for the following:
   1. Closeout Documents – As-Builts
   2. Closeout Documents – Manuals
   3. Final Cleaning
   4. Provide additional breakdown of costs when requested by either the Architect or the Engineer.

D. Include within each line item, direct proportional amount of Contractor's overhead and profit.

E. Revise schedule to list approved Change Orders, with each Application For Payment.

1.4 APPLICATIONS FOR PAYMENT

A. Submit three copies of each application on AIA Form G702 - Application and Certificate for Payment and AIA G703 - Continuation Sheet for G702

B. Content and Format: Utilize Schedule of Values for listing items in Application for Payment.

C. Submit updated construction schedule with each Application for Payment.

D. Payment Period: Once a month.

E. Submit with transmittal letter as specified for Submittals in Section 013300.

F. Stored Material: Payment for stored material will be made under the following conditions
   1. Materials are being stored on site
   2. Materials are being stored off-site within a 60 mile radius of the project site and a certificate of insurance has been provided naming Woodford County Board of Education as the insured.

G. Substantiating Data: When Architect/Engineer requires substantiating information, submit data justifying dollar amounts in question.

1.5 CHANGE PROCEDURES

A. Submittals: Submit name of individual authorized to receive change documents, and be responsible for informing others in Contractor's employ or Subcontractors of changes to the Work.

B. When a change is proposed to the scope of the work impacting the Contract Cost or Contract Time, the Contractor shall submit a complete and thorough breakdown of the additional costs separating material and labor costs. The Contractor shall identify material quantities, and manhour requirements where applicable. The General Contractor shall attach all quotes received from Subcontractors to substantiate the pricing.

C. The Owner will advise of minor changes in the Work not involving adjustment to Contract Sum/Price or Contract Time by issuing supplemental instructions on AIA Form G710.

D. The Owner may issue a Proposal Request including a detailed description of proposed change with supplementary or revised Drawings and specifications, and a change in Contract Time for executing the change. Contractor will prepare and submit estimate within the time stipulated within the request.

E. Contractor may propose changes by submitting a request for change to Owner, describing proposed change and its full effect on the Work. Include a statement describing reason for the change, and effect on Contract Sum/Price and Contract Time with full documentation and a statement describing effect on Work by separate or other Contractors.

F. Stipulated Sum/Price Change Order: Based on Proposal Request and Contractor's fixed price quotation or Contractor's request for Change Order as approved by Owner.

G. Change Order Forms: AIA G701 Change Order.

H. Execution of Change Orders: Architect will issue Change Orders for signatures of parties as provided in Conditions of the Contract.

I. Correlation Of Contractor Submittals:
   1. Promptly revise Schedule of Values and Application for Payment forms to record each authorized Change Order as separate line item and adjust Contract Sum/Price.
   2. Promptly revise progress schedules to reflect change in Contract Time, revise sub-schedules to adjust times for other items of work affected by the change, and resubmit.
   3. Promptly enter changes in Project Record Documents.

1.6 DEFECT ASSESSMENT

A. Replace the Work, or portions of the Work, not conforming to specified requirements.

B. If, in the opinion of the Owner it is not practical to remove and replace the Work, the Owner will direct appropriate remedy or adjust payment.

C. The defective Work may remain, but unit sum/price will be adjusted to new sum/price at discretion of Owner.

D. Defective Work will be partially repaired to instructions of Owner and unit sum/price will be adjusted to new sum/price at discretion of Architect/Owner.

E. Authority of Owner to assess defects and identify payment adjustments is final.

F. Non-Payment For Rejected Products: Payment will not be made for rejected products for any of the following:
   1. Products determined as unacceptable before or after placement.
   2. Products placed beyond lines and levels of required Work.

3. Loading, hauling, and disposing of rejected products.

PART 2 PRODUCTS - Not Used

PART 3 EXECUTION - Not Used

END OF SECTION

SECTION 013000 - ADMINISTRATIVE REQUIREMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Coordination and Project conditions.

B. Preconstruction meeting.

C. Hazardous Materials

D. Progress meetings.

E. Closeout meeting.

F. Alteration Procedures.

1.2 COORDINATION AND PROJECT CONDITIONS

A. Coordinate scheduling, submittals, and Work of Project Manual to ensure efficient and orderly sequence of painting.

B. Coordination Meetings: In addition to other meetings specified in this Section, hold coordination meetings with personnel and Subcontractors to ensure coordination of Work.

C. Coordinate completion and clean-up of Work in preparation for Substantial Completion.

D. After Substantial Completion, coordinate access to Site for correction of defective Work and Work not complying with Contract Documents, to minimize disruption of Owner's activities.

1.3 PRECONSTRUCTION MEETING

A. Architect will schedule and preside over meeting after Notice of Award.

B. Attendance Required: Architect, Engineer, Owner, major subcontractors and Contractor.

C. Minimum Agenda:
1. Execution of Owner-Contractor Agreement if not already executed.
2. Submission of executed bonds and insurance certificates.
3. Submission of project directory, schedule of values and Progress Schedule/Work Sequence Plan – if not already distributed.
4. Designation of personnel representing parties in Contract, and Architect.
5. Communication procedures.
6. Procedures and processing of requests for interpretations, field decisions, submittals, substitutions, Applications for Payments, proposal request, Change Orders, and Contract closeout procedures.
7. Scheduling.
8. Critical Work sequencing.

D. Architect: Record minutes and distribute copies to participants prior to next meeting date.

1.4 HAZARDOUS MATERIALS

A. The contractor is hereby advised that it is possible that hazardous materials, including but not limited to asbestos, asbestos products, or other toxic substances may be present in the building. If any workman encounters any material, which he suspects is hazardous or toxic; he shall discontinue work on or near that material and shall immediately advise the Owner.

B. The architect and architect's consultants shall have no responsibility for the discovery, presence, handling, removal or disposal of or exposure of persons to hazardous materials in any form at the project site, including but not limited to asbestos, asbestos products, polychlorinated biphenyl (PCB) or other toxic substances.

C. If the work which is to be performed under this contract interfaces in any way with existing components which contain hazardous materials, it shall be the contractor's responsibility to contact the Owner regarding the proper means and methods to be utilized in dealing with the hazardous materials. It is not the intent of this contract for any hazardous materials to be disturbed, removed or disposed.

D. By execution of the contract for construction, the Contractor hereby agrees to bring no claim for negligence, breach of contract, indemnity or otherwise against the architect, his principals, employees, agents, and consultants if such claim in any way would involve the investigation of or remedial work related to hazardous materials in any form at the project site, including but not limited to asbestos, asbestos products, polychlorinated biphenyl (PCB) or other toxic substances. The contractor further agrees to defend, indemnify, and hold the Architect and his principals, employees, agents and consultant harmless from any such claims related to hazardous material that may be brought by the Contractor's subcontractors, Suppliers or other third parties who may be acting under the direction of the Contractor pursuant to this project.

1.5 PROGRESS MEETINGS

A. Schedule and administer meetings throughout progress of the Work at maximum weekly intervals.

B. Architect will make arrangements for meetings, prepare agenda with copies for participants, and preside over meetings.

C. Attendance Required: Job superintendent, major Subcontractors Contractors and suppliers, Architect, Engineer and Owner representative, as appropriate to agenda topics for each meeting.

D. Minimum Agenda:
   1. Review minutes of previous meetings.
   2. Review of Work progress.
   3. Field observations, problems, and decisions.
   4. Identification of problems impeding planned progress.
   5. Review of submittal schedule and status of submittals.
   6. Review of off-Site fabrication and delivery schedules.
   7. Maintenance of Progress Schedule.
   8. Corrective measures to regain projected schedules.
   9. Planned progress during succeeding work period.
   10. Coordination of projected progress.
   11. Maintenance of quality and work standards.
   12. Effect of proposed changes on Progress Schedule and coordination.
   13. Other business relating to Work.

E. Architect: Record minutes and distribute copies to participants and those affected by decisions in a timely manner and before the next meeting date.

1.6 CLOSEOUT MEETING

A. Schedule Project closeout meeting with sufficient time to prepare for requesting Substantial Completion. Preside over meeting and be responsible for minutes.

B. Attendance Required: Contractor, major Subcontractors, Architect, Engineer, Owner's Representative, and others appropriate to agenda.

C. The Architect will schedule the meeting. The Contractor shall submit written notice not less than three days in advance of desired meeting date.

D. Minimum Agenda:
1. Start-up of facilities and systems.
2. Operations and maintenance manuals.
3. Testing, adjusting, and balancing.
4. System demonstration and observation.
5. Operation and maintenance instructions for Owner's personnel.
6. Contractor's inspection of Work.
7. Contractor's preparation of an initial "punch list."
8. Procedure to request Architect/Engineer inspection to determine date of Substantial Completion.
9. Completion time for correcting deficiencies.
10. Inspections by authorities having jurisdiction.
11. Certificate of Occupancy and transfer of insurance responsibilities.
12. Partial release of retainage.
13. Final cleaning.
14. Preparation for final inspection.
15. Closeout Submittals:
    a. Project record documents.
    b. Operating and maintenance documents.
    c. Operating and maintenance materials.
    d. Affidavits.
16. Final Application for Payment.
17. Contractor's demobilization of Site.
18. Maintenance.

E. Architect will record minutes and distribute to participants and those affected by decisions in a timely manner and not more than two weeks after the meeting.

PART 2 PRODUCTS - Not Used

PART 3 EXECUTION

3.1 ALTERATION PROCEDURES

A. Designated areas of existing facilities will be occupied for normal operations during progress of construction. Cooperate with Owner in scheduling operations to minimize conflict and to permit continuous usage.

1. Perform Work not to interfere with operations of occupied areas.
2. Clean areas daily. Clean spillage, overspray, and heavy collection of dust in Owner-occupied areas immediately.

B. Materials: Match existing products with new products for patching and extending Work.

C. Employ skilled and experienced installer to perform alteration and renovation Work.

D. Prepare surface and remove surface finishes to permit installation of new Work and finishes.

E. Where new Work abuts or aligns with existing Work, provide smooth and even transition. Patch Work to match existing adjacent Work in texture and appearance.

END OF SECTION

SECTION 013300 - SUBMITTAL PROCEDURES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Submittal procedures.

B. Construction progress schedules.

C. Product Data.

D. Electronic CAD Files of Project Drawings

E. Shop Drawings.

F. Samples.

G. Other Submittals.

H. Test Reports

I. Certificates.

J. Manufacturer's Instructions.

K. Manufacturer's Field Reports.

L. Construction photographs.

M. Contractor review.

N. Architect/Engineer review.

1.2 SUBMITTAL PROCEDURES

A. Transmit each submittal with Contractor's standard Cover Letter/Transmittal.

B. Identify Project, Contractor, subcontractor and supplier; pertinent drawing and detail number, and specification section number, appropriate to submittal.

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

D. All submittals shall be made electronically and shall be issued by end of day on Tuesday, October 24, 2017.

E. For each submittal for review, allow 3 days excluding delivery time to and from Contractor.

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

G. Allow space on submittals for Contractor and Architect/Engineer review stamps.

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

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

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

K. Incomplete Submittals: Architect/Engineer will not review. Complete submittals for each item are required. Delays resulting from incomplete submittals are not the responsibility of Architect/Engineer.

1.3 CONSTRUCTION PROGRESS SCHEDULES

A. Submit initial schedules within 3 days after date of Notice of Award of Contract. After review, resubmit required revised data within 3 days.

B. Submit revised Progress Schedules with each Application for Payment.

C. Indicate estimated percentage of completion for each item of Work at each submission.

D. Revisions To Schedules:
1. Indicate progress of each activity to date of submittal, and projected completion date of each activity.
2. Identify activities modified since previous submittal, major changes in scope, and other identifiable changes.
3. Prepare narrative report to define problem areas, anticipated delays, and impact on Schedule. Report corrective action taken, or proposed, and its effect including effect of changes on schedules of separate contractors.

1.4 PRODUCT DATA

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

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

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

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

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

1.5 ELECTRONIC CAD FILES OF PROJECT DRAWINGS

A. Electronic CAD Files of Project Drawings: May only be used to expedite production of Shop Drawings for the Project. Use for other Projects or purposes is not allowed.

B. Electronic CAD Files of Project Drawings: Distributed only under the following conditions:
   1. Use of files is solely at receiver's risk. Architect/Engineer does not warrant accuracy of files. Receiving files in electronic form does not relieve receiver of responsibilities for measurements, dimensions, and quantities set forth in Contract Documents. In the event of ambiguity, discrepancy, or conflict between information on electronic media and that in Contract Documents, notify Architect/Engineer of discrepancy and use information in hard-copy Drawings and Specifications.
   2. CAD files do not necessarily represent the latest Contract Documents, existing conditions, and as-built conditions. Receiver is responsible for determining and complying with these conditions and for incorporating addenda and modifications.
   3. User is responsible for removing information not normally provided on Shop Drawings and removing references to Contract Documents. Shop Drawings submitted with information associated with other trades or with references to Contract Documents will not be reviewed and will be immediately returned.
   4. Receiver shall not hold Architect/Engineer responsible for data or file clean-up required to make files usable, nor for error or malfunction in translation, interpretation, or use of this electronic information.
   5. Receiver shall understand that even though Architect/Engineer has computer virus scanning software to detect presence of computer viruses, there is no guarantee that computer viruses are not present in files or in electronic media.
   6. Receiver shall not hold Architect/Engineer responsible for such viruses or their consequences, and shall hold Architect/Engineer harmless against costs, losses, or damage caused by presence of computer virus in files or media.

1.6 SHOP DRAWINGS

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

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

C. When required by individual Specification Sections, provide Shop Drawings signed and sealed by a professional Engineer responsible for designing components shown on Shop Drawings.
   1. Include signed and sealed calculations to support design.
   2. Submit Shop Drawings and calculations in form suitable for submission to and approval by authorities having jurisdiction.
   3. Make revisions and provide additional information when required by authorities having jurisdiction.

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

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

1.7 SAMPLES

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

B. Samples for Selection as Specified in Product Sections:
   1. Submit to Architect/Engineer for aesthetic, color, and finish selection.
   2. Submit Samples of finishes, textures, and patterns for Architect/Engineer selection.

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

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

E. Submit number of Samples specified in individual Specification Sections; Architect/Engineer will retain one Sample.

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

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

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

1.8 OTHER SUBMITTALS

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

B. Informational Submittal: Submit data for Architect/Engineer's knowledge as Contract administrator or for Owner.

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

1.9 TEST REPORTS

A. Informational Submittal: Submit reports for Architect/Engineer's knowledge as Contract administrator or for Owner.

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

1.10 CERTIFICATES

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

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

C. Certificates may be recent or previous test results on material or product but must be acceptable to Architect/Engineer.

1.11 MANUFACTURER'S INSTRUCTIONS

A. Informational Submittal: Submit manufacturer's installation instructions for Architect/Engineer's knowledge as Contract administrator or for Owner.

B. Submit printed instructions for delivery, storage, assembly, installation, startup, adjusting, and finishing, to Architect/Engineer in quantities specified for Product Data.

C. Indicate special procedures, perimeter conditions requiring special attention, and special environmental criteria required for application or installation.

1.12 MANUFACTURER'S FIELD REPORTS

A. Informational Submittal: Submit reports for Architect/Engineer's knowledge as Contract administrator or for Owner.

B. Submit report within 48 hours of observation to Architect/Engineer for information.

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

1.13 CONSTRUCTION PHOTOGRAPHS

A. When requested by the Architect/Engineer provide photographs of conditions that will become concealed prior to observation by Architect/Engineer and/or to convey specific conditions requiring Architect/Engineer consultation

B. Digital Images: Deliver digital image electronic files via e-mail.
   1. Digital Images: Uncompressed jpeg format that do not exceed 2 MB per image.

1.14 CONTRACTOR REVIEW

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

B. Contractor: Responsible for:
   1. Determination and verification of materials including manufacturer's catalog numbers.
   2. Determination and verification of field measurements and field construction criteria.
   3. Checking and coordinating information in submittal with requirements of Work and of Contract Documents.
   4. Determination of accuracy and completeness of dimensions and quantities.
   5. Confirmation and coordination of dimensions and field conditions at Site.
   6. Construction means, techniques, sequences, and procedures.
   7. Safety precautions.
   8. Coordination and performance of Work of all trades.

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

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

1.15 ARCHITECT/ENGINEER REVIEW

A. Informational submittals and other similar data are for Architect/Engineer's information, do not require Architect/Engineer's responsive action, and will not be reviewed or returned with comment.

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

C. Submittal approval does not authorize changes to Contract requirements unless accompanied by Change Order, or Architect's Supplemental Instruction.

PART 2 PRODUCTS - Not Used

PART 3 EXECUTION - Not Used

END OF SECTION

SECTION 014000 - QUALITY REQUIREMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Quality control.

B. Tolerances.

C. References.

D. Examination

E. Preparation

1.2 QUALITY CONTROL

A. Monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce Work of specified quality.

B. Comply with manufacturers' instructions, including each step-in sequence.

C. When manufacturers' instructions conflict with Contract Documents, request clarification from Owner before proceeding.

D. Comply with specified standards as minimum quality for the Work except where more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.

E. Perform Work by persons qualified to produce required and specified quality.

F. Supervise performance of Work in such manner and by such means to ensure that Work, whether completed or in progress, will not be subjected to harmful, dangerous, damaging, or otherwise deleterious exposure during construction period.

1.3 TOLERANCES

A. Monitor fabrication and installation tolerance control of products to produce acceptable Work. Do not permit tolerances to accumulate.

B. Comply with manufacturers' tolerances. When manufacturers' tolerances conflict with Contract Documents, request clarification from Architect/Engineer before proceeding.

C. Adjust products to appropriate dimensions; position before securing products in place.

1.4 REFERENCES

A. For products or workmanship specified by association, trade, or other consensus standards, comply with requirements of standard, except when more rigid requirements are specified or are required by applicable codes.

B. Conform to reference standard by date of issue current on date of Contract Documents, except where specific date is established by code.

C. Obtain copies of standards where required by product specification sections.

D. When specified reference standards conflict with Contract Documents, request clarification from Owner before proceeding.

E. Neither contractual relationships, duties, nor responsibilities of parties in Contract nor those of Owner shall be altered from Contract Documents by mention or inference otherwise in reference documents.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify existing site conditions and substrate surfaces are acceptable for subsequent Work. Beginning new Work means acceptance of existing conditions.

B. Verify existing substrate is capable of structural support or attachment of new Work being applied or attached.

C. Examine and verify specific conditions described in individual specification sections.

D. Verify utility services are available, of correct characteristics, and in correct locations.

3.2 PREPARATION

A. Clean substrate surfaces prior to applying next material or substance.

B. Seal cracks or openings of substrate prior to applying next material or substance.

C. Apply manufacturer required or recommended substrate primer, sealer, or conditioner prior to applying new material or substance in contact or bond.

END OF SECTION

SECTION 015000 - TEMPORARY FACILITIES AND CONTROLS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Temporary Utilities:
   1. Temporary electricity.
   2. Temporary lighting for construction purposes.
   3. Temporary heating
   4. Temporary cooling.
   5. Temporary ventilation.
   6. Communication services.
   7. Temporary water service.
   8. Temporary sanitary facilities.

B. Construction Facilities:
   1. Field Offices & sheds
   2. Vehicular access.
   3. Parking.
   4. Progress cleaning and waste removal.
   5. Fire-prevention facilities.
   6. Worker Conduct & Quality Assurance

C. Temporary Controls:
   1. Barriers.
   2. Enclosures and fencing.
   3. Security.
   4. Water Control.
   5. Dust control.
   6. Erosion & Sediment Control
   7. Noise control.
   8. Pest and rodent control.
   9. Pollution control.

D. Removal of utilities, facilities, and controls.

1.2 REFERENCES

A. ASTM International:
   1. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
   2. ASTM E 90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements.
   3. ASTM E 119 - Standard Test Methods for Fire Tests of Building Construction and Materials.

B. Temporary Provisions Provided by the Contractor:
   1. Temporary barriers and barricades.
   2. Cleaning during construction.
   3. Temporary sanitary facilities.

C. Coordinate and provide the following items as necessary for execution of the Work including associated costs:
   1. Construction aids.

2. Temporary fire protection, dust control, erosion and sediment control, water control, noise control, and other necessary temporary controls.
3. Temporary barriers, barricades, and similar devices as necessary for safety and protection of construction personnel and public.
4. Temporary tree and plant protection.
5. Temporary provisions for protection of installed Work.

1.3 TEMPORARY ELECTRICITY

A. Provide & pay for power service required from utility source as needed for construction operation.

B. Provide temporary electric feeder from electrical service. Do not disrupt Owner's use of service.

C. Provide power outlets with branch wiring and distribution boxes located as required for construction operations. Provide suitable, flexible power cords as required for portable construction tools and equipment.

D. Provide main service disconnect and overcurrent protection at convenient location.

E. Permanent convenience receptacles shall not be used during construction.

1.4 TEMPORARY LIGHTING FOR CONSTRUCTION PURPOSES

A. Provide and maintain lighting for construction operations.

B. Provide and maintain 1 watt/sq ft lighting to exterior staging and storage areas after dark for security purposes.

C. Provide and maintain 0.25 watt/sq ft HID lighting to interior work areas after dark for security purposes.

D. Provide branch wiring from power source to distribution boxes with lighting conductors, pigtails, lamps, and the like, for specified lighting levels.

E. Maintain lighting and provide routine repairs.

F. Permanent building lighting may be used during construction.

1.5 TEMPORARY HEATING

A. Provide and pay for heating devices and heat as needed to maintain specified conditions for construction operations.

B. Before operating permanent equipment for temporary heating purposes, verify installation is approved for operation, equipment is lubricated, and filters are in place. Provide and pay for replacement of filters and worn or consumed parts. Replace filters at Substantial Completion.

C. Maintain minimum ambient temperature of 50 degrees F in areas where construction is in progress unless indicated otherwise in individual product Sections.

1.6 TEMPORARY COOLING

A. Existing cooling systems shall not be used during construction.

B. Provide and pay for cooling devices and cooling as needed to maintain specified conditions for construction operations.

C. Before operating permanent equipment for temporary cooling purposes, verify installation is approved for operation, equipment is lubricated, and filters are in place. Provide and pay for maintenance, and regular replacement of filters and worn or consumed parts. Replace filters at Substantial Completion.

D. Maintain maximum ambient temperature of 80 degrees F in areas where construction is in progress unless indicated otherwise in individual product Sections.

1.7 TEMPORARY VENTILATION

A. Ventilate enclosed areas to achieve curing of materials, to dissipate humidity, and to prevent accumulation of dust, fumes, vapors, or gases.

1.8 COMMUNICATION SERVICES

A. Telephone Service: Provide telecommunication services to the site and site foreman at all times. Use of cellular phones is acceptable.

B. Facsimile Service: not required.

C. Internet Service: Provide and maintain broadband internet service to contractor's home office at all times.

1.9 TEMPORARY WATER SERVICE

A. Owner will pay cost of temporary water. Exercise measures to conserve energy. Use Owner's existing water system, extended and supplemented with temporary devices as needed to maintain specified conditions for construction operations.

1.10 TEMPORARY SANITARY FACILITIES

A. Provide and maintain required facilities and enclosures. Existing facility use is not permitted. Provide facilities at time of Project mobilization.

1.11 FIELD OFFICES AND SHEDS

A. Office: Weather tight, with lighting, electrical outlets, heating, cooling and ventilating equipment, and equipped with sturdy furniture.

B. Provide space for Project meetings, with table and chairs to accommodate 15 persons.

C. Locate offices and sheds minimum distance of 30 feet from existing structures.

D. Do not use permanent facilities for field offices or for storage.

E. Construction: Portable or mobile buildings, or buildings constructed with floors raised above ground, securely fixed to foundations with steps and landings at entrance doors.
   1. Construction: Structurally sound, secure, weather tight enclosures for office and storage spaces. Maintain during progress of Work; remove at completion of Work.
   2. Temperature Transmission Resistance of Floors, Walls, and Ceilings: Compatible with occupancy and storage requirements.
   3. Exterior Materials: Weather resistant.

4. Lighting for Offices: 50 ft C at desk top height, exterior lighting at entrance doors.
5. Fire Extinguishers: Appropriate type fire extinguisher at each office and each storage area.
6. Interior Materials in Storage Sheds: As required to provide specified conditions for storage of products.

F. Environmental Control:
1. Heating, Cooling, and Ventilating for Offices: Automatic equipment to maintain comfort conditions.
2. Storage Spaces: Heating and ventilation as needed to maintain products in accordance with Contract Documents; lighting for maintenance and inspection of products.

G. Storage Areas And Sheds: Size to storage requirements for products of individual Sections, allowing for access and orderly provision for maintenance and for inspection of products to requirements of Section 016000.

H. Preparation: Fill and grade sites for temporary structures sloped for drainage away from buildings.

I. Installation:
1. Install office spaces ready for occupancy 15 days after date fixed in Notice to Proceed.

J. Maintenance And Cleaning:
1. Weekly janitorial services for offices; periodic cleaning and maintenance for office and storage areas.
2. Maintain approach walks free of mud, water, and snow.

1.12 VEHICULAR ACCESS

A. Utilize existing paved surfaces for access to the site. Do not block drives or other vehicular access ways. Maintain drives unobstructed and for Owners continuous use.

B. Provide unimpeded access for emergency vehicles. Maintain 20 foot-wide driveways with turning space between and around combustible materials.

C. Provide and maintain access to fire hydrants and control valves free of obstructions.

D. Provide means of removing mud from vehicle wheels before entering streets.

E. Use designated existing on-Site roads for construction traffic.

1.13 PARKING

A. Parking areas will be defined at the Pre-Construction meeting.

B. Use of existing on-site streets and driveways used for light weight construction traffic is permitted. Tracked vehicles not allowed on paved areas.

C. Parking facilities located outside of the Construction limits shall not be utilized by construction personnel.

D. Do not allow heavy vehicles or construction equipment in parking areas.

E. Maintenance:
1. Maintain traffic and parking areas in sound condition free of excavated material, construction equipment , products, mud, snow, and ice.

2. Maintain existing and permanent paved areas used for construction; promptly repair breaks, potholes, low areas, standing water, and other deficiencies, to maintain paving and drainage in original, or specified, condition.

F. Repair:
1. Repair existing facilities damaged by use, to "like new" condition.

G. Mud From Site Vehicles: Provide means of removing mud from vehicle wheels before entering streets; set up wheel wash stations with provisions for drainage if necessary.

1.14 PROGRESS CLEANING AND WASTE REMOVAL

A. Maintain areas free of waste materials, debris, and rubbish. Maintain site in clean and orderly condition.

B. Remove debris and rubbish from pipe chases, plenums, attics, crawl spaces, and other closed or remote spaces, prior to enclosing spaces.

C. Broom and vacuum clean interior areas prior to start of surface finishing, and continue cleaning to eliminate dust.

D. Clean site daily. Collect and remove waste materials, debris, and rubbish from site weekly and dispose off-site.

1.15 FIRE-PREVENTION FACILITIES

A. Prohibit the use of any/all tobacco products, including smoking of any substance on Owner's Property.

B. Establish fire watch for cutting, welding, and other hazardous operations capable of starting fires. Maintain fire watch before, during, and after hazardous operations until threat of fire does not exist.

C. Portable Fire Extinguishers: NFPA 10; 10-pound capacity, 4A-60B: C UL rating.
1. Provide fire extinguisher on site and inside contractor's office.

1.16 WORKER CONDUCT & QUALITY ASSURANCE

A. Workers shall be fully clothed at all times including shirts, full length pants, and shoes.

B. Use and/or the presence of alcohol, tobacco products, drugs and/or firearms is strictly prohibited.

C. Workers shall not socialize with staff of students.

D. The Contractor shall prevent any worker convicted of a felony sex crime from performing work at the site.

E. The Contractor shall prevent any worker from performing work on the site until certification has been provided by the KY Cabinet of Health & Family Services stating there are no findings of substantiated child abuse or neglect on record. (KRS 160.380)
1. Applications shall be filed with the KARES Helpdesk. A copy of the application is included at the end of this specification section.
2. Applications shall be filed for all workers, including subcontractors, upon notice of contract award.
3. The cost is $10.00/applicant.

4. For Additional information contact:
   KARES Helpdesk
   National Background Check Program
   Phone: (502) 564-2159
   Fax: (502) 564-6546
   KARES.Helpdesk@ky.gov
   https://chfs.ky.gov/agencies/os/oig/Pages/kares-public.aspx

1.17 BARRIERS

A. Provide barriers to prevent unauthorized entry to construction areas to allow for Owner's use of site, and to protect existing facilities and adjacent properties from damage from construction operations and demolition and as specified on the site drawings.

B. Provide barricades required by authorities having jurisdiction for public rights-of-way.

C. Provide protection for plants designated to remain. Replace damaged plants.

D. Protect non-owned vehicular traffic, stored materials, site, and structures from damage.

1.18 ENCLOSURES AND FENCING

A. Construction: Height and material as appropriate to fully define separation of construction and Owner-occupied zones during the work.

B. Exterior Enclosures:
   1. Provide temporary weather tight closure of exterior openings to accommodate acceptable working conditions and protection for products, to allow for maintenance of required ambient temperatures and to prevent entry of unauthorized persons.

C. Interior Enclosures:
   1. Provide temporary barriers and protective coverings as necessary to separate work areas from Owner occupied areas, to prevent penetration of dust and moisture into Owner occupied areas, and to prevent damage to existing materials and equipment.

1.19 SECURITY

A. Security Program:
   1. Protect Work on existing premises and Owner's operations from theft, vandalism, and unauthorized entry.
   2. Initiate program in coordination with Owner's existing security system at project mobilization.
   3. Maintain program throughout construction period until Owner acceptance precludes need for Contractor security.

B. Entry Control:
   1. Restrict entrance of persons and vehicles into Project site and existing facilities.
   2. Allow entrance only to authorized persons.
   3. Maintain log of workers and visitors, make available to Owner on request.
   4. Coordinate access of Owner's personnel to site in coordination with Owner's security forces.

1.20 WATER CONTROL

A. Protect Site from puddles or running water. Provide temporary drainage devices as appropriate.

1.21 DUST CONTROL

A. Execute Work by methods to minimize raising dust from construction operations.

B. Provide positive means to prevent air-borne dust from dispersing into atmosphere.

1.22 EROSION & SEDIMENT CONTROL

A. Plan and execute construction by methods to control surface drainage from cuts and fills from borrow and waste disposal areas. Prevent erosion and sedimentation.

B. Minimize surface area of bare soil exposed at one time.

C. Provide temporary measures including berms, dikes, drains, and other devices to prevent water flow.

D. Construct fill and waste areas by selective placement to avoid erosive surface silts and clays.

E. Periodically inspect earthwork to detect evidence of erosion and sedimentation. Promptly apply corrective measures.

F. Comply with sediment and erosion control requirements included in the site drawings and specification section 312001 Storm Water Pollution Prevention Plan.

1.23 NOISE CONTROL

A. Provide methods, means, and facilities to minimize noise produced by construction operations.

B. Refrain from use of radios, power actuated and pneumatic tools, sawing, hammering and other noisy activities to the greatest degree possible to accommodate Owner occupancy during the work.

1.24 PEST CONTROL

A. Provide methods, means, and facilities to prevent pests and insects from entering facility.

1.25 POLLUTION CONTROL

A. Provide methods, means, and facilities to prevent contamination of soil, water, and atmosphere from discharge of noxious, toxic substances, and pollutants produced by construction operations.

B. Comply with pollution and environmental control requirements of authorities having jurisdiction.

1.26 RODENT CONTROL

A. Provide methods, means, and facilities to prevent rodents from accessing or invading premises.

1.27 REMOVAL OF UTILITIES, FACILITIES, AND CONTROLS

A. Remove temporary utilities, equipment, facilities, materials, prior to Substantial Completion inspection.

B. Remove underground installations to minimum depth of 2 feet. Grade site as indicated on Drawings.

C. Clean and repair damage caused by installation or use of temporary work.

D. Restore existing and permanent facilities used during construction to “like new” condition.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

END OF SECTION

SECTION 016000 - PRODUCT REQUIREMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Products.

B. Product delivery requirements.

C. Product storage and handling requirements.

D. Product options.

1.2 PRODUCTS

A. At minimum, comply with specified requirements and reference standards.

B. Specified products define standard of quality, type, function, dimension, appearance, and performance required.

C. Furnish products of qualified manufacturers that are suitable for intended use. Furnish products of each type by single manufacturer unless specified otherwise. Confirm that manufacturer's production capacity can provide sufficient product, on time, to meet Project requirements.

1.3 PRODUCT DELIVERY REQUIREMENTS

A. Transport and handle products according to manufacturer's instructions.

B. Promptly inspect shipments to ensure products comply with requirements, quantities are correct, and products are undamaged.

C. Provide equipment and personnel to handle products; use methods to prevent soiling, disfigurement, or damage.

1.4 PRODUCT STORAGE AND HANDLING REQUIREMENTS

A. Store and protect products according to manufacturer's instructions.

B. Store products with seals and labels intact and legible.

C. Store sensitive products in weathertight, climate-controlled enclosures in an environment suitable to product.

1.5 PRODUCT OPTIONS

A. Except where substitutions are specifically identified as “not permitted”, manufactured products, devices or materials specified under particular brand names or name of manufacturer shall not be construed to mean that these are closed specifications, whether the clause “or equal” is included or not. Other products comparable in type, quality, utility

and price are acceptable if approved by the Architect and the Owner. The burden of proof of quality shall, in all cases, rest with the Contractor. The Owner shall be the final judge of parallel equality and reserves the right to require that the product or material specified by name be furnished at no increase in contract amount. If the materials listed within the proposal form are accepted by the Owner, then no deviations from those listings will be permitted except at the discretion of the Owner in the interest of expediting construction or overall standardization.

1.6 PRODUCT SUBSTITUTION PROCEDURES

A. All requests for Substitutions must be submitted a minimum of 7 days prior to Bid Date.

B. Document each request with complete data substantiating compliance of proposed Substitution with Contract Documents.

C. A request constitutes a representation that Bidder:
1. Has investigated proposed product and determined that it meets or exceeds quality level of specified product.
2. Will provide same warranty for Substitution as for specified product.
3. Will coordinate installation and make changes to other Work, which may be required for the Work to be complete with no additional cost to Owner.
4. Waives claims for additional costs or time extension, which may subsequently become apparent.
5. Will reimburse Owner and Architect/Engineer for review or redesign services associated with re-approval by authorities having jurisdiction.

D. Substitutions will not be considered when they are indicated or implied on Shop Drawing or Product Data submittals, without separate written request prior to Bid Date, or when acceptance will require revision to Contract Documents.

E. Substitution Submittal Procedure –
1. Submit three copies of request for Substitution for consideration. Limit each request to one proposed Substitution.
2. Complete the attached form and use as a "Cover Sheet". Additionally, submit Product Data, and certified test results attesting to proposed product equivalence. Burden of proof is on proposer.
3. The owner shall be the final judge of parallel quality and reserves the right to require that the product or material specified by name be furnished at no increase to the contract.
4. Architect/Engineer will notify Contractor in writing of decision to accept or reject request.

PART 2 PRODUCTS – not used

PART 3 EXECUTION

A. Substitution Form as follows:

KENTUCKY DEPARTMENT OF EDUCATION
DIVISION OF FACILITIES MANAGEMENT

CERTIFICATE OF PRODUCT COMPLIANCE
FOR PROPOSED SUBSTITUTED PROJECTS
702 KAR 4:160
MAY 1993

TO: _____

_____

_____

I, _____, being a duly authorized representative of
(name)

_____ the manufacturer, and/or
(company name)

distributor and/or sales representative of _____,
(product name)

do hereby certify that the above named product complies in strict accordance with the Contract Documents for the construction of _____ located in
(project name)

_____, and that the product is compatible
(project address)

and fit for the intended use and incorporation into this project.

Further, I understand that the Architect and Owner may rely on this certification.

_____

(Signed)

_____

(Date)

Attached is supporting information.

END OF SECTION

SECTION 017000 - EXECUTION AND CLOSEOUT REQUIREMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Closeout procedures.

B. Starting of systems.

C. Demonstration and instructions.

D. Testing, Adjusting, And Balancing

E. Project Record Documents

F. Operation and maintenance data.

G. Manual for Equipment and Systems

H. Spare parts and maintenance products.

I. Product warranties and product bonds.

J. Examination.

K. Preparation.

L. Execution.

M. Cutting and patching.

N. Protecting installed construction.

O. Final cleaning.

1.2 CLOSEOUT PROCEDURES

A. Prerequisites to Substantial Completion: Complete following items before requesting Certification of Substantial Completion, either for entire Work or for portions of Work:
   1. Submit maintenance manuals, Project record documents, and other similar final record data in compliance with this Section.
   2. Conduct inspection to establish basis for request that Work is substantially complete. Create comprehensive list (initial punch list) indicating items to be completed or corrected, value of incomplete or nonconforming Work, reason for being incomplete, and date of anticipated completion for each item. Include copy of list with request for Certificate of Substantial Completion.
   3. Discontinue or change over and remove temporary facilities and services from Project Site, along with construction tools, and similar elements.
   4. Perform final cleaning according to this Section.

B. Substantial Completion Inspection:
   1. When Contractor considers Work to be substantially complete, submit to Architect/Engineer:
      a. Written certificate that Work, or designated portion, is substantially complete.
      b. List of items to be completed or corrected (initial punch list).
   2. Within seven days after receipt of request for Substantial Completion, Architect/Engineer will make inspection to determine whether Work or designated portion is substantially complete.
   3. Should Architect/Engineer determine that Work is not substantially complete:
      a. Architect/Engineer will promptly notify Contractor in writing, stating reasons for its opinion.
      b. Contractor shall remedy deficiencies in Work and send second written request for Substantial Completion to Architect/Engineer.
      c. Architect/Engineer will reinspect Work.
      d. Redo and Inspection of Deficient Work: Repeated until Work passes Architect/Engineer's inspection.
   4. When Architect/Engineer finds that Work is substantially complete, Architect/Engineer will:
      a. Prepare Certificate of Substantial Completion on AIA G704 - Certificate of Substantial Completion, accompanied by Contractor's list of items to be completed or corrected as verified and amended by Architect/Engineer and Owner (final punch list).
      b. Submit Certificate to Owner and Contractor for their written acceptance of responsibilities assigned to them in Certificate.
   5. After Work is substantially complete, Contractor shall:
      a. Allow Owner occupancy of Project under provisions stated in Certificate of Substantial Completion.
      b. Complete Work listed for completion or correction within time period stipulated.
   6. Owner will occupy all portions of building as specified in Section 01 10 00 - Summary.

C. Prerequisites for Final Completion: Complete following items before requesting final acceptance and final payment.
   1. When Contractor considers Work to be complete, submit written certification that:
      a. Contract Documents have been reviewed.
      b. Work has been examined for compliance with Contract Documents.
      c. Work has been completed according to Contract Documents.
      d. Work is completed and ready for final inspection.
   2. Submittals: Submit following:
      a. Final punch list indicating all items have been completed or corrected.
      b. Final payment request with final releases and supporting documentation not previously submitted and accepted. Include certificates of insurance for products and completed operations where required.
      c. Specified warranties, workmanship/maintenance bonds, maintenance agreements, and other similar documents.
      d. Accounting statement for final changes to Contract Sum.
      e. Contractor's affidavit of payment of debts and claims on AIA G706 - Contractor's Affidavit of Payment of Debts and Claims.
      f. Contractor affidavit of release of liens on AIA G706A - Contractor's Affidavit of Release of Liens.
      g. Consent of surety to final payment on AIA G707 - Consent of Surety to Final Payment Form.
   3. Perform final cleaning for Contractor-soiled areas according to this Section.

D. Final Completion Inspection:
   1. Within seven days after receipt of request for final inspection, Architect/Engineer will make inspection to determine whether Work or designated portion is complete.
   2. Should Architect/Engineer consider Work to be incomplete or defective:

a. Architect/Engineer will promptly notify Contractor in writing, listing incomplete or defective Work.
b. Contractor shall remedy stated deficiencies and send second written request to Architect/Engineer that Work is complete.
c. Architect/Engineer will reinspect Work.
d. Redo and Inspection of Deficient Work: Repeated until Work passes Architect/Engineer's inspection.

1.3 STARTING OF SYSTEMS

A. Coordinate schedule for startup of emergency generator.

B. Notify Architect/Engineer seven days prior to startup of generator.

C. Verify that each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, control sequence, and for conditions which may cause damage.

D. Verify that tests, meter readings, and electrical characteristics agree with those required by equipment or system manufacturer.

E. Verify that wiring and support components for equipment are complete and tested.

F. Execute startup under supervision of manufacturer's representative or Contractors' personnel according to manufacturer's instructions.

G. When specified in individual Specification Sections, require manufacturer to provide authorized representative who will be present at Site to inspect, check, and approve equipment or system installation prior to startup and will supervise placing equipment or system in operation.

H. Submit a written report according to Section 013300 - Submittal Procedures that equipment or system has been properly installed and is functioning correctly.

1.4 DEMONSTRATION AND INSTRUCTIONS

A. Demonstrate operation and maintenance of products to Owner's personnel one week prior to date of Substantial Completion.

B. Demonstrate Project equipment by qualified representative who is knowledgeable about the Project.

C. Use operation and maintenance manuals as basis for instruction. Review contents of manual with Owner's personnel in detail to explain all aspects of operation and maintenance.

D. Demonstrate startup, operation, control, adjustment, troubleshooting, servicing, maintenance, and shutdown of each item of equipment at agreed time and location.

E. Prepare and insert additional data in operations and maintenance manuals when need for additional data becomes apparent during instruction.

F. Required instruction time for each item of equipment and system is specified in individual Specification Sections.

1.5 TESTING, ADJUSTING, AND BALANCING

A. Testing, adjusting and balancing of HVAC systems shall be performed in compliance with requirements enumerated in specification section 203100 Testing.

B. Reports will be submitted by independent firm to Architect/Engineer indicating observations and results of tests and indicating compliance or noncompliance with requirements of Contract Documents.

1.6 PROJECT RECORD DOCUMENTS

A. Maintain on Site one set of the following record documents; record actual revisions to the Work:
1. Drawings.
2. Specifications.
3. Addenda.
4. Change Orders and other modifications to the Contract.
5. Reviewed Shop Drawings, product data, and Samples.
6. Manufacturer's instruction for assembly, installation, and adjusting.

B. Ensure entries are complete and accurate, enabling future reference by Owner.

C. Store record documents separate from documents used for construction.

D. Record information concurrent with construction progress, not less than weekly.

E. Specifications: Legibly mark and record, at each product Section, description of actual products installed, including the following:
1. Manufacturer's name and product model and number.
2. Product substitutions or alternates used.
3. Changes made by Addenda and modifications.

F. Record Drawings and Shop Drawings: Legibly mark each item to record actual construction as follows:
1. Include Contract modifications such as Addenda, supplementary instructions, change directives, field orders, minor changes in the Work, and change orders.
2. Include locations of concealed elements of the Work.
3. Identify depth of buried utility lines and provide dimensions showing distances from permanent facility components that are parallel to utilities.
4. Dimension ends, corners, and junctions of buried utilities to permanent facility components using triangulation.
5. Identify and locate existing buried or concealed items encountered during Project.
6. Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
7. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the Work.
8. Field changes of dimension and detail.
9. Details not on original Drawings.

G. Submit marked-up paper copy documents to Architect/Engineer before Substantial Completion with claim for final Application for Payment.

1.7 OPERATION AND MAINTENANCE DATA

A. Submit data in PDF composite electronic indexed file.

B. Contents: Prepare table of contents with each product or system description identified, typed on white paper, in three parts as follows:
   1. Part 1: Directory, listing names, addresses, and telephone numbers of Architect/Engineer, Contractor, Subcontractors, and major equipment suppliers.
   2. Part 2: Operation and maintenance instructions, arranged by Specification Section. For each category, identify names, addresses, and telephone numbers of Subcontractors and suppliers. Include the following:
      a. Significant design criteria.
      b. Maintenance instructions for new work
   3. Part 3: Project documents and certificates, including the following:
      a. Shop Drawings and product data.
      b. Certificates.
      c. Originals of warranties.

1.8 MANUAL FOR EQUIPMENT AND SYSTEMS

A. Submit preliminary draft or proposed formats and outlines of contents before start of Work. Architect/Engineer will review draft and return one copy with comments.

B. For equipment, or component parts of equipment put into service during construction and operated by Owner, submit documents within ten days after acceptance.

C. Submit before Substantial Completion. Draft copy will be reviewed and returned after Substantial Completion, with Architect/Engineer comments. Revise content of document sets as required prior to final submission.

D. Submit in PDF composite electronic indexed file of final manual within seven days after final inspection.

E. Each Item of Equipment and Each System: Include description of unit or system and component parts. Identify function, normal operating characteristics, and limiting conditions. Include performance curves, with engineering data and tests, and complete nomenclature and model number of replaceable parts.

F. Panelboard Circuit Directories: Provide electrical service characteristics, controls, and communications; typed.

G. Include color-coded wiring diagrams as installed.

H. Operating Procedures: Include startup, break-in, and routine normal operating instructions and sequences. Include regulation, control, stopping, shutdown, and emergency instructions. Include summer, winter, and special operating instructions.

I. Maintenance Requirements: Include routine procedures and guide for preventative maintenance and troubleshooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.

J. Include servicing and lubrication schedule and list of lubricants required.

K. Include manufacturer's printed operation and maintenance instructions.

L. Include sequence of operation by controls manufacturer.

M. Include original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.

N. Include control diagrams by controls manufacturer as installed.

O. Include Contractor's coordination drawings with color-coded piping diagrams as installed.

P. Include charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.

Q. Include list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.

R. Additional Requirements: As specified in individual product Specification Sections.

S. Include listing in table of contents for design data with tabbed dividers and space for insertion of data.

1.9 SPARE PARTS AND MAINTENANCE PRODUCTS

A. Furnish spare parts, maintenance, and extra products in quantities specified in individual Specification Sections.

B. Deliver to Project Site and place in location as directed by Owner; obtain receipt prior to final payment.

1.10 PRODUCT WARRANTIES AND PRODUCT BONDS

A. Obtain warranties and bonds executed in duplicate by responsible Subcontractors, suppliers, and manufacturers within ten days after completion of applicable item of Work.

B. Execute and assemble transferable warranty documents and bonds from Subcontractors, suppliers, and manufacturers.

C. Verify documents are in proper form, contain full information, and are notarized.

D. Co-execute submittals when required.

E. Include table of contents and assemble in three D side ring binder with durable plastic cover.

F. Submit prior to final Application for Payment.

G. Time of Submittals:
   1. For equipment or component parts of equipment put into service during construction with Owner's permission, submit documents within ten days after acceptance.
   2. Make other submittals within ten days after date of Substantial Completion, prior to final Application for Payment.

3. For items of Work for which acceptance is delayed beyond Substantial Completion, submit within ten days after acceptance, listing date of acceptance as beginning of warranty or bond period.

PART 2 PRODUCTS - Not Used

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that existing Site conditions and substrate surfaces are acceptable for subsequent Work. Beginning new Work means acceptance of existing conditions.

B. Verify that existing substrate is capable of structural support or attachment of new Work being applied or attached.

C. Examine and verify specific conditions described in individual Specification Sections.

D. Verify that utility services are available with correct characteristics and in correct locations.

3.2 PREPARATION

A. Clean substrate surfaces prior to applying next material or substance according to manufacturer's instructions.

B. Seal cracks or openings of substrate prior to applying next material or substance.

C. Apply manufacturer-required or -recommended substrate primer, sealer, or conditioner prior to applying new material or substance in contact or bond.

3.3 EXECUTION

A. Comply with manufacturer's installation instructions, performing each step in sequence. Maintain one set of manufacturer's installation instructions at Project Site during installation and until completion of construction.

B. When manufacturer's installation instructions conflict with Contract Documents, request clarification from Architect/Engineer before proceeding.

C. Verify that field measurements are as indicated on approved Shop Drawings or as instructed by manufacturer.

D. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, or disfigurement.
   1. Secure Work true to line and level and within specified tolerances, or if not specified, industry-recognized tolerances.
   2. Physically separate products in place, provide electrical insulation, or provide protective coatings to prevent galvanic action or corrosion between dissimilar metals.
   3. Exposed Joints: Provide uniform joint width and arrange to obtain best visual effect. Refer questionable visual-effect choices to Architect/Engineer for final decision.

E. Allow for expansion of materials and building movement.

F. Climatic Conditions and Project Status: Install each unit of Work under conditions to ensure best possible results in coordination with entire Project.
   1. Isolate each unit of Work from incompatible Work as necessary to prevent deterioration.
   2. Coordinate enclosure of Work with required inspections and tests to minimize necessity of uncovering Work for those purposes.

G. Mounting Heights: Where not indicated, mount individual units of Work at industry recognized standard mounting heights for particular application indicated.
   1. Refer questionable mounting heights choices to Architect/Engineer for final decision.
   2. Elements Identified as Accessible to Handicapped: Comply with applicable codes and regulations.

H. Adjust operating products and equipment to ensure smooth and unhindered operation.

I. Clean and perform maintenance on installed Work as frequently as necessary through remainder of construction period. Lubricate operable components as recommended by manufacturer.

3.4 CUTTING AND PATCHING

A. Employ skilled and experienced installers to perform cutting and patching.

B. Submit written request in advance of cutting or altering elements affecting:
   1. Structural integrity of element.
   2. Integrity of weather-exposed or moisture-resistant elements.
   3. Efficiency, maintenance, or safety of element.
   4. Visual qualities of sight-exposed elements.
   5. Work of Owner or separate contractor.

C. Execute cutting, fitting, and patching including excavation and fill to complete Work and to:
   1. Fit the several parts together, to integrate with other Work.
   2. Uncover Work to install or correct ill-timed Work.
   3. Remove and replace defective and nonconforming Work.
   4. Remove samples of installed Work for testing.
   5. Provide openings in elements of Work for penetrations of mechanical and electrical Work.

D. Execute Work by methods to avoid damage to other Work and to provide proper surfaces to receive patching and finishing.

E. Cut masonry and concrete materials using masonry saw or core drill.

F. Restore Work with new products according to requirements of Contract Documents.

G. Refinish surfaces to match adjacent finishes. For continuous surfaces, refinish to nearest intersection; for assembly, refinish entire unit.

3.5 PROTECTING INSTALLED CONSTRUCTION

A. Protect installed Work and provide special protection where specified in individual Specification Sections.

B. Provide temporary and removable protection for installed products. Control activity in immediate Work area to prevent damage.

C. Provide protective coverings at walls, projections, jambs, sills, and soffits of openings.

D. Use durable sheet materials to protect finished floors, stairs, and other surfaces from traffic, dirt, wear, damage, or movement of heavy objects.

E. Prohibit traffic or storage upon waterproofed or roofed surfaces. When traffic or activity is necessary, obtain recommendations for protection from waterproofing or roofing material manufacturer.

F. Prohibit traffic from landscaped areas.

3.6 FINAL CLEANING

A. Execute final cleaning prior to final Project assessment.

B. Clean Site; sweep paved areas, rake clean landscaped surfaces.

C. Remove waste and surplus materials, rubbish, and construction facilities from Site.

END OF SECTION

SECTION 024119 - SELECTIVE BUILDING DEMOLITION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Demolishing designated building equipment and fixtures.
2. Demolishing designated construction.
3. Cutting and alterations for completion of the Work.
4. Removing designated items for reuse and Owner's retention.
5. Protecting items designated to remain.
6. Removing demolished materials.

B. Related Sections:

1. Section 011000 – Summary: Project Description, Owner's occupancy of building during construction, and phasing requirements of the work.
2. Section 015000 – Temporary Facilities and Controls: Barriers and Enclosures, cleaning and waste removal.
3. Divisions 20-25 – Mechanical: demolition requirements for mechanical work
4. Divisions 26-28 – Electrical: demolition requirements for electrical work.
5. Divisions 31-33 – Site: demolition requirements for site work.

1.2 CLOSEOUT SUBMITTALS

A. Section 017000 - Execution and Closeout Requirements: Requirements for submittals.

B. Project Record Documents: Accurately record actual locations of capped utilities, concealed utilities discovered during demolition, and subsurface obstructions.

1.3 QUALITY ASSURANCE

A. Conform to all applicable codes for demolition work, dust control, products requiring electrical disconnection and re-connection.

B. Conform to all applicable codes and Section 013000 for procedures when hazardous or contaminated materials are discovered.

C. Obtain required permits from authorities having jurisdiction.

1.4 SEQUENCING

A. Section 011000 - Summary: Requirements for sequencing.

B. Sequence activities in phases; refer to Article 1.4 TIMES OF COMPLETION AND LIQUIDATED DAMAGES for a detailed description of phasing requirements.

C. Owner will conduct salvage operations before demolition begins to remove materials Owner chooses to retain.

1.5 SCHEDULING

A. Section 013000 - Administrative Requirements: Requirements for scheduling.

B. Schedule Work to coincide with new construction.

C. Cooperate with Owner in scheduling noisy operations and waste removal that may impact Owners operation.

D. Coordinate utility and building service interruptions with Owner.
1. Do not disable or disrupt building fire or life safety systems without three days prior written notice to Owner.
2. Schedule tie-ins to existing systems to minimize disruption.
3. Coordinate Work to ensure fire alarms, smoke detectors, emergency lighting, exit signs and other life safety systems remain in operation in areas not schedule for renovation.

E. Maintain all utility services including, but not limited to, power, water, gas, phone, data and cable TV to the Bradley Building, Bus Garage including power to site lighting and bus engine heaters at all times during construction.

1.6 PROJECT CONDITIONS

A. Conduct demolition to minimize interference with adjacent and occupied building areas.

B. Cease operations immediately if structure appears to be in danger and notify Architect/Engineer. Do not resume operations until directed.

1.7 DEMOLITION of PCB's

A. Due to the likely presence of ballast containing PCB's in existing light fixtures that are to be demolished, as well as mercury content in the fluorescent lamps and thermostats, contractor is to assume that all existing-to-be-removed fluorescent fixtures and contain such material, and is to perform the following abatement procedures in accordance with all applicable Federal PCB and Mercury Abatement regulations. Thermostats containing mercury-containing contact tubes are to be dealt with in the same manner.

B. Electrician is to completely remove all light fixtures/thermostats that are scheduled to be demolished.

C. Electrical contractor is to supply, at the site, separate drums to contain the removed ballast and removed fluorescent lamps.

D. Electrical contractor is to remove the ballast from the light fixtures while wearing gloves and deposit the ballast into the drums.

E. In the unlikely event that a ballast is found to be leaking, the electrical contractor has the option of going ahead and removing it and depositing it in the drums or refusing to remove it by

contacting the Owner and requesting that some other qualified person handle the leaking ballast, at which point, the Owner will handle the removal of that specific leaking ballast.

F. Mercury tubes may be removed from thermostats in order to reduce waste. Thermostats/mercury-containing tubes must be properly handled and packaged to avoid breakage. Follow proper cleanup procedures as dictated by the Kentucky Department of Environmental Protection in the event of breakage.

G. Once all ballast, fluorescent lamps and thermostats are removed and deposited into the drums, the electrical contractor will be responsible for picking up the drums and removing them from the site to be incinerated or recycled as required. Electrical contractor shall provide, to the Owner, copies of manifests showing that the materials have been properly disposed.

PART 2 - PRODUCTS

2.1 Not Used.

PART 3 - EXECUTION

3.1 PREPARATION

A. Notify affected utility companies before starting work and comply with their requirements.

B. Mark location and termination of utilities.

C. Erect, and maintain temporary barriers and security devices at locations indicated, necessary, or as directed by the Architect, including warning signs and lights, and similar measures, for protection of the Owner, and existing improvements indicated to remain.

D. Erect and maintain weatherproof closures for exterior openings.

E. Erect and maintain temporary partitions to prevent spread of dust, odors, and noise to permit continued Owner occupancy.

F. Prevent movement of structure; provide temporary bracing and shoring required to ensure safety of existing structure.

G. Provide appropriate temporary signage including signage for exit or building egress.

H. Do not close or obstruct building egress path.

I. Do not disable or disrupt building fire or life safety systems without 3 days prior written notice to Owner.

3.2 SALVAGE REQUIREMENTS

A. Coordinate with Owner to identify building components and equipment required to be removed and delivered to Owner.

B. Tag components and equipment Owner designates for salvage.

C. Protect designated salvage items from demolition operations until items can be removed.

D. Carefully remove building components and equipment indicated to be salvaged.

E. Disassemble as required to permit removal from building.

F. Package small and loose parts to avoid loss.

G. Mark equipment and packaged parts to permit identification and consolidation of components of each salvaged item.

H. Prepare assembly instructions consistent with disassembled parts. Package assembly instructions in protective envelope and securely attach to each disassembled salvaged item.

I. Deliver salvaged items to Owner. Obtain signed receipt from Owner.

3.3 DEMOLITION

A. Conduct demolition to minimize interference with adjacent and occupied building areas.

B. Maintain protected egress from and access to adjacent existing buildings at all times.

C. Do not close or obstruct roadways, bus access drives or sidewalks without permits &/or Owner's written permission, as appropriate.

D. Cease operations immediately when structure appears to be in danger and notify Architect/Engineer.

E. Disconnect and remove designated utilities within demolition areas.

F. Cap and identify abandoned utilities at termination points when utility is not completely removed. Annotate Record Drawings indicating location and type of service for capped utilities remaining after demolition.

G. Demolish in orderly and careful manner. Protect existing improvements, supporting structural members.

H. Carefully remove building components indicated to be reused.
   1. Disassemble components as required to permit removal.
   2. Package small and loose parts to avoid loss.
   3. Mark components and packaged parts to permit reinstallation.
   4. Store components, protected from construction operations, until reinstalled.

I. Remove demolished materials from site except where specifically noted otherwise. Do not burn or bury materials on site.

J. Remove materials as Work progresses. Upon completion of Work, leave areas in clean condition.

K. Remove temporary Work.

3.4 SCHEDULES

A. Remove, store and protect the following materials and equipment:
   1. All existing kitchen equipment scheduled to be relocated; refer to drawings.
   2. Other items identified by Owner at the Pre-construction meeting.

B. Remove the following equipment and materials for Owner's retention. Deliver to location designated by Owner
   1. Gas fired two burner oven

C. Owner will remove the following material and equipment before start of demolition:
   1. All loose kitchen wares

D. Protect all existing construction assemblies, systems and finishes scheduled to remain.

E. Demolish the following materials and equipment:
   1. Existing load bearing and non-load bearing masonry walls as specified on the demolition drawings; Contractor to provide temporary shoring and bracing necessary to complete installation of new work and to prevent damage to the existing roof structure.

END OF SECTION 024119

DIVISION 3

SECTION 033000 – CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1. Related Documents:

A. Drawings and general provisions of Contract, including General and Supplementary Condition apply to work of this section.

2. Description of Work:

A. The extent of concrete work shown on drawings.

B. Concrete paving and walks are specified in Division 32

3. 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 301 "Specifications for Structural Concrete ".
2. ACI 318 "Building Code Requirements for Reinforced Concrete".
3. ACI 117 “Standard Specifications for Tolerances for Concrete Construction and Materials.”
4. Concrete Reinforcing Steel Institute, "Manual of Standard Practice".

B. Concrete Testing Service: The Special Inspector (employed by the Owner)shall perform material evaluation tests, field cylinder tests and to design concrete mixes.

C. Materials and installed work may require testing and retesting, as directed by Architect, at anytime during progress of work. Allow free access to material stockpiles and facilities. Tests, not specifically indicated to be done at Owner's expense, including retesting of rejected materials and installed work, shall be done at Contractor's expense.

4. Submittals:

A. Product Data: Submit manufacturers product data with application and installation instructions for proprietary materials and items, including reinforcement and forming accessories, admixtures, patching compounds, water stops, joint systems, curing compounds, dry-shake finish materials, and others as requested by Architect.

B. Shop Drawings; Reinforcement: Submit shop drawings for fabrication, bending, and placement of concrete reinforcement. Comply with ACI 315 "Manual of Standard Practice for Detailing Reinforced Concrete Structures" showing bar schedules, stirrup spacing, diagrams of bent bars, arrangement of concrete reinforcement. Include special reinforcement required and openings through concrete structures.

C. Samples: Submit samples of materials as specified and as otherwise requested by Architect, including names, sources and descriptions.

D. Laboratory Test Reports: Submit laboratory test reports for concrete materials and mix design test as specified.

E. Material Certificates: Provide materials certificates in lieu of materials laboratory test reports when permitted by Architect. Material certificates shall be signed by manufacturer and Contractor, certifying that each material item complies with, or

exceeds, specified requirements.

PART 2 - PRODUCTS

1. Form Materials:

A. Forms for Exposed Finish Concrete: Unless otherwise indicated, construct formwork for exposed concrete surfaces with plywood, metal, metal-framed plywood faced or other acceptable panel-type materials, to provide continuous, straight, smooth, exposed surfaces. Furnish in largest practicable sizes to minimize number of joints and to conform to joint system shown on drawings. Provide form material with sufficient thickness to withstand pressure of newly-placed concrete without bow or deflection.

1. Use plywood complying with U.S. Product Standard PS-1 "B-B (Concrete Form) Plywood", Class I, Exterior Grade or better, mill-oiled an edge-sealed, with each piece bearing legible inspection trademark.

B. Forms for Unexposed Finish Concrete: Form concrete surfaces which will be unexposed in finished structure with plywood, lumber, metal or other acceptable material. All lumber used must be dressed on at least 2 edges and one side to insure a tight fit.

C. Form Coatings: Provide commercial formulation form-coating compounds that will not bond with, stain nor adversely affect concrete surfaces, and will impair subsequent treatments of concrete surfaces.

2. Reinforcing Materials:

A. Recycled Content of Steel Products: Provide products with an average recycled content of steel products so postconsumer recycled content plus one-half of preconsumer recycled content is not less than 25 percent.

B. Reinforcing Bars (Rebar): ANSI/ASTM A 615, Grade 60, deformed.

C. Steel Wire: ANSI/ASTM A 82, plain, cold-drawn, steel.

D. Welded Wire Fabric (WWF): ASTM A 185, welded steel wire fabric (flat sheets).

E. Supports for Reinforcement: Provide supports for reinforcement including bolsters, chairs, spacers and other devices for spacing, supporting and fastening reinforcing bars and welded wire fabric in place. Use wire bar type supports complying with CRSI recommendations, unless otherwise acceptable.

F. For exposed-to-view concrete surfaces, where legs of supports are in contact with forms, provide supports with legs which are plastic protected (CRSI, Class 1) or stainless steel protected (CRSI, Class 2).

3. Concrete Materials:

A. Portland Cement: ANSI/ASTM C 150, Type I, unless otherwise acceptable to Architect.
1. Fly ash: ASTM C 618, Class C

B. Use one brand of cement throughout project, unless otherwise acceptable to Architect.

C. Normal Weight Aggregates: ASTM C 33, and as herein specified. Provide aggregates form a single source for exposed concrete.

D. Water: Potable.

E. Air-Entraining Admixture: ASTM C 260.

F. Calcium chloride not permitted.

G. Mid-Range Water-Reducing Admixture: ASTM C494 Type A

4. Related Materials:

A. Vapor Barrier: Provide vapor barrier cover over prepared base material for all slab on grade. Use only materials with a permeance rating of less than 0.01 Perms when tested in accordance with ASTM E154 as follows:

1. Refer to Section 07260 for specific requirements.

B. Chemical Hardener: Colorless aqueous solution containing a blend of magnesium fluosilicate and zinc fluosilicate combined with a wetting agent, containing not less than 2 lbs. of fluosilicates per gal.

C. Absorptive Cover: Burlap cloth made from jute or kenaf, weighing approximately 9 oz. per sq. yd., complying with AASHTO M 182, Class 2.

D. Moisture-Retaining Cover: One of the following, complying with ASTM C 171.

1. Waterproof paper.

2. Polyethylene film.

3. Polyethylene-coated burlap.

E. Liquid Membrane-Forming Curing Compound: ASTM C 1315, Type 1, Class A.

1. Provide a curing compound compatible with floor sealers and floor finishes in areas to receive sealer and finishes. See Division 9 and room finish schedule for type of floor sealer and finishes.

F. Expansion Joint Material:
1. Type F by Sonneborn for exterior slab conditions.
2. Self-adhesive bond break material and interior slab conditions.

5. Proportioning and Design of Mixes:

A. Prepare design mixes for each type and strength of concrete by either laboratory trial batch or field experience methods as specified in ACI 301. If trial batch method used, use an independent testing facility acceptable to Architect for preparing and reporting proposed mix designs. The testing facility shall not be the same as used for field quality control testing unless otherwise acceptable to Architect.

B. Submit written reports to Architect of each proposed mix for each class of concrete at least 15 days prior to start of work. Do not begin concrete production until mixes have been reviewed by Architect.

C. Design mixes to provide normal weight concrete with the following properties, as indicated on drawings and schedules.

1. 4000 psi 28-day compressive strength; 520 lbs. cement per cu. yd. minimum; W/C ratio, 0.46 max. Combined fly ash and Pozzolan : 25% max (by weight). Fly ash substitution only permitted in slabs.

D. 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 Owner and as accepted by Architect. Laboratory test data for

revised mix design and strength results must be submitted to and accepted by Architect before using in work.

E. Admixtures:

1. Use air-entraining admixture in exterior exposed concrete, unless otherwise indicated. Add air-entraining admixture at manufacturer's prescribed rate to result in concrete at point of placement having air content within following limits:

   a. Concrete structures and slabs exposed to freezing and thawing or subjected to hydraulic pressure:

      3% to 5% for maximum 1" aggregate.

   b. Other Concrete:

      2% to 4% air.

F. Slump Limits: Proportion and design mixes to result in concrete slump at point of placement as follows(these values can be exceeded by use of water-reducer, but ranges required before addition of water-reducer):

1. Ramps and sloping surfaces: Not more than 3".

2. Reinforced foundation systems: Not less than 1" and not more than 5".

3. Other concrete: Not less than 1" and not more than 5".

6. Concrete Mixes:

A. Job-Site Mixing: Mix materials for concrete in appropriate drum type batch machine mixer. For mixers of one cu. yd., or smaller capacity, continue mixing at least 1-1/2 minutes, but not more than 5 minutes after ingredients are in mixer, before any part of batch is released. For mixers of capacity larger than one cu. yd., increase minimum 1-1/2 minutes of mixing time by 15 seconds for each additional cu. yd., or fraction thereof.

B. Provide batch ticket for each batch discharges and used in work, indicating project identification name and number, date, mix type, mix time, quantity, and amount of water introduced.

C. Ready Mix Concrete: Comply with requirements of ASTM C 94, and as herein specified.

1. Delete references for allowing additional water to be added to batch for material with insufficient slump. Addition of water to the batch will not be permitted.

D. During hot weather, or under conditions contributing to rapid setting of concrete, a shorter mixing time than specified in ASTM C 94 may be required.

1. When air temperature is between 85 degrees (F) and 90 degrees (F), reduce mixing and delivery time for 1-1/2 hours to 75 minutes, and when air temperature is above 90 degrees (F), reduce mixing and delivery time to 60 minutes.

PART 3 - EXECUTION

1. Forms:

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. Construct formwork so concrete members and structures are of correct size, shape, alignment, elevation and position.

B. Design formwork to be readily removable without impact, shock or damage to cast-in-place concrete surfaces and adjacent materials.

C. Construct forms to sizes, shapes, lines and dimensions shown, and to obtain accurate alignment, location, grades, level and plumb work in finished structures. Provide for openings, offsets, sinkages, keyways, recesses, moldings, rustications, reglets, chamfers, blocking, screeds, bulkheads, anchorages and inserts, and other features required in work. Use selected materials to obtain required finishes. Solidly butt joints and provide backup at joints to prevent leakage of cement paste.

D. Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush plates or wrecking plates where stripping may damage cast concrete surfaces. Provide top forms for inclined surfaces where slope is too steep to place concrete with bottom forms only. Kerf wood inserts for forming keyways, reglets, recesses, and the like, to prevent swelling and for easy removal.

E. Provide temporary openings where interior area of formwork is inaccessible for cleanout, for inspection before concrete placement, and for placement of concrete. Securely brace temporary openings and set tightly to forms to prevent loss of concrete mortar. Locate temporary openings on forms at inconspicuous locations.

F. Chamfer exposed corners and edges as indicated, using wood, metal, PVC or rubber chamfer strips fabricated to produce uniform smooth lines and tight edge joints.

G. Form Ties: Factory-fabricated, adjustable-length, removable or snap off metal form ties, designed to prevent form deflection, and to prevent spalling concrete surfaces upon removal.

1. Unless otherwise indicated, provide ties so portion remaining within concrete after removal is at least 1-1/2" inside concrete.

2. Unless otherwise shown, provide form ties which will not leave holes larger than 1" diameter in concrete surface.

H. Provisions for Other Trades: Provide openings in concrete formwork to accommodate work of other trades. Determine size and location of openings, recesses and chases from trades providing such items. Accurately place and securely support items built into forms.

I. Cleaning and Tightening: Thoroughly clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt or other debris just before concrete is placed. Retighten forms and bracing after concrete placement is required to eliminate mortar leaks and maintain proper alignment.

2. Placing Reinforcement:

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, ice, and other materials which reduce or destroy bond with concrete.

C. Accurately position, support and secure reinforcement against displacement by formwork, construction, or concrete placement operations. Locate and support reinforcing by metal chairs, runners, bolsters, spacers, and hangers, as required.

D. Place reinforcement to obtain at least minimum coverages for concrete protection. Arrange, space and securely tie bars and bar supports to hold reinforcement in position during concrete placement operations. Set wire ties so ends are directed into concrete, not toward exposed concrete surfaces.

E. Install welded wire fabric in as long lengths as practicable. Lap adjoining pieces at least one full mesh and lace splices with wire. Offset end laps in adjacent widths to prevent continuous laps in either direction.

3. Joints:

A. Construction Joints: Locate and install construction joints, which are not shown on drawings, so as not to impair strength and appearance of the structure, as acceptable to Architect.

B. Provide keyways at least 1-1/2" deep in construction joints in walls, slabs and between walls and footings; accepted bulkheads designed for this purpose may be used for slabs.

C. Place construction joints perpendicular to the main reinforcement. Continue reinforcement across construction joints.

D. Control Joints: Saw cut joints as shown on the drawings. Joints to be sawn as soon as concrete is set sufficiently, but must be sawn the same day as the concrete is poured.

4. Installation of Embedded Items:

A. General: 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. Use setting drawings, diagrams, instructions and directions provided by suppliers of items to be attached thereto.

B. Edge Forms and Screed Strips for Slabs: Set edge forms or bulkheads and intermediate screed strips for slabs to obtain required elevations and contours in finished slab surface. Provide and secure units sufficiently strong to support types of screed strips by use of strike-off templates or accepted compacting type screeds.

5. 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 manufacturers instructions.

C. Coat steel forms with a non-staining, rust-preventative form oil or otherwise protect against rusting. Rust-stained steel formwork is not acceptable.

6. Concrete Placement:

A. 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 form coatings are not used.

B. Coordinate the installation of joint materials and moisture barriers with placement of forms and reinforcing steel.

C. General: Comply with ACI 304, and as herein specified. Deposit concrete continuously or in layers of such thickness that no concrete will 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.

D. 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.

E. Consolidate placed concrete by mechanical vibrating equipment and procedures for consolidation of concrete in accordance with ACI recommended practices.

F. Do not use vibrators to transport concrete inside form. 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.

G. 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.

H. Consolidate concrete during placing operations so that concrete is thoroughly worked around reinforcement and other embedded items and into corners.

I. Bring slab surfaces to correct level with straightedge and strike off. All interior slabs shall pitch to floor drains (if drains are indicated on Architectural or Mechanical or Structural Drawings). All exterior slabs shall drain away from the building and shall not pond any water. Do not set screeds off metal deck setting on steel beams. Use bull floats or darbies to smooth surface, free of humps or hollows. Do not disturb slab surfaces prior to beginning finishing operations.

J. Maintain reinforcing in proper position during concrete placement operations.

K. 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.

L. When air temperature has fallen to or is expected to fall below 40 degrees (F), uniformly heat water and aggregates before mixing to obtain a concrete mixture temperature of not less than 50 degrees (F), and not more than 80 degrees (F) at point of placement.

M. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.

N. Do not use calcium chloride, salt and other materials containing antifreeze agents or chemical accelerators, unless otherwise accepted in mix designs. Non-chloride accelerators may be used if submitted and approved in the design mix.

O. Hot Weather Placing: When hot weather conditions exist that would seriously impair quality and strength of concrete, place concrete in compliance with ACI 305 and as herein specified.

P. Cool ingredients before mixing to maintain concrete temperature at time of placement below 90 degrees (F). Mixing water may be chilled or chopped ice may be used to control temperature provided water equivalent of ice is calculated to total amount of mixing.

Q. Cover reinforcing steel with water-soaked burlap if it becomes too hot, so that steel temperature will not exceed the ambient air temperature immediately before embedment in concrete.

R. Wet forms thoroughly before placing concrete.

S. Use water-reducing retarding admixture (Type D) when required by high temperatures, low humidity, or their adverse placing conditions.

7. Finish of Formed Surfaces:

A. Rough Form Finish: For formed concrete surfaces not exposed-to-view in the finish work or by other construction, unless otherwise indicated. This is the concrete surface having texture imparted by form facing material used, with tie holes and defective areas repaired and patched and fins and other projections exceeding 1/4" in height rubbed down or chopped off.

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, or a covering material applied directly to concrete, such as waterproofing, damp proofing, painting or other similar system. This is as-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 completely removed and smoothed.

C. Smooth Rubbed Finish: Provide smooth rubbed finish to exposed concrete surfaces, which have received smooth form finish treatment, not later than one day after form removal.

D. 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.

E. Related Uniformed Surfaces: At tops of walls, horizontal offsets surfaces occurring adjacent to formed surfaces, strike-off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces, unless otherwise indicated.

F. Trowel Finish: Apply trowel finish to monolithic slab surfaces to be exposed-to-view, and slab surfaces to be covered with resilient flooring, paint 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.

G. Chemical-Hardener Finish: Apply chemical-hardener finish to interior concrete floors where indicated by the Architect on the Room Finish Schedule. Apply liquid chemical-hardener after complete curing and drying of the concrete surface. Dilute liquid hardener with water, and apply in 3 coats; first coat, 1/3-strength; second coat, 1/2-strength; third coat, 2/3-strength. Evenly apply each coat, and allow 24 hours for drying between coats.

1. Apply proprietary chemical hardeners, in accordance with manufacturer's printed instructions.

2. After final coat of chemical-hardener solution is applied and dried, remove surplus hardener by scrubbing and mopping with water.

8. 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. Provide moisture curing by following methods.

1. Keep concrete surface continuously wet by covering 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

coverage of concrete surfaces and edges, with 4" lap over adjacent absorptive covers.

F. Provide moisture-cover curing as follows: 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.

G. Provide curing compound to slabs as follows:

1. Apply specified curing and sealing compound to concrete slabs as soon as final finishing operations are complete (within 2 hours). Apply uniformly in continuously operation by power spray or roller in accordance with manufacturer's directions. Recoat areas subjected to heavy rainfall within 3 hours after initial application. Maintain continuity of coating and repair damage during period.

2. Do not use membrane curing compounds on surfaces which are to be covered with coating material applied directly to concrete, liquid floor hardener, waterproofing, damp proofing, membrane roofing, flooring, painting, and other coatings and finish materials, unless otherwise acceptable to Architect. Coordinate with specified finishes and verify before application.

H. Curing Formed Surfaces: Cure formed concrete surfaces, including undersides of beams, supported slabs and other similar surfaces by moist curing with forms in place for full curing period of until forms are removed. If forms are removed, continue curing by methods specified above, as applicable.

I. Curing Unformed Surfaces: Cure unformed surfaces, such as slabs, floor topping, and other flat surfaces by application of appropriate curing compound.

J. Final cure concrete surfaces to receive liquid floor hardener or finish flooring by use of moisture-retaining cover, unless otherwise directed.

K. All control and expansion joints shall be cleaned and filled with a self-leveling sealant that complies to ASTM C-920 and applied according to the manufacturers recommendations. The sealant sall be one of the following or an approved equal:

1) Sika - Sikaflex - 2c SL
2) Sonneborn - Sonolastic SL 1

9. Removal of Forms:

A. Formwork not supporting weight of concrete, such as sides of beams, walls, columns, and similar parts of this work, 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 operations are maintained.

B. Formwork supporting weight of concrete, such as beam soffits, joints, slabs and other structural elements, may not be removed in less than 14 days and until concrete has attained design minimum compressive strength at 28 days. Determine potential compressive strength of in place concrete by testing field-cured specimens representative of concrete location or members.

C. Form facing material may be removed 4 days after placement, only if shores and other vertical supports have been arranged to permit removal of form facing material without loosening or disturbing shores and supports.

10. 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 formwork.

B. When forms are extended for successive concrete placement, thoroughly clean surfaces, remove fins and laitance, and tighten forms to close joints. Align and secure joint to avoid offsets. Do not use "patched" forms for exposed concrete surfaces, except as acceptable to Architect.

11. Inspection:

Concrete shall not be placed over pipes, conduits, etc. until such work has been tested, inspected and approved. No concrete shall be deposited until the Architect has inspected the forms and placing of steel reinforcement and given permission to place concrete.

12. Notifying Other Trades:

This Contractor shall notify the Mechanical and Electrical Contractors, and all other Contractors, at the proper time to install all conduits, pipes, pipe sleeves, anchors, or other equipment coming under their respective contracts in the form work.

13. 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.

B. Equipment Bases and Foundations: Provide machine and equipment bases and foundations, as shown on drawings. Set anchor bolts for machines and equipment to template at correct elevations, complying with certified diagrams or templates of manufacturer furnishing machines and equipment.

14. Concrete Surface Repairs:

A. Patching Defective Areas: Repair and patch defective areas with cement mortar immediately after removal of forms, when acceptable to Architect.

B. Cut out honeycomb, rock pockets, voids over 1/4" in any dimension, and holes left by tie rods and bolts, down to solid concrete but, in no case to a depth of less than 1". Make edges of cuts perpendicular to the concrete surface. Thoroughly clean, dampen with water and brush-coat the area to be patched with specified bonding agent. Place patching mortar after bonding compound has dried.

C. For exposed-to-view surfaces, blend white Portland cement and standard Portland cement so that, when dry, patching mortar will match color surrounding. Provide test areas at inconspicuous location to verify mixture and color match before proceeding with patching. Compact mortar in place and strike-off slightly higher than surrounding surface.

D. Repair of Formed Surfaces: Remove and replace concrete having defective surfaces if defects cannot be repaired to satisfaction of Architect. Surface defects, as such, include color and texture irregularities, cracks, spalls, air bubbles, honeycomb, rock pockets, fins and other projections on surface; and stains and other discolorations that cannot be removed by cleaning. Flush out form tie holes, fill with dry pack mortar, or precast cement cone plugs secured in place with bonding agent.

E. Repair concealed formed surfaces, where possible, that contain defects that affect the durability of concrete. If defects cannot be repaired, remove and replace concrete.

F. Repair of Unformed Surfaces: Test unformed surfaces, such as monolithic slabs, for smoothness and verify surface plane to tolerances specified for each surface and finish. Correct low and high areas as herein specified. Test unformed surfaces sloped to drain for trueness of slope, in addition to smoothness, using a template having required slope.

G. Repair finished unformed surfaces that contain defects which affect durability of concrete.

Surface defects, as such, include crazing, cracks in excess of 0.01" wide or which penetrate to reinforcement or completely through non-reinforced sections regardless of width, spalling, popouts, honeycomb, rock pockets, and other objectionable conditions.

H. Correct high areas in unformed surfaces by grinding, after concrete has cured at least 14 days.

I. Correct low areas in unformed surfaces during, or immediately after completion of surface finishing operations by cutting out low areas and replacing with fresh concrete. Finish repaired areas to blend into adjacent concrete. Proprietary patching compounds may be used when acceptable to Architect.

J. Repair defective areas, except random cracks and single holes not exceeding 1" diameter, by cutting out and replacing with fresh concrete. Remove defective areas to sound concrete with clean, square cuts and expose reinforcing steel with at least 3/4" clearance all round. Dampen concrete surfaces in contact with patching concrete and apply bonding compound. Mix patching concrete of same materials to provide concrete of same type or class as original concrete. Place, compact and finish to blend with adjacent finished concrete. Cure in same manner as adjacent concrete.

K. Repair isolated random cracks and single holes not over 1" in diameter by dry-pack method. Groove top of cracks and cut-out holes to sound concrete and clean of dust, dirt and loose particles. Dampen cleaned concrete surfaces and apply bonding compound. Mix dry-pack, consisting of one part Portland cement to 2-1/2 parts fine aggregate passing a No. 16 mesh sieve, using only enough water as required for handling and placing. Place dry pack after bonding compound has dried. Compact dry-pack mixture in area continuously moist for not less than 72 hours.

L. Use epoxy-based mortar for structural repairs, where directed by Architect.

M. Repair methods not specified above may be used, subject to acceptance of Architect.

15. Quality Control Testing During Construction:

A. Sampling Fresh Concrete: ASTM C 172, except modified for slump to comply with ASTM C 94.

1. 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.

2. Air content: ASTM C 173; volumetric method for light-weight or normal weight concrete; ASTM C 231 pressure for normal weight concrete; one for each set of compressive strength test specimens.

3. 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 made.

4. Compression Test Specimen: ASTM C 31; one set of 4 standard cylinders for each compressive strength test, unless otherwise directed. Mold and store cylinders for laboratory cured test specimens except when field-cure test specimens are required.

5. Compressive Strength Tests: ASTM C 39; one set for each 100 cu. yds. or fraction thereof, of each concrete class placed in any one day or for each 5000 sq. ft. of surface area placed; 1 specimen tested at 7 days, 2 specimens tested at 28 days, and one specimen retained in reserve for later testing if required.

6. When frequency of testing will provide less than 5 strength tests for a given class of concrete, conduct testing from at least 5 randomly selected batches or from each batch if fewer than 5 are used.
7. When total quantity of a given class of concrete is less than 50 cu. yds., strength test may be waived by Architect if, in his judgement, adequate evidence of satisfactory strength is

provided.

8. When strength of field-cured cylinders is less than 85 % of companion laboratory-cured cylinders, evaluate current operations and provide corrective procedures for protecting and curing the in-place concrete.

9. Strength level of concrete will be considered satisfactory if averages of sets of three consecutive strength test results equal or exceed specified compressive strength, and no individual strength test result falls below specified compressive by more than 500 psi.

B. Test results will be reported in writing to Architect, Structural Engineer, and Contractor on same day that tests are made. Reports of compressive strength test 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.

C. Additional Tests: The testing service will make additional tests of in-place concrete when test results indicate specified concrete strengths and other characteristics have not been attained in the structure, as directed by Architect. Testing service may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42, or by other methods as directed. Contractor shall pay for such test required, when unacceptable concrete is verified.

END OF SECTION 033000

SECTION 040513 - MASONRY MORTARING AND GROUTING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Mortar for masonry.

B. Related Requirements:
1. Section 042000 - Unit Masonry: Installation of mortar.
2. Section 081214 – Standard Steel Frames: Grouting steel door frames.
3. Section 077123 – Downspouts
4. Section 0334100 – Storm Utility Drainage Piping

1.2 REFERENCE STANDARDS

A. American Concrete Institute:

1. ACI 530/530.1 - Building Code Requirements and Specification for Masonry Structures.

B. ASTM International:

1. ASTM C5 - Standard Specification for Quicklime for Structural Purposes.
2. ASTM C91 - Standard Specification for Masonry Cement.
3. ASTM C91M - Standard Specification for Masonry Cement.
4. ASTM C144 - Standard Specification for Aggregate for Masonry Mortar.
5. ASTM C150 - Standard Specification for Portland Cement.
6. ASTM C150M - Standard Specification for Portland Cement.
7. ASTM C199 - Standard Test Method for Pier Test for Refractory Mortars.
8. ASTM C206 - Standard Specification for Finishing Hydrated Lime.
9. ASTM C270 - Standard Specification for Mortar for Unit Masonry.
10. ASTM C387 - Standard Specification for Packaged, Dry, Combined Materials for Concrete and High Strength Mortar.
11. ASTM C387M - Standard Specification for Packaged, Dry, Combined Materials for Concrete and High Strength Mortar.
12. ASTM C595 - Standard Specification for Blended Hydraulic Cements.
13. ASTM C595M - Standard Specification for Blended Hydraulic Cements.
14. ASTM C780 - Standard Test Method for Preconstruction and Construction Evaluation of Mortars for Plain and Reinforced Unit Masonry.
15. ASTM C1142 - Standard Specification for Extended Life Mortar for Unit Masonry.
16. ASTM C1314 - Standard Test Method for Compressive Strength of Masonry Prisms.
17. ASTM C1329 - Standard Specification for Mortar Cement.
18. ASTM C1329M - Standard Specification for Mortar Cement.
19. ASTM C1357 - Standard Test Methods for Evaluating Masonry Bond Strength.

1.3 SUBMITTALS

A. Section 013300 - Submittal Procedures: Requirements for submittals.

B. Samples: Submit two samples of mortar, illustrating mortar color and color range.

C. Design Data: Submit required environmental conditions, admixture limitations, and design mix if property specification of ASTM C270 is to be used.

D. Manufacturer Instructions: Submit premixed mortar installation instructions.

1.4 QUALITY ASSURANCE

A. Comply with ACI 530/530.1.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Section 016000 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.

B. Inspection: Accept materials on Site in manufacturer's original packaging and inspect for damage.

C. Store materials according to manufacturer instructions.

D. Protection:
1. Protect materials from moisture and dust by storing in clean, dry location remote from construction operations areas.
2. Provide additional protection according to manufacturer instructions.

1.6 AMBIENT CONDITIONS

A. Section 015000 - Temporary Facilities and Controls: Requirements for ambient condition control facilities for product storage and installation.

B. Cold Weather Requirements: Comply with ACI 530/530.1 if ambient temperature or temperature of masonry units is less than 40 degrees F.

C. Hot Weather Requirements: Comply with ACI 530/530.1 if ambient temperature is greater than 100 degrees F or ambient temperature is greater than 90 degrees F with wind velocity greater than 8 mph.

PART 2 - PRODUCTS

2.1 MORTAR AND MASONRY GROUT

A. Manufacturers:
1. Brixment
2. Kosmortar
3. Medusa
4. Glen-Gery
5. LaFarge Corp.
6. The Quikrete Companies
7. Substitutions: Section 016000 - Product Requirements

B. COMPONENTS

1. Premix Mortar: ASTM C387, Type S and N, using gray color cement.
2. Mortar Aggregate: ASTM C144, standard masonry type.
3. Grout Aggregate: ASTM C404, fine.
4. Water: Clean and potable.
5. Mortar Color: match existing colored mortar.
6. Calcium chloride is not permitted.
7. Bonding Agent: Latex type.

2.2 MIXES

A. Mortar Mixes:
   1. Mortar For Structural Masonry: ASTM C270, Type S using Property specification.
   2. Mortar For Non-Structural Masonry: ASTM C270, Type N using Property specification.
   3. Pointing Mortar: ASTM C270, Type N using Property specification.

B. Mortar Mixing:
   1. Thoroughly mix mortar ingredients in accordance with ASTM C270 in quantities needed for immediate use.
   2. Achieve uniformly damp sand immediately before mixing process.
   3. Add admixtures to achieve uniformity of mix and coloration.
   4. Re-temper only within two hours of mixing.

C. Grout Mixes:
   1. Grout: 3,000 psi strength at 28 days; 8-10 inches slump; mixed in accordance with ASTM C476 Fine grout.

D. Grout Mixing:
   1. Thoroughly mix grout ingredients in quantities needed for immediate use in accordance with ASTM C476.
   2. Add admixtures; mix uniformly.
   3. Do not use anti-freeze compounds to lower the freezing point of grout.

PART 3 - EXECUTION

3.1 PREPARATION

A. Section 017000 - Execution and Closeout Requirements: Requirements for installation preparation.

B. Apply bonding agent to existing concrete surfaces.

C. Mortar Mixing:

   1. Thoroughly mix mortar ingredients according to ASTM C270 in quantities needed for immediate use.
   2. Achieve uniformly damp sand immediately before mixing process.
   3. Add mortar color and admixtures to achieve uniform mix and coloration.
   4. Retemper only within two hours of mixing.

3.2 INSTALLATION

A. According to ACI 530/530.1.

3.3 SCHEDULE

A. Exterior Cavity Wall: CMU with Type S mortar and Brick Veneer with Type N mortar

B. Interior CMU Load-bearing walls: Type S mortar

C. Interior CMU Non-load bearing walls: Type N mortar

D. Provide grout seal between downspouts & cast-iron downspout boots.

END OF SECTION 040513

SECTION 042000 - UNIT MASONRY

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
1. Brick and Concrete masonry units.
2. Masonry reinforcement, anchorage, and accessories.
3. Dampproofing and air barrier.
4. Cutting and patching of existing masonry assemblies
   a. Tooth new masonry units into existing where exposed to view.
5. Cleaning of new masonry.

B. Related Requirements:
1. Section 040514 - Masonry Mortaring and Grouting: Mortar and grout.
2. Section 051200 - Structural Steel Framing: Product requirements for steel anchors for for placement by this Section.
3. Section 052100 - Steel Joist Framing: Product requirements for steel bearing pads for joists for placement by this Section.
4. Section 055000 - Metal Fabrications: Product requirements for loose steel lintels, and fabricated steel items, for placement by this section.
5. Section 072113 - Board Insulation: Insulation for cavity spaces.
6. Section 079000 - Joint Protection: Rod and sealant at control and expansion joints.
7. Section 081214 – Standard Steel Frames: Steel frames for placement by this section.
8. Section 099000 – Painting: Paint finish of designated CMU
9. Division 23 – Mechanical: Cutting and patching of existing masonry assemblies as needed to complete the mechanical work.
10. Division 27 – Electrical: Cutting and patching of existing masonry assemblies as needed to complete the electrical work.

1.2 REFERENCE STANDARDS

A. American Concrete Institute:

1. ACI 530/530.1 - Building Code Requirements and Specification for Masonry Structures and Related Commentaries.

B. ASTM International:

1. ASTM A82 - Standard Specification for Steel Wire, Plain, for Concrete Reinforcement.
2. ASTM A82M - Standard Specification for Steel Wire, Plain, for Concrete Reinforcement.
3. ASTM A153- Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
4. ASTM A153M- Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
5. ASTM A240 - Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications.
6. ASTM A240M - Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications.

7. ASTM A307 - Standard Specification for Carbon Steel Bolts and Studs, 60 000 PSI Tensile Strength.
8. ASTM A580 - Standard Specification for Stainless Steel Wire.
9. ASTM A580M - Standard Specification for Stainless Steel Wire.
10. ASTM A615 - Standard Specification for Deformed and Plain Carbon Steel Bars for Concrete Reinforcement.
11. ASTM A615M - Standard Specification for Deformed and Plain Carbon Steel Bars for Concrete Reinforcement.
12. ASTM A653 - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
13. ASTM A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
14. ASTM A951 - Standard Specification for Steel Wire for Masonry Joint Reinforcement.
15. ASTM A951M - Standard Specification for Steel Wire for Masonry Joint Reinforcement.
16. ASTM B370 - Standard Specification for Copper Sheet and Strip for Building Construction.
17. ASTM B695 - Standard Specification for Coatings of Zinc Mechanically Deposited on Iron and Steel.
18. ASTM C27 - Standard Classification of Fireclay and High-Alumina Refractory Brick.
19. ASTM C55 - Standard Specification for Concrete Building Brick.
20. ASTM C62 - Standard Specification for Building Brick (Solid Masonry Units Made From Clay or Shale).
21. ASTM C67 - Standard Test Methods for Sampling and Testing Brick and Structural Clay Tile.
22. ASTM C73 - Standard Specification for Calcium Silicate Brick (Sand-Lime Brick).
23. ASTM C90 - Standard Specification for Loadbearing Concrete Masonry Units.
24. ASTM C129 - Standard Specification for Nonloadbearing Concrete Masonry Units.
25. ASTM C140 - Standard Test Methods for Sampling and Testing Concrete Masonry Units and Related Units.
26. ASTM C216 - Standard Specification for Facing Brick (Solid Masonry Units Made from Clay or Shale).
27. ASTM C578 - Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation.
28. ASTM C652 - Standard Specification for Hollow Brick (Hollow Masonry Units Made From Clay or Shale).
29. ASTM C1314 - Standard Test Method for Compressive Strength of Masonry Prisms.
30. ASTM D226 - Standard Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing.
31. ASTM D226M - Standard Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing.
32. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
33. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials.

1.3 COORDINATION

A. Section 013000 - Administrative Requirements: Requirements for coordination.

B. Coordinate Work of this Section with brick veneer installation of door frames, window blocking, installation of structural framing supported by masonry, and air barriers.

1.4 SUBMITTALS

A. Section 013300 - Submittal Procedures: Submittal requirements.

B. Product Data: Submit data for concrete masonry units, brick and **ALL** specified accessories.

C. CMU Fabricator's Test Reports & Certificate: Submit Independent test results demonstrating mfr's compliance with ASTM standards for maximum weight and strength characteristics associated with Light Weight CMU.

D. Submit certified test results for brick efflorescence in accordance with ASTM C67. Brick rated greater than "slightly effloresced" is not acceptable.

1.5 QUALITY ASSURANCE

A. Perform Work according to ACI 530/530.1.

1.6 QUALIFICATIONS

A. Installer: Company specializing in performing Work of this Section with minimum five years' documented experience.

1.7 MOCKUPS

A. Section 014000 - Quality Requirements: Requirements for mockups.

B. Construct cavity masonry wall mockup. Mock-up shall be a minimum of 5' long by 4 feet high and shall be constructed on a level concrete base. Mock-up shall include all specified masonry accessories demonstrating proper installation of reinforcement, dampproofing, flashing, vents, weeps, mortar net and mortar color that matches existing color.

C. Coordinate location of Mock-Up with Architect.

D. Evaluation will include:
1. Quality and cleanliness of products; masonry products shall be free from chips &/or other surface blemishes
2. Location and placement of brick ties/reinforcement
3. Location and placement of flashings, vents, and weeps
4. Alignment of header joints
5. Cleanliness of air space
6. All tolerances listed in Part 3

E. Remove mockup when directed by Architect.

1.8 SEQUENCING

A. Section 011000 - Summary: Requirements for sequencing.

B. Sequence activities in phases; refer to Article 1.4 TIMES OF COMPLETION AND LIQUIDATED DAMAGES for a detailed description of phasing requirements.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Section 016000 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.

B. Accept CMU units on site. Inspect for damage. Inspect CMU surfaces; do not install material with excessive pitting, irregular face texture or chips.

1.10 AMBIENT CONDITIONS

A. Section 015000 - Temporary Facilities and Controls: Requirements for ambient condition control facilities for product storage and installation.

B. Do not store reinforcing material directly on ground. Utilize blocking and other methods to prevent rust on accessories prior to installation.

C. Cold Weather Requirements: According to ACI 530.1 when ambient temperature or temperature of masonry units is less than 40 degrees F.

D. Hot Weather Requirements: According to ACI 530.1 when ambient temperature is greater than 100 degrees F or ambient temperature is greater than 90 degrees F with wind velocity greater than 8 mph.

1.11 EXISTING CONDITIONS

A. Field Measurements: Verify elevations, dimensions, and alignment of foundations and other supporting construction prior to beginning Work. Align bed joints of new masonry with existing.

PART 2 - PRODUCTS

2.1 UNIT MASONRY ASSEMBLIES: CONCRETE BLOCK

A. Manufacturers:
1. Lee Block
2. Boyle Block
3. Reading Rock
4. Ready Mix Concrete
5. Substitutions: Section 016000 - Product Requirements

2.2 UNIT MASONRY ASSEMBLIES: BRICK

A. Manufacturers:
1. Match Existing
   a. Type 1(Red): Belden Brick ASTM C216 Type FBX Grade SW, Modular Size Cherry Velours.
   b. Type 2(Gray): Belden Brick ASTM C216 Type FBX Grade SW, Modular Size #8533 Velours.
   c. Contact Kenny Cox with Clay Ingels Co, 859-252-0836, for pricing and availability.
2. Substitutions: Section 016000 – Not Permitted

2.3 COMPONENTS

A. Face Brick: ASTM C216, Type FBX, Grade SW; color to match existing.

B. Brick Size and Shape: Nominal size of 2 1/2" x 3 1/2" x 7 1/2 inches. Furnish special units for 90 degree corners.

C. Ground Face Concrete Block: York Building Products, Gemstone Plus. Match existing as close as possible. Exposed surfaces shall be filled, polished and sealed. Provide special sill shape to match existing.

D. Hollow Load Bearing Concrete Masonry Units (CMU): ASTM C90, Type II - Non-moisture Controlled; light weight.

E. Solid Load-Bearing Concrete Masonry Units (CMU): ASTM C90, Type II - Non-moisture Controlled; light weight.

F. Hollow Non-Load Bearing Concrete Masonry Units (CMU): ASTM C129, Type II - Non-moisture Controlled; light weight.

G. Concrete Masonry Unit Size and Shape: Nominal modular size as indicated on the drawings and as required to complete the work. Furnish special units for 90 degree corners, bond beams, and lintels. Base shapes to be straight. All corners to be bullnosed unless otherwise indicated. Units shall be scored to appear they are nominal 8x8 to match existing.

2.4 ACCESSORIES

A. Single Wythe Joint Reinforcement: Ladder type; steel wire, hot dip galvanized to ASTM A641 Class 1 after fabrication, cold drawn steel wire conforming to ASTM A951, 9 gauge rods with 9 gauge cross ties. D/A 320 Ladur as manufactured by DUR-O-Wal, Inc. or approved equal.

B. Multiple Wythe Masonry Unit Joint Reinforcement: Ladder type; with adjustable wall ties; hot dip galvanized after fabrication (1.5 oz or better zinc coating) cold drawn steel conforming to ASTM A951, No. 9 side rods with No. 9 cross ties. D/A 360 Ladur Eye as manufactured by DUR-O-Wal, Inc. or approved equal.

C. Reinforcing Steel: ASTM A615 60 ksi yield grade, deformed billet bars, uncoated finish.

D. Strap Anchors: Bent steel shape, 2 inch size x 1/4 inch thick, hot dip galvanized to ASTM A153, B2 finish.

E. Anchor Bolts: Headed, J-shaped or L-shaped.

F. Thru-wall Flashings: Copper core flexible flashing with non-asphalt adhesive wicking fabric laminated to one copper face and non-woven wicking fabric laminated to the opposing face with non-asphalt adhesive. Corner and splice material shall be companion 5 ounce product or pre-manufactured corners. Flashing shall be York Flashvent with Multi-Flash 500/Gorilla Flash MF or approved equal.

G. Preformed Control Joints: Rubber material. Furnish with corner and tee accessories, cement fused joints.

H. Joint Filler: Closed cell rubber; oversized 50 percent to joint width; self expanding.

I. Mortar and Grout: As specified in Section 040503.

J. Nailing Strips: Softwood, preservative treated for moisture resistance, dovetail shape, sized to masonry joints.

K. Cavity Vents: Molded polyvinyl chloride grilles; insect resistant.

L. Cavity Weeps: 100% cotton rope x 1/4" diameter. Mason Pro 100% Cotton Tiger Sash or equal.

M. Cavity Netting: MortarNet by Mortar Net Solutions or approved equal.

N. Cleaning Solution: Non-acidic, not harmful to masonry Work of adjacent materials.

O. Dampproofing: Cold applied asphalt emulsion and accessories. Sonneborn Hydrocide Mastic 700 or 700B and associated primers & cements. Equivalent products by Pecora or Tremco are acceptable.

P. Sand: Clean, dry, washed properly graded fine masonry sand.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Section 017000 - Execution and Closeout Requirements: Requirements for installation examination.

B. Verify that field conditions are acceptable and ready to receive Work.

C. Verify that items provided by other Sections of Work are properly sized and located.

D. Verify that built-in items are in proper location and ready for roughing into masonry Work.

3.2 PREPARATION

A. Section 017000 - Execution and Closeout Requirements: Requirements for installation preparation.

B. Direct and coordinate placement of metal anchors supplied to other Sections.

C. Furnish temporary bracing during installation of masonry Work. Maintain in place until building structure provides permanent support.

D. Wet clay and shale brick before laying when initial rate of absorption is greater than 30 g per min./30 sq. in. when tested according to ASTM C67.

3.3 INSTALLATION

A. Establish lines, levels, and coursing indicated. Protect from displacement.

B. Maintain masonry courses to uniform dimension. Form bed and head joints of uniform thickness.

C. Coursing of CMU:
1. Bond: Stacked bond.
2. Coursing: One unit and one mortar joint to equal 8 inches.
3. Mortar Joints: Concave.

D. Coursing of Brick Units:
1. Bond: Running, unless otherwise shown on the drawings.
2. Coursing: Three units and three mortar joints to equal 8 inches.
3. Mortar Joints: Concave.

E. Placing and Bonding:
1. Lay solid masonry units in full bed of mortar, with full head joints.
2. Lay hollow masonry units with face shell bedding on head and bed joints.
3. Buttering corners of joints or excessive furrowing of mortar joints are not permitted.
4. Remove excess mortar as Work progresses.
5. Interlock intersections and external corners except where interior walls abut exterior walls. At these locations provide interlocking ladder type joint reinforcement in every other bed joint to provide lateral stability between the two walls; but do not interlock masonry. Rake head joint continuously to a depth of 3/8" where walls meet and fill joint with sealant.
6. Do not shift or tap masonry units after mortar has achieved initial set. Where adjustment is required, remove mortar and replace.
7. Perform Project Site cutting of masonry units with proper tools to assure straight, clean, unchipped edges. Prevent broken masonry unit corners or edges.
8. Cut mortar joints flush where wall tile is scheduled, resilient base is scheduled, cavity insulation is applied, or bitumen dampproofing is applied.
9. Isolate masonry from vertical structural framing members with movement joint.
10. Isolate top of masonry from horizontal structural framing members and slabs or decks with compressible joint filler.

F. Weeps and Vents: Provide cotton weeps in outer wythe of brick veneer at 48 inches on center horizontally above all through-wall flashing, shelf angles, and lintels. Provide vents in outer wythe of brick veneer at 48" on center horizontally above all through-wall flashing, shelf angles, lintels AND 24" on center continuously at the top of the wall.

G. Cavity Wall: Do not permit mortar to drop or accumulate into cavity air space or to plug weeps. Build inner wythe ahead of outer wythe to receive cavity insulation and air/vapor retarder adhesive.

H. Cavity Netting: Install mortar netting at base of walls above through wall flashing to a height of 16 inches.

I. Joint Reinforcement and Anchorage - Single-Wythe Masonry:
1. Install horizontal joint reinforcement 16 inches o.c. for running bond and 8 inches on center for stacked bond.
2. Place masonry joint reinforcement in first and second horizontal joints above and below openings. Extend minimum 16 inches each side of opening.
3. Place joint reinforcement continuous in first and second joint below top of walls.
4. Lap joint reinforcement ends minimum 6 inches.
5. Reinforce stack-bonded unit joint corners and intersections with strap anchors 16 inches o.c.

J. Joint Reinforcement and Anchorage - Masonry Veneer:

1. Install horizontal joint reinforcement 16 inches on center for running bond and 8 inches on center for stacked bond.
2. Place masonry joint reinforcement in first and second horizontal joints above and below openings. Extend minimum 16 inches each side of opening.
3. Place joint reinforcement continuous in first and second joint below top of walls.
4. Lap joint reinforcement ends minimum 6 inches.
5. Embed wall ties in masonry backing to bond veneer at maximum 16 inches o.c. vertically and 16 inches o.c. horizontally. Place wall ties at maximum 8 inches o.c. vertically within 8 inches of jamb of wall openings.
6. Reinforce stack-bonded unit joint corners and intersections with strap anchors 16 inches o.c.

K. Masonry Flashings:
1. Extend flashings horizontally through outer wythe at foundation walls, above ledge or shelf angles and lintels, under parapet caps, at bottom of walls, and cut flush with face of brick.
2. Turn flashing up minimum 8 inches and bed into mortar joint of masonry backing.
3. Lap end joints minimum 6 inches and seal watertight.
4. Turn flashing, fold, and seal at corners, bends, and interruptions.

L. Lintels:
1. Install loose steel or concrete masonry bond beam lintels over openings.
2. Install reinforced unit masonry lintels over miscellaneous openings less than 24 inches wide where lintels are not scheduled or indicated.
3. Do not splice reinforcing bars.
4. Support and secure reinforcing bars from displacement.
5. Place and consolidate grout fill without displacing reinforcing.
6. Allow masonry lintels to attain specified strength before removing temporary supports.
7. Maintain minimum 8-inch bearing on each side of opening.

M. Dampproofing
1. Apply dampproofing to concealed face of concrete masonry units associated with exterior cavity walls in accordance with manufacturers written instructions.

N. Grouted Components:
1. Reinforce bond beams and pilasters as indicated on Drawings. Maintain minimum of 1 inch clearance from bottom web.
2. Lap splices bar diameters as required by code.
3. Support and secure reinforcing bars from displacement.
4. Place and consolidate grout fill without displacing reinforcing.
5. At bearing locations, fill masonry cores with grout for minimum 12 inches both sides of opening.

O. Reinforced Masonry:
1. Lay masonry units with cells vertically aligned and cavities between wythes clear of mortar and unobstructed.
2. Place reinforcement bars as indicated on Drawings.
3. Splice reinforcement as specified in Section 033000 – Cast-In-Place Concrete.
4. Support and secure reinforcement from displacement.
5. Place and consolidate grout fill without displacing reinforcing.
6. Place grout according to ACI 530.1.

P. Control and Expansion Joints:

1. Install control joints at the following maximum spacings, unless otherwise indicated on Drawings:

a. Exterior Walls: 20 feet o.c. and within 24 inches on one side of each interior and exterior corner.
b. Interior Walls: 30 feet o.c.
c. At changes in wall height.

2. Do not continue horizontal joint reinforcement through control joints.
3. Install preformed control joint device in continuous lengths. Seal butt and corner joints.
4. Size control joint as specified in Section 079000 - Joint Protection for sealant performance.

Q. Built-in Work:
1. As Work progresses, install fabricated metal frames wood nailing strips anchor bolts plates and other items to be built in the Work and furnished by other Sections.
2. Install built-in items plumb and level.
3. Bed anchors of metal door and glazed frames in adjacent mortar joints. Fill frame voids solid with grout or mortar. Fill adjacent masonry cores with grout minimum 12 inches from framed openings.
4. Do not build in materials subject to deterioration.
5. Fill cells of CMU with masonry sand in locations where acoustic walls are specified on the drawings.

R. Cutting and Fitting:
1. Cut and fit for chases, pipes, conduit, sleeves, and grounds. Coordinate with other Sections of Work to provide correct size, shape, and location.
2. Obtain Architect/Engineer's approval prior to cutting or fitting masonry Work not indicated or where appearance or strength of masonry Work may be impaired.

3.4 TOLERANCES

A. Section 014000 - Quality Requirements: Requirements for tolerances.

B. Maximum Variation from Alignment of Columns and/or Pilasters: 1/4 inch.

C. Maximum Variation from Unit to Adjacent Unit: 1/16 inch.

D. Maximum Variation from Plane of Wall: 1/4 inch in 10 feet and 1/2 inch in 20 feet or more.

E. Maximum Variation from Plumb: 1/4 inch per story non-cumulative; 1/2 inch in two stories or more.

F. Maximum Variation from Level Coursing: 1/8 inch in 3 feet and 1/4 inch in 10 feet; 1/2 inch in 30 feet.

G. Maximum Variation of Joint Thickness: 1/8 inch in 3 feet.

H. Maximum Variation from Cross Sectional Thickness of Walls: 1/4 inch.

I. Maximum Variation for Steel Reinforcement:
1. Install reinforcement within the tolerances specified in ACI 530.1 for foundation walls.
2. Plus or minus 1/2 inch when distance from centerline of steel to opposite face of masonry is 8 inches or less.
3. Plus or minus 1 inch when distance is between 8 and 24 inches.
4. Plus or minus 1-1/4 inch when distance is greater than 24 inches.
5. Plus or minus 2 inches from location along face of wall.

3.5 CLEANING

A. Section 017000 - Execution and Closeout Requirements: Requirements for cleaning.

B. Remove excess mortar and mortar smears as Work progresses.

C. Replace defective mortar. Match adjacent Work.

D. Clean soiled surfaces with cleaning solution.

E. Use non-metallic tools in cleaning operations.

3.6 PROTECTION

A. Section 017000 - Execution and Closeout Requirements: Requirements for protecting finished Work.

B. Protect exposed external corners subject to damage.

C. Protect base of walls from mud and mortar splatter.

D. Protect masonry and other items built into masonry walls from mortar droppings and staining caused by mortar.

E. Protect tops of masonry Work with waterproof coverings secured in place without damaging masonry. Provide coverings where masonry is exposed to weather when Work is not in progress. Maintain protection on tops of completed exterior walls until installation of permanent waterproof cap materials.

3.7 SCHEDULE

A. Unit Masonry Assemblies include, but are not necessary limited to:
   1. Exterior Cavity Walls: brick veneer on structural load-bearing reinforced single wythe concrete masonry unit.
   2. Interior Partitions: Single wythe concrete masonry units. Stack bond.
   3. Masonry infill and repair of new or existing openings in masonry wall assemblies. Infill openings to match existing; tooth-in new work with existing unless otherwise noted on the drawings
   4. Cutting and patching of existing masonry as required to conceal new plumbing &/or electrical raceways.
   5. New openings in existing masonry assemblies: Provide new steel support as appropriate for the size of the new opening. Cut and patch masonry as required to install new steel. Provide flashing and vents in exterior walls where new lintels are installed.

END OF SECTION 042000

SECTION 051200 - STRUCTURAL STEEL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Structural steel.
2. Prefabricated building columns.
3. Grout.

B. Related Sections:

1. Division 1 Section "Quality Requirements" for independent testing agency procedures and administrative requirements.
2. Division 5 Section "Architecturally Exposed Structural Steel Framing" for additional requirements for architecturally exposed structural steel.
3. Division 5 Section "Steel Deck" for field installation.
4. Division 5 Section "Metal Fabrications" for steel lintels and shelf angles not attached to structural-steel frame, miscellaneous steel fabrications, and other metal items not defined as structural steel.
5. Division 5 Section "Metal Stairs."
6. Division 9 painting Sections for surface-preparation and priming requirements.

1.3 DEFINITIONS

A. Structural Steel: Elements of structural-steel frame, as classified by AISC 303, "Code of Standard Practice for Steel Buildings and Bridges."

1.4 PERFORMANCE REQUIREMENTS

A. Connections: Provide details of connections required by the Contract Documents to be selected or completed by structural-steel fabricator, to withstand loads indicated and comply with other information and restrictions indicated.

1.5 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings: Show fabrication of structural-steel components.

1. Include details of cuts, connections, splices, camber, holes, and other pertinent data.
2. Include embedment drawings.
3. Indicate welds by standard AWS symbols, distinguishing between shop and field welds, and show size, length, and type of each weld. Show backing bars that are to be removed and supplemental fillet welds where backing bars are to remain.
4. Indicate type, size, and length of bolts, distinguishing between shop and field bolts. Identify pretensioned and slip-critical high-strength bolted connections.
5. For structural-steel connections indicated to comply with design loads, include structural design data .

C. Welding Procedure Specifications (WPSs) and Procedure Qualification Records (PQRs): Provide according to AWS D1.1/D1.1M, "Structural Welding Code - Steel," for each welded joint , including the following:

1. Power source (constant current or constant voltage).
2. Electrode manufacturer and trade name, for demand critical welds.

D. Qualification Data: For qualified Installer AND fabricator.

E. Welding certificates.

F. Paint Compatibility Certificates: From manufacturers of topcoats applied over shop primers, certifying that shop primers are compatible with topcoats.

G. Mill test reports for structural steel, including chemical and physical properties.

H. Product Test Reports: For the following:

1. Bolts, nuts, and washers including mechanical properties and chemical analysis.
2. Direct-tension indicators.
3. Tension-control, high-strength bolt-nut-washer assemblies.
4. Shear stud connectors.
5. Shop primers.
6. Nonshrink grout.

I. Source quality-control reports.

1.6 QUALITY ASSURANCE

A. Fabricator Qualifications: A qualified fabricator that participates in the AISC Quality Certification Program and is designated an AISC-Certified Plant, Category STD., OR

AWS SHOP CERTIFIED OR employ an independent special inspection agency to verify the fabrication of all structural members. This inspection agency shall have AWS D1.1 qualifications and be approved by the Engineer and Owner. The Special Inspection agency (for the steel fabricator) must submit reports of acceptance for all shop fabricated items as required in KBC-2007, section 1704.2 and 1704.3. The cost of this shall be the sole responsibility of the Steel Fabricator. Any material sent to the site without a report of acceptance from the fabricator's special inspector will be inspected by the owner's special inspector. The cost of these additional tests will be deducted from the contractor's application for payment. If the lack of inspections from the fabricator persists, then owner's special inspector will be sent to the fabricator's shop daily to inspect all of the material for this project and the costs for these inspections will be deducted from the contractor's application for payment (NO EXCEPTIONS).

B. Installer Qualifications: A qualified installer with a minimum of 5 years experience on projects of similar (or larger) scale, with regard to size and complexity.

C. Shop-Painting Applicators: Qualified according to AISC's Sophisticated Paint Endorsement P1 or SSPC-QP 3, "Standard Procedure for Evaluating Qualifications of Shop Painting Applicators."

D. Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."

E. Comply with applicable provisions of the following specifications and documents:

1. AISC 303.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Store materials to permit easy access for inspection and identification. Keep steel members off ground and spaced by using pallets, dunnage, or other supports and spacers. Protect steel members and packaged materials from corrosion and deterioration.

1. Do not store materials on structure in a manner that might cause distortion, damage, or overload to members or supporting structures. Repair or replace damaged materials or structures as directed.

B. Store fasteners in a protected place in sealed containers with manufacturer's labels intact.

1. Fasteners may be repackaged provided Owner's testing and inspecting agency observes repackaging and seals containers.
2. Clean and relubricate bolts and nuts that become dry or rusty before use.
3. Comply with manufacturers' written recommendations for cleaning and lubricating ASTM F 1852 fasteners and for retesting fasteners after lubrication.

1.8 COORDINATION

A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' recommendations to ensure that shop primers and topcoats are compatible with one another.

B. Coordinate installation of anchorage items to be embedded in or attached to other construction without delaying the Work. Provide setting diagrams, sheet metal templates, instructions, and directions for installation.

PART 2 - PRODUCTS

2.1 STRUCTURAL-STEEL MATERIALS

A. W-Shapes: ASTM A 992/A 992M .

B. Channels, Angles, M , S-Shapes: ASTM A 36/A 36M.

C. Plate and Bar: ASTM A 36/A 36M.

D. Corrosion-Resisting Structural-Steel Shapes, Plates, and Bars: ASTM A 588/A 588M, Grade 50 (345).

E. Cold-Formed Hollow Structural Sections: ASTM A 500, Grade B, structural tubing.

F. Corrosion-Resisting Cold-Formed Hollow Structural Sections: ASTM A 847/A 847M, structural tubing.

G. Steel Pipe: ASTM A 53/A 53M, Type E or S, Grade B.

1. Weight Class: As indicated on drawings.
2. Finish: Painted, except where indicated to be galvanized.

H. Steel Castings: ASTM A 216/A 216M, Grade WCB with supplementary requirement S11.

I. Steel Forgings: ASTM A 668/A 668M.

J. Welding Electrodes: Comply with AWS requirements.

2.2 BOLTS, CONNECTORS, AND ANCHORS

A. High-Strength Bolts, Nuts, and Washers: ASTM A 325, Type 1, heavy-hex steel structural bolts; ASTM A 563, Grade C, heavy-hex carbon-steel nuts; and ASTM F 436 Type 1, hardened carbon-steel washers; all with plain finish.

B. Tension-Control, High-Strength Bolt-Nut-Washer Assemblies: ASTM F 1852, Type 1, round head assemblies consisting of steel structural bolts with splined ends, heavy-hex carbon-steel nuts, and hardened carbon-steel washers.

1. Finish: Plain.

C. Shear Connectors: ASTM A 108, Grades 1015 through 1020, headed-stud type, cold-finished carbon steel; AWS D1.1/D1.1M, Type B.

D. Unheaded Anchor Rods: ASTM F 1554, Grade 55, weldable.

1. Configuration: Hooked.
2. Nuts: ASTM A 563 heavy-hex carbon steel.
3. Plate Washers: ASTM A 36/A 36M carbon steel.
4. Washers: ASTM F 436 , Type 1, hardened carbon steel.
5. Finish: Plain.

E. Headed Anchor Rods: ASTM F 1554, Grade 55, weldable, straight.

1. Nuts: ASTM A 563 (ASTM A 563M) heavy-hex carbon steel.
2. Plate Washers: ASTM A 36/A 36M carbon steel.
3. Washers: ASTM F 436 (ASTM F 436M), Type 1, hardened carbon steel.
4. Finish: Plain.

F. Threaded Rods: ASTM A 36/A 36M .

1. Nuts: ASTM A 563 heavy-hex carbon steel.
2. Washers: ASTM F 436 , Type 1, hardened carbon steel.
3. Finish: Plain.

G. Clevises andTurnbuckles: Made from cold-finished carbon steel bars, ASTM A 108, Grade 1035.

H. Eye Bolts and Nuts: Made from cold-finished carbon steel bars, ASTM A 108, Grade 1030.

I. Sleeve Nuts: Made from cold-finished carbon steel bars, ASTM A 108, Grade 1018.

2.3 PRIMER

A. Primer: Comply with Division 9 painting Sections.

B. Primer: SSPC-Paint 25, Type I, zinc oxide, alkyd, linseed oil primer.

C. Primer: SSPC-Paint 25 BCS, Type I, zinc oxide, alkyd, linseed oil primer.

D. Primer: SSPC-Paint 23, latex primer.

E. Primer: Fabricator's standard lead- and chromate-free, nonasphaltic, rust-inhibiting primer complying with MPI#79 and compatible with topcoat.

F. Galvanizing Repair Paint: ASTM A 780.

G. Primer: SSPC-Paint 20 shall be used for all exposed exterior steel.

2.4 GROUT

A. Metallic, Shrinkage-Resistant Grout: ASTM C 1107, factory-packaged, metallic aggregate grout, mixed with water to consistency suitable for application and a 30-minute working time.

2.5 FABRICATION

A. Structural Steel: Fabricate and assemble in shop to greatest extent possible. Fabricate according to AISC's "Code of Standard Practice for Steel Buildings and Bridges" and AISC 360.

1. Camber structural-steel members where indicated.
2. Fabricate beams with rolling camber up.
3. Identify high-strength structural steel according to ASTM A 6/A 6M and maintain markings until structural steel has been erected.
4. Mark and match-mark materials for field assembly.
5. Complete structural-steel assemblies, including welding of units, before starting shop-priming operations.

B. Thermal Cutting: Perform thermal cutting by machine to greatest extent possible.

1. Plane thermally cut edges to be welded to comply with requirements in AWS D1.1/D1.1M.

C. Bolt Holes: Cut, drill, or punch standard bolt holes perpendicular to metal surfaces.

D. Finishing: Accurately finish ends of columns and other members transmitting bearing loads.

E. Cleaning: Clean and prepare steel surfaces that are to remain unpainted according to SSPC-SP 2, "Hand Tool Cleaning."

F. Shear Connectors: Prepare steel surfaces as recommended by manufacturer of shear connectors. Use automatic end welding of headed-stud shear connectors according to AWS D1.1/D1.1M and manufacturer's written instructions.

G. Steel Wall-Opening Framing: Select true and straight members for fabricating steel wall-opening framing to be attached to structural steel. Straighten as required to provide uniform, square, and true members in completed wall framing.

H. Holes: Provide holes required for securing other work to structural steel and for other work to pass through steel framing members.

1. Cut, drill, or punch holes perpendicular to steel surfaces. Do not thermally cut bolt holes or enlarge holes by burning.
2. Baseplate Holes: Cut, drill, mechanically thermal cut, or punch holes perpendicular to steel surfaces.
3. Weld threaded nuts to framing and other specialty items indicated to receive other work.

2.6 SHOP CONNECTIONS

A. High-Strength Bolts: Shop install high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts" for type of bolt and type of joint specified.

1. Joint Type: Pretensioned (TORQUE CONTROL BOLTS).

2.7 SHOP PRIMING

A. Shop prime steel surfaces except the following:

1. Surfaces embedded in concrete or mortar. Extend priming of partially embedded members to a depth of 2 inches (50 mm).
2. Surfaces to be field welded.
3. Surfaces to be high-strength bolted with slip-critical connections.
4. Surfaces to receive sprayed fire-resistive materials (applied fireproofing).
5. Galvanized surfaces.

B. Surface Preparation: Clean surfaces to be painted. Remove loose rust and mill scale and spatter, slag, or flux deposits. Prepare surfaces according to the following specifications and standards:

1. SSPC-SP 2, "Hand Tool Cleaning."
2. SSPC-SP 3, "Power Tool Cleaning."

C. Priming: Immediately after surface preparation, apply primer according to manufacturer's written instructions and at rate recommended by SSPC to provide a minimum dry film thickness of 1.5 mils (0.038 mm). Use priming methods that result in full coverage of joints, corners, edges, and exposed surfaces.

2.8 GALVANIZING

A. Hot-Dip Galvanized Finish: Apply zinc coating by the hot-dip process to structural steel according to ASTM A 123/A 123M.

1. Fill vent and drain holes that will be exposed in the finished Work unless they will function as weep holes, by plugging with zinc solder and filing off smooth.
2. Galvanize lintels, shelf angles and welded door frames attached to structural-steel frame and located in exterior walls.

2.9 SOURCE QUALITY CONTROL

A. Testing Agency: Owner will engage an independent testing and inspecting agency to perform shop tests and inspections and prepare test reports.

1. Provide testing agency with access to places where structural-steel work is being fabricated or produced to perform tests and inspections.

B. Correct deficiencies in Work that test reports and inspections indicate does not comply with the Contract Documents.

C. Bolted Connections: Shop-bolted connections will be inspected according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."

D. Welded Connections: In addition to visual inspection, shop-welded connections will be tested and inspected according to AWS D1.1/D1.1M and the following inspection procedures, at testing agency's option:

1. Liquid Penetrant Inspection: ASTM E 165.
2. Magnetic Particle Inspection: ASTM E 709; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration will not be accepted.
3. Ultrasonic Inspection: ASTM E 164.
4. Radiographic Inspection: ASTM E 94.

E. In addition to visual inspection, shop-welded shear connectors will be tested and inspected according to requirements in AWS D1.1/D1.1M for stud welding and as follows:

1. Bend tests will be performed if visual inspections reveal either a less-than-continuous 360-degree flash or welding repairs to any shear connector.
2. Tests will be conducted on additional shear connectors if weld fracture occurs on shear connectors already tested, according to requirements in AWS D1.1/D1.1M.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify, with steel Erector present, elevations of concrete- and masonry-bearing surfaces and locations of anchor rods, bearing plates, and other embedments for compliance with requirements.

1. Prepare a certified survey of bearing surfaces, anchor rods, bearing plates, and other embedments showing dimensions, locations, angles, and elevations.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Provide temporary shores, guys, braces, and other supports during erection to keep structural steel secure, plumb, and in alignment against temporary construction loads and loads equal in intensity to design loads. Remove temporary supports when permanent structural steel, connections, and bracing are in place unless otherwise indicated.

1. Do not remove temporary shoring supporting composite deck construction until cast-in-place concrete has attained its design compressive strength.

3.3 ERECTION

A. Set structural steel accurately in locations and to elevations indicated and according to AISC 303 and AISC 360.

B. Base Bearing and Leveling Plates: Clean concrete- and masonry-bearing surfaces of bond-reducing materials, and roughen surfaces prior to setting plates. Clean bottom surface of plates.

1. Set plates for structural members on wedges, shims, or setting nuts as required.
2. Weld plate washers to top of baseplate.
3. Snug-tighten anchor rods after supported members have been positioned and plumbed. Do not remove wedges or shims but, if protruding, cut off flush with edge of plate before packing with grout.
4. Promptly pack grout solidly between bearing surfaces and plates so no voids remain. Neatly finish exposed surfaces; protect grout and allow to cure. Comply with manufacturer's written installation instructions for shrinkage-resistant grouts.

C. Maintain erection tolerances of structural steel within AISC's "Code of Standard Practice for Steel Buildings and Bridges."

D. Align and adjust various members that form part of complete frame or structure before permanently fastening. Before assembly, clean bearing surfaces and other surfaces that will be in permanent contact with members. Perform necessary adjustments to compensate for discrepancies in elevations and alignment.

1. Level and plumb individual members of structure.
2. Make allowances for difference between temperature at time of erection and mean temperature when structure is completed and in service.

E. Splice members only where indicated.

F. Do not use thermal cutting during erection

G. Do not enlarge unfair holes in members by burning or using drift pins. Ream holes that must be enlarged to admit bolts.

H. Shear Connectors: Prepare steel surfaces as recommended by manufacturer of shear connectors. Use automatic end welding of headed-stud shear connectors according to AWS D1.1/D1.1M and manufacturer's written instructions.

3.4 FIELD CONNECTIONS

A. High-Strength Bolts: Install high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts" for type of bolt and type of joint specified.

1. Joint Type: Pretensioned.
2. "Code of Standard Practice for Steel Buildings and Bridges" for mill material.

3.5 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified independent testing and inspecting agency to inspect field welds and high-strength bolted connections.

B. Bolted Connections: Bolted connections will be inspected according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."

C. Welded Connections: Field welds will be visually inspected according to AWS D1.1/D1.1M.

1. In addition to visual inspection, field welds will be tested and inspected according to AWS D1.1/D1.1M and the following inspection procedures, at testing agency's option:

a. Liquid Penetrant Inspection: ASTM E 165.
b. Magnetic Particle Inspection: ASTM E 709; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration will not be accepted.
c. Ultrasonic Inspection: ASTM E 164.
d. Radiographic Inspection: ASTM E 94.

D. In addition to visual inspection, test and inspect field-welded shear connectors according to requirements in AWS D1.1/D1.1M for stud welding and as follows:

1. Perform bend tests if visual inspections reveal either a less-than-continuous 360-degree flash or welding repairs to any shear connector.
2. Conduct tests on additional shear connectors if weld fracture occurs on shear connectors already tested, according to requirements in AWS D1.1/D1.1M.

E. Correct deficiencies in Work that test reports and inspections indicate does not comply with the Contract Documents.

3.6 REPAIRS AND PROTECTION

A. Galvanized Surfaces: Clean areas where galvanizing is damaged or missing and repair galvanizing to comply with ASTM A 780.

B. Touchup Painting: Immediately after erection, clean exposed areas where primer is damaged or missing and paint with the same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.

1. Clean and prepare surfaces by SSPC-SP 2 hand-tool cleaning or SSPC-SP 3 power-tool cleaning.

C. Touchup Painting: Cleaning and touchup painting are specified in Division 9 painting Sections.

END OF SECTION 051200

SECTION 053100 - STEEL DECK

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Roof deck.
2. Noncomposite form deck.

~~C.~~B. ~~R~~elated Sections include the following:

1. Division 3 Section "Cast-in-Place Concrete" for concrete fill.
2. Division 5 Section "Structural Steel" for shop- and field-welded shear connectors.
3. Division 5 Section "Metal Fabrications" for framing deck openings with miscellaneous steel shapes.
4. Division 9 painting Sections for repair painting of primed deck.

1.3 SUBMITTALS

A. Product Data: For each type of deck, accessory, and product indicated.

B. Shop Drawings: Show layout and types of deck panels, anchorage details, reinforcing channels, pans, cut deck openings, special jointing, accessories, and attachments to other construction.

C. Product Certificates: For each type of steel deck, signed by product manufacturer.

D. Welding certificates.

E. Research/Evaluation Reports: For steel deck.

1.4 QUALITY ASSURANCE

A. Welding: Qualify procedures and personnel according to AWS D1.3, "Structural Welding Code - Sheet Steel."

B. Fire-Test-Response Characteristics: Where indicated, provide steel deck units identical to those tested for fire resistance per ASTM E 119 by a testing and inspecting agency acceptable to authorities having jurisdiction.

1. Fire-Resistance Ratings: Indicated by design designations of applicable testing and inspecting agency.
2. Steel deck units shall be identified with appropriate markings of applicable testing and inspecting agency.

C. AISI Specifications: Comply with calculated structural characteristics of steel deck according to AISI's "North American Specification for the Design of Cold-Formed Steel Structural Members."

D. FMG Listing: Provide steel roof deck evaluated by FMG and listed in its "Approval Guide, Building Materials" for Class 1 fire rating and Class 1-90 windstorm ratings.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Protect steel deck from corrosion, deformation, and other damage during delivery, storage, and handling.

B. Stack steel deck on platforms or pallets and slope to provide drainage. Protect with a waterproof covering and ventilate to avoid condensation.

1.6 COORDINATION

A. Coordinate installation of sound-absorbing insulation strips in topside ribs of acoustical deck with roofing installation specified in Division 7 to ensure protection of insulation strips against damage from effects of weather and other causes.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Steel Deck:

a. ASC Profiles, Inc.
b. Canam Steel Corp.;The Canam Manac Group.
c. Consolidated Systems, Inc.

d. DACS, Inc.
e. D-Mac Industries Inc.
f. Epic Metals Corporation.
g. Marlyn Steel Decks, Inc.
h. New Millennium Building Systems, LLC.
i. Nucor Corp.; Vulcraft Division.
j. Roof Deck, Inc.
k. United Steel Deck, Inc.
l. Valley Joist; Division of EBSCO Industries, Inc.
m. Verco Manufacturing Co.
n. Wheeling Corrugating Company; Div. of Wheeling-Pittsburgh Steel Corporation.

2.2 ROOF DECK

A. Steel Roof Deck: Fabricate panels, without top-flange stiffening grooves, to comply with "SDI Specifications and Commentary for Steel Roof Deck," in SDI Publication No. 30, and with the following:

1. Prime-Painted Steel Sheet: ASTM A 1008/A 1008M, Structural Steel (SS), Grade 33 minimum, shop primed with manufacturer's standard baked-on, rust-inhibitive primer.

   a. Color: Manufacturer's standard.

2. Galvanized Steel Sheet: ASTM A 653/A 653M, Structural Steel (SS), Grade 33 coating.
3. Galvanized and Shop-Primed Steel Sheet: ASTM A 653/A 653M, Structural Steel (SS), Grade 33, G60 zinc coating; cleaned, pretreated, and primed with manufacturer's standard baked-on, rust-inhibitive primer.

   a. Color: Manufacturer's standard.
4. Deck Profile:Type B(or N or BA acoustical – see plans) WR, wide rib.
5. Profile Depth: 1-1/2 inches or 3" (see plans).
6. Design Uncoated-Steel Thickness: 22 GAGE or 18 GAGE see plans.
7. Span Condition: Simple span.
8. Side Laps: Overlapped.

2.3 COMPOSITE FLOOR DECK

A. Composite Steel Floor Deck: Fabricate panels, with integrally embossed or raised pattern ribs and interlocking side laps, to comply with "SDI Specifications and Commentary for Composite Steel Floor Deck," in SDI Publication No. 29, the minimum section properties indicated, and the following:

1. Prime-Painted Steel Sheet: ASTM A 611, Grade **C** minimum, with top surface phosphatized and unpainted and bottom surface shop primed with gray or white baked-

on, lead- and chromate-free rust-inhibitive primer complying with performance requirements of FS TT-P-664.

2. Galvanized Steel Sheet: ASTM A 653/A 653M, Structural Steel (SS), Grade 33 ,**G60** zinc coating.
3. Galvanized and Shop-Primed Steel Sheet: ASTM A 653/A 653M, Structural Steel (SS), Grade 33 , G60 zinc coating; with unpainted top and bottom surface cleaned, pretreated, and primed with manufacturer's baked-on, lead- and chromate-free rust-inhibitive primer complying with performance requirements of FS TT-P-664.
4. Profile Depth: 3 **inches**.
5. Design Uncoated-Steel Thickness: 18 gage.
6. Span Condition: Single span & double span conditions.

2.4 NONCOMPOSITE FORM DECK

A. Noncomposite Steel Form Deck: Fabricate ribbed-steel sheet noncomposite form-deck panels to comply with "SDI Specifications and Commentary for Noncomposite Steel Form Deck," in SDI Publication No. 30, with the minimum section properties indicated, and with the following:

1. Uncoated Steel Sheet: ASTM A 1008/A 1008M, Structural Steel (SS), Grade 33 minimum.
2. Prime-Painted Steel Sheet: ASTM A 1008/A 1008M, Structural Steel (SS), Grade 33 minimum, with top and underside surface shop primed with manufacturer's standard baked-on, rust-inhibitive primer.

    a. Color: Manufacturer's standard.

3. Galvanized Steel Sheet: ASTM A 653/A 653M, Structural Steel (SS), Grade [33] G90 zinc coating.

    a. Color: Manufacturer's standard.

4. Profile Depth: 9/16 inch.
5. Design Uncoated-Steel Thickness: 26 GAGE.
6. Span Condition: Simple span.
7. Side Laps: Overlapped.

2.5 ACCESSORIES

A. General: Provide manufacturer's standard accessory materials for deck that comply with requirements indicated.

B. Mechanical Fasteners: Corrosion-resistant, low-velocity, power-actuated ; or self-drilling, self-threading screws.

C. Side-Lap Fasteners: Corrosion-resistant, hexagonal washer head; self-drilling, carbon-steel screws, No. 10 minimum diameter.

D. Flexible Closure Strips: Vulcanized, closed-cell, synthetic rubber.

E. Miscellaneous Sheet Metal Deck Accessories: Steel sheet, minimum yield strength of 33,000 psi, not less than 0.0359-inch design uncoated thickness, of same material and finish as deck; of profile indicated or required for application.

F. Pour Stops and Girder Fillers: Steel sheet, minimum yield strength of 33,000 psi, of same material and finish as deck, and of thickness and profile recommended by SDI Publication No. 30 for overhang and slab depth.

G. Column Closures, End Closures, Z-Closures, and Cover Plates: Steel sheet, of same material, finish, and thickness as deck, unless otherwise indicated.

H. Piercing Hanger Tabs: Piercing steel sheet hanger attachment devices for use with floor deck.

I. Weld Washers: Uncoated steel sheet, shaped to fit deck rib, 0.0598 inch [0.0747 inch] thick, with factory-punched hole of 3/8-inch minimum diameter.

J. Recessed Sump Pans: Single-piece steel sheet, 0.0747 inch thick, of same material and finish as deck, with 3-inch- wide flanges and [level] [sloped] recessed pans of 1-1/2-inch minimum depth. For drains, cut holes in the field.

K. Flat Sump Plate: Single-piece steel sheet, 0.0747 inch thick, of same material and finish as deck. For drains, cut holes in the field.

L. Galvanizing Repair Paint: [ASTM A 780] [SSPC-Paint 20 or DOD-P-21035, with dry film containing a minimum of 94 percent zinc dust by weight].

M. Repair Paint: Manufacturer's standard rust-inhibitive primer of same color as primer.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine supporting frame and field conditions for compliance with requirements for installation tolerances and other conditions affecting performance.

3.2 INSTALLATION, GENERAL

A. Install deck panels and accessories according to applicable specifications and commentary in SDI Publication No. 30, manufacturer's written instructions, and requirements in this Section.

B. Install temporary shoring before placing deck panels, if required to meet deflection limitations.

C. Locate deck bundles to prevent overloading of supporting members.

D. Place deck panels on supporting frame and adjust to final position with ends accurately aligned and bearing on supporting frame before being permanently fastened. Do not stretch or contract side-lap interlocks.

E. Place deck panels flat and square and fasten to supporting frame without warp or deflection.

F. Cut and neatly fit deck panels and accessories around openings and other work projecting through or adjacent to deck.

G. Provide additional reinforcement and closure pieces at openings as required for strength, continuity of deck, and support of other work.

H. Comply with AWS requirements and procedures for manual shielded metal arc welding, appearance and quality of welds, and methods used for correcting welding work.

I. Mechanical fasteners may be used in lieu of welding to fasten deck. Locate mechanical fasteners and install according to deck manufacturer's written instructions.

3.3 ROOF-DECK INSTALLATION

A. Fasten roof-deck panels to steel supporting members using Mechanical fasteners as indicated in the plans. :

B. Side-Lap and Perimeter Edge Fastening: Fasten side laps and perimeter edges of panels between supports, at intervals not exceeding the amounts indicated on the plans and as follows:

1. Mechanically fasten with self-drilling, No. 10 diameter or larger, carbon-steel screws.

C. End Bearing: Install deck ends over supporting frame with a minimum end bearing of 1-1/2 inches, with end joints as follows:

1. End Joints: Lapped 2 inches minimum.

D. Roof Sump Pans and Sump Plates: Install over openings provided in roof deck and mechanically fasten flanges to top of deck. Space mechanical fasteners not more than 12 inches apart with at least one fastener at each corner.

1. Install reinforcing channels or zees in ribs to span between supports and mechanically fasten.

E. Miscellaneous Roof-Deck Accessories: Install ridge and valley plates, finish strips, end closures, and reinforcing channels according to deck manufacturer's written instructions. mechanically fasten to substrate to provide a complete deck installation.

F. Sound-Absorbing Insulation: Installation into topside ribs of deck as specified. In areas designated on plans the roof deck type BA acoustical shall be provided under this section and installed under the roofing specifications.

3.4 FLOOR-DECK INSTALLATION

A. Fasten floor-deck panels to steel supporting members by arc spot (puddle) welds of the surface diameter indicated and as follows:

1. Weld Diameter: 5/8 inch , nominal.
2. Weld Spacing: Space and locate welds as indicated.
3. Weld Washers: Install weld washers at each weld location.

B. Side-Lap and Perimeter Edge Fastening: Fasten side laps and perimeter edges of panels between supports, at intervals not exceeding the lesser of half of the span or 36 inches, and as follows:

1. Mechanically fasten with self-drilling, No. 10 diameter or larger, carbon-steel screws.
2. Fasten with a minimum of 1-1/2-inch- long welds.

C. End Bearing: Install deck ends over supporting frame with a minimum end bearing of [1-1/2 inches , with end joints as follows:

1. End Joints: Lapped.

D. Pour Stops and Girder Fillers: Weld steel sheet pour stops and girder fillers to supporting structure according to SDI recommendations, unless otherwise indicated.

E. Floor-Deck Closures: Weld steel sheet column closures, cell closures, and Z-closures to deck, according to SDI recommendations, to provide tight-fitting closures at open ends of ribs and sides of deck.

3.5 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified independent testing and inspecting agency to perform field tests and inspections and prepare test reports.

B. Field welds will be subject to inspection.

C. Testing agency will report inspection results promptly and in writing to Contractor and Engineer.

D. Remove and replace work that does not comply with specified requirements.

E. Additional inspecting, at Contractor's expense, will be performed to determine compliance of corrected work with specified requirements.

3.6 REPAIRS AND PROTECTION

A. Galvanizing Repairs: Prepare and repair damaged galvanized coatings on both surfaces of deck with galvanized repair paint according to ASTM A 780 and manufacturer's written instructions.

B. Repair Painting: Wire brush and clean rust spots, welds, and abraded areas on both surfaces of prime-painted deck immediately after installation, and apply repair paint.

1. Apply repair paint, of same color as adjacent shop-primed deck, to bottom surfaces of deck exposed to view.

C. Repair Painting: Wire brushing, cleaning, and repair painting of rust spots, welds, and abraded areas of both deck surfaces are included in Division 9 ."

D. Provide final protection and maintain conditions to ensure that steel deck is without damage or deterioration at time of Substantial Completion.

END OF SECTION 053100

SECTION 055000 - METAL FABRICATIONS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
1. Shop-fabricated metal items.
2. Loose steel lintels.
3. Ledge and shelf angles.
4. Structural supports for miscellaneous attachments.

B. Related Requirements:
1. Section 033000 - Cast-In-Place Concrete: Execution requirements for embedded anchors and attachments for metal fabrications specified by this Section in concrete.
2. Section 042000 - Unit Masonry: Execution requirements for embedded anchors and attachments for metal fabrications specified by this Section in masonry.
3. Section 051200 - Structural Steel Framing: Structural steel column anchor bolts.
4. Section 052100 - Steel Joist Framing: Structural joist bearing plates, including anchorage.
5. Section 053113 - Steel Floor Decking: Bearing plates angles and for metal deck bearing, including anchorage.
6. Section 099000 - Painting and Coating: Field-applied paint finish.

1.2 REFERENCE STANDARDS

A. Aluminum Association:

1. AA DAF-45 - Designation System for Aluminum Finishes.

B. American Architectural Manufacturers Association:

1. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum.
2. AAMA 2603 - Voluntary Specification, Performance Requirements and Test Procedures for Pigmented Organic Coatings on Aluminum Extrusions and Panels.
3. AAMA 2604 - Voluntary Specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels.
4. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels.

C. American Welding Society:

1. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination.
2. AWS D1.1 - Structural Welding Code - Steel.
3. AWS D1.1M - Structural Welding Code - Steel.
4. AWS D1.6 - Structural Welding Code - Stainless Steel.
5. AWS D1.6M - Structural Welding Code - Stainless Steel.

D. ASTM International:

1. ASTM A36 - Standard Specification for Carbon Structural Steel.

2. ASTM A36M - Standard Specification for Carbon Structural Steel.
3. ASTM A53- Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
4. ASTM A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
5. ASTM A123 - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
6. ASTM A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
7. ASTM A153 - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
8. ASTM A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
9. ASTM A193 - Standard Specification for Alloy-Steel and Stainless Steel Bolting for High Temperature or High Pressure Service and Other Special Purpose Applications.
10. ASTM A193M - Standard Specification for Alloy-Steel and Stainless Steel Bolting for High Temperature or High Pressure Service and Other Special Purpose Applications.
11. ASTM A240 - Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications.
12. ASTM A240M - Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications.
13. ASTM A269 - Standard Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service.
14. ASTM A276 - Standard Specification for Stainless Steel Bars and Shapes.
15. ASTM A307 - Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength.
16. ASTM A312 - Standard Specification for Seamless, Welded, and Heavily Cold Worked Austenitic Stainless Steel Pipes.
17. ASTM A312M - Standard Specification for Seamless, Welded, and Heavily Cold Worked Austenitic Stainless Steel Pipes.
18. ASTM A325 - Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength.
19. ASTM A325M - Standard Specification for Structural Bolts, Steel, Heat Treated, 830 mPa Minimum Tensile Strength.
20. ASTM A354 - Standard Specification for Quenched and Tempered Alloy Steel Bolts, Studs, and Other Externally Threaded Fasteners.
21. ASTM A500 - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.
22. ASTM A500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.
23. ASTM A501 - Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing.
24. ASTM A554 - Standard Specification for Welded Stainless Steel Mechanical Tubing.
25. ASTM A563 - Standard Specification for Carbon and Alloy Steel Nuts.
26. ASTM A563M - Standard Specification for Carbon and Alloy Steel Nuts.
27. ASTM A572 - Standard Specification for High-Strength Low-Alloy Columbium-Vanadium Structural Steel.
28. ASTM A572M - Standard Specification for High-Strength Low-Alloy Columbium-Vanadium Structural Steel.
29. ASTM A653 - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
30. ASTM A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
31. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar.

32. ASTM A780 - Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings.
33. ASTM A780M - Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings.
34. ASTM A992 - Standard Specification for Structural Steel Shapes.
35. ASTM A992M - Standard Specification for Structural Steel Shapes.
36. ASTM B26 - Standard Specification for Aluminum-Alloy Sand Castings.
37. ASTM B26M - Standard Specification for Aluminum-Alloy Sand Castings.
38. ASTM B85 - Standard Specification for Aluminum-Alloy Die Castings.
39. ASTM B85M - Standard Specification for Aluminum-Alloy Die Castings.
40. ASTM B177 - Standard Guide for Engineering Chromium Electroplating.
41. ASTM B177M - Standard Guide for Engineering Chromium Electroplating.
42. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
43. ASTM B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
44. ASTM B210 - Standard Specification for Aluminum and Aluminum-Alloy Drawn Seamless Tubes.
45. ASTM B210M - Standard Specification for Aluminum and Aluminum-Alloy Drawn Seamless Tubes.
46. ASTM B211 - Standard Specification for Aluminum and Aluminum-Alloy Rolled or Cold Finished Bar, Rod, and Wire.
47. ASTM B211M - Standard Specification for Aluminum and Aluminum-Alloy Rolled or Cold-Finished Bar, Rod, and Wire.
48. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
49. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
50. ASTM B695 - Standard Specification for Coatings of Zinc Mechanically Deposited on Iron and Steel.
51. ASTM F436 - Standard Specification for Hardened Steel Washers.
52. ASTM F436M - Standard Specification for Hardened Steel Washers.
53. ASTM F1554 - Standard Specification for Anchor Bolts, Steel, 36, 55, and 105 ksi Yield Strength.

E. National Ornamental & Miscellaneous Metals Association:

1. NOMMA Guideline 1 - Joint Finishes.

F. SSPC: The Society for Protective Coatings:

1. SSPC - Steel Structures Painting Manual.
2. SSPC Paint 15 - Steel Joist Shop Primer/Metal Building Primer.
3. SSPC Paint 20 - Zinc-Rich Coating (Type I - Inorganic and Type II - Organic).
4. SSPC SP 1 - Solvent Cleaning.
5. SSPC SP 10 - Near-White Blast Cleaning.

1.3 SUBMITTALS

A. Only request submittals needed to verify compliance with Project requirements.

B. Section 013300 - Submittal Procedures: Submittal requirements.

C. Shop Drawings: Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories. Include erection drawings, elevations, and details where

applicable. Indicate welded connections using standard AWS A2.0 welding symbols. Indicate net weld lengths.

D. Samples: Provide 2 samples of welded wire mesh.

E. Welders Certificates: Certify welders employed on the Work, verifying AWS qualification within previous 12 months.

1.4 QUALITY ASSURANCE

A. Finish joints according to NOMMA Guideline 1.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Section 016000 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.

B. Inspection: Accept metal fabrications on-Site in labeled shipments. Inspect for damage.

C. Protect metal fabrications from damage by exposure to weather or by ground contact.

1.6 EXISTING CONDITIONS

A. Field Measurements: Verify field measurements prior to fabrication. Indicate field measurements on Shop Drawings.

PART 2 - PRODUCTS

2.1 LINTELS

A. Description:
1. Steel sections.
2. Size and Configuration:
   a. As indicated on Drawings.
   b. Length to allow 8-inch minimum bearing on both sides of opening.
3. Exterior Location Finish: Galvanized.
4. Interior Location Finish: Prime paint, one coat.

2.2 LEDGE AND SHELF ANGLES

A. Ledge and Shelf Angles Channels and Plates Not Attached to Structural Framing:

1. For support of metal decking, steel joists and/or masonry.
2. Finish: Galvanized.

2.3 STRUCTURAL SUPPORTS

A. Miscellaneous Structural Supports:

1. Description: Steel sections, shape and size as indicated on Drawings or as required to support applied loads with maximum deflection of 1/240 of the span.
2. Finish: Prime paint, one coat.

2.4 ANCHORS

A. Description:
1. ASTM A307; Grade A.
2. Shape: Hooked.
3. Furnish with nut and washer.
4. Finish: None.

2.5 MATERIALS

A. Steel:
1. Structural W Shapes: ASTM A992.
2. Structural Shapes: ASTM A36.
3. Channels and Angles: ASTM A36.
4. Steel Plate: ASTM A572; Grade 50.
5. Hollow Structural Sections: ASTM A500, Grade B.
6. Steel Pipe: ASTM A53, Grade B, Schedule 40.
7. Welded Wire Mesh: 3 Mesh Center to Center, .120 wire diameter
8. Bolts: ASTM A325; Type 1.
9. Nuts: ASTM A563; heavy-hex type.
10. Washers: ASTM F436; Type 1.
11. Welding Materials: AWS D1.1; type required for materials being welded.

B. Bolts, Nuts, and Washers for Equipment and Piping:
1. Carbon Steel:
   a. Structural Connections: ASTM A307, Grade A, hot-dip galvanized.
   b. Anchor Bolts: ASTM A307, Grade A, hot-dip galvanized.
   c. Pipe and Equipment Flange Bolts: ASTM A193, Grade B-7.

2. Stainless Steel: Type 316 stainless steel, Class 2; ASTM A193 for bolts; ASTM A194 for nuts.

2.6 FABRICATION

A. Fit and shop-assemble items in largest practical sections for delivery to Site.

B. Fabricate items with joints tightly fitted and secured.

C. Continuously seal joined members by intermittent welds and plastic filler.

D. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small, uniform radius.

E. Exposed Mechanical Fastenings: Flush countersunk screws or bolts; unobtrusively located; consistent with design of component, except where specifically noted otherwise.

F. Supply components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.

G. Fabrication Tolerances:
1. Squareness: 1/8-inch maximum difference in diagonal measurements.
2. Maximum Offset between Faces: 1/16 inch.
3. Maximum Misalignment of Adjacent Members: 1/16 inch.
4. Maximum Bow: 1/8 inch in 60 inches.
5. Maximum Deviation from Plane: 1/16 inch in 48 inches.

2.7 FINISHES

A. Steel:

1. Prepare surfaces to be primed according to SSPC SP 2.
2. Do not prime surfaces in direct contact with concrete or where field welding is required.
3. Prime-paint items with one coat except where galvanizing is specified.
4. Galvanizing: ASTM A123; hot-dip galvanize after fabrication.
5. Galvanizing for Fasteners, Connectors, and Anchors:
   a. Hot-Dip Galvanizing: ASTM A153.
   b. Mechanical Galvanizing: ASTM B695; Class 50 minimum.
6. Bolts: Hot-dip galvanized.
7. Nuts: Hot-dip galvanized.
8. Washers: Hot-dip galvanized.
9. Shop Primer: SSPC Paint 15, Type 1, gray oxide.
10. Touchup Primer: Match shop primer.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Section 013000 - Administrative Requirements: Requirements for installation examination.

B. Verify that field conditions are acceptable and are ready to receive Work.

3.2 PREPARATION

A. Section 017000 - Execution and Closeout Requirements: Requirements for installation preparation.

B. Clean and strip primed steel items to bare metal and aluminum where Site welding is required.

C. Supply steel items required to be cast into concrete or embedded in masonry with setting templates to appropriate sections.

3.3 INSTALLATION

A. Install items plumb and level, accurately fitted, and free from distortion or defects.

B. Make provisions for erection stresses. Install temporary bracing to maintain alignment until permanent bracing and attachments are installed.

C. Field-weld components indicated on Shop Drawings.

D. Perform field welding according to AWS D1.1.

E. Obtain approval of Architect/Engineer prior to Site cutting or making adjustments not scheduled.

3.4 TOLERANCES

A. Section 014000 - Quality Requirements: Requirements for tolerances.

B. Maximum Variation from Plumb: 1/4 inch per story or for every 12 feet in height, whichever is greater, non-cumulative.

C. Maximum Variation from Level: 1/16 inch in 3 feet and 1/4 inch in 10 feet.

D. Maximum Offset from Alignment: 1/4 inch.

E. Maximum Out-of-Position: 1/4 inch.

3.5 ADJUSTING

A. Section 017000 - Execution and Closeout Requirements: Requirements for starting and adjusting.

B. Adjust operating hardware and lubricate as necessary for smooth operation.

3.6 SCHEDULE

A. The following is a list of principal items only. Refer to Drawing details for item not specifically schedule.
   1. Ledge and Shelf Angles, Channels and Plates not attached to Structural Framing: For support of metal decking, at floor or roof penetrations where no specific detail is included in the drawings. Prime paint finish.
   2. Lintels: Including, but not limited to lintels detailed in drawings for masonry wall openings, lintels required for all mechanical &/or electrical masonry wall penetrations in new and/or existing walls and/or roof. Galvanized finish when exposed to exterior, otherwise prime paint finish.

END OF SECTION 055000

SECTION 061000 - CARPENTRY

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
1. Preservative treatment of wood.
2. Miscellaneous framing and sheathing.
3. Concealed wood blocking associated with wall and roof framing including roof curbs.
4. Wood furring and grounds.

B. Related Requirements:
1. Section 033000-Concrete Work: Setting anchors in concrete and concrete openings to receive wood blocking.
2. Section 042000 – Unit Masonry: Setting anchors in masonry and masonry openings to receive wood blocking.
3. Section 064100 - Custom Cabinets: Shop fabricated custom cabinet work.
4. Section 085113 – Aluminum Windows: Window openings to receive wood blocking.

1.2 REFERENCE STANDARDS

A. American National Standards Institute / American Hardboard Association:

1. ANSI/AHA A135.4 - Basic Hardboard.

B. American Wood Protection Association:

1. AWPA M4 - Standard for the Care of Preservative-Treated Wood Products.
2. AWPA U1 - Use Category System: User Specification for Treated Wood.

C. APA - The Engineered Wood Association:

1. APA - Plywood Design Specification, including supplements.
2. APA AFG-01 - Adhesives for Field-Gluing Plywood to Wood Framing.
3. APA PS 1 - Voluntary Product Standard - Structural Plywood.

D. ASTM International:

1. ASTM A153 - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
2. ASTM A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
3. ASTM B695 - Standard Specification for Coatings of Zinc Mechanically Deposited on Iron and Steel.
4. ASTM C1177 - Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing.
5. ASTM C1177M - Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing.
6. ASTM C1280 - Standard Specification for Application of Exterior Gypsum Panel Products for Use as Sheathing.

7. ASTM C1396 - Standard Specification for Gypsum Board.
8. ASTM C1396M - Standard Specification for Gypsum Board.
9. ASTM D2559 - Standard Specification for Adhesives for Bonded Structural Wood Products for Use Under Exterior Exposure Conditions.
10. ASTM D3498 - Standard Specification for Adhesives for Field-Gluing Plywood to Lumber Framing for Floor Systems.
11. ASTM D5456 - Standard Specification for Evaluation of Structural Composite Lumber Products.
12. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
13. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials.
14. ASTM F1667 - Standard Specification for Driven Fasteners: Nails, Spikes, and Staples.

E. Forest Stewardship Council:

1. FSC Guidelines.

F. National Lumber Grades Authority:

1. NLGA - Standard Grading Rules for Canadian Lumber.

G. Northeastern Lumber Manufacturers Association:

1. NELMA - Standard Grading Rules for Northeastern Lumber.

H. Redwood Inspection Service:

1. RIS - Standard Specifications for Grades of California Redwood Lumber.

I. South Coast Air Quality Management District:

1. SCAQMD Rule 1168 - Adhesive and Sealant Applications.

J. Southern Pine Inspection Bureau:

1. SPIB - Standard Grading Rules for Southern Pine Lumber.

K. West Coast Lumber Inspection Bureau:

1. WCLIB Standard 17 - Grading Rules for West Coast Lumber.

L. Western Wood Products Association:

1. WWPA - Western Lumber Grading Rules.

1.3 COORDINATION

A. Section 013000 - Administrative Requirements: Requirements for coordination.

B. Coordinate Work of this Section with installation of wood roof decking, and prefabricated wood trusses.

1.4 SUBMITTALS

A. Section 013300 - Submittal Procedures: Requirements for submittals.

B. Product Data: Submit manufacturer information on wood preservative materials, and all other products specified herein

C. Samples: Submit samples of all fiber cement products and Baltic birch plywood.

1.5 QUALITY ASSURANCE

A. Perform Work according to:
   1. Lumber Grading Agency: Certified by DOC PS 20.
   2. Wood Structural Panel Grading Agency: Certified by APA - The Engineered Wood Association.
   3. Lumber: DOC PS 20.
   4. Wood Structural Panels: DOC PS 1 or PS 2.

1.6 SEQUENCING

A. Section 011000 - Summary: Requirements for sequencing.

B. Sequence activities in phases; refer to Article 1.4 TIMES OF COMPLETION AND LIQUIDATED DAMAGES for a detailed description of phasing requirements.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Section 016000 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.

B. Inspection: Accept materials on Site in manufacturer's original packaging and inspect for damage.

C. Store materials according to manufacturer instructions.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Lumber:
   1. Lumber Grading Rules: Comply with APA RIS SPIB and WWPA.
   2. Beam Framing:
      a. Stress Group: S4S; select structural
      b. Species: Southern Pine
      c. Grade: No. 1 grade
      d. Maximum Moisture Content: 13 percent.
   3. Non-structural Light Framing:
      a. Stress Group: S4S, select structural

b. Species: Southern Pine
c. Grade: No. 2 grade
d. Maximum Moisture Content: 13 percent

4. Studding:
   a. Stress Group: S4S, stud grade
   b. Species: Southern Pine
   c. Grade: Stud Grade
   d. Maximum Moisture Content: 13 percent.

5. Miscellaneous Framing: same as non-structural light framing

B. Miscellaneous Sheathing:
   1. Wood Structural Panel Roof Sheathing:
      a. Description: APA plywood.
      b. Exposure Durability: as appropriate for the application required
      c. Facing: Sanded.

2.2 FACTORY WOOD TREATMENT

A. Wood Preservative: Exterior blocking and any wood member used in an exterior application except exposed trim shall be pressure treated as called for by Federal Spec TT-W-571 or the published standards of the American Wood preserver's Associations and the following:
   1. Maximum moisture content 30%.
   2. Use paintable type treatment where wood is scheduled for paint or which will come in contact with finish materials,
   3. All treated lumber shall be identified as to name of treated, preservative used and retention of preservative in pounds per cubic foot of lumber.
   4. All lumber shall be seasoned after treatment to content required for non-treated lumber.

2.3 ACCESSORIES - GENERAL

A. Fasteners and Anchors:

   1. Fasteners:
      a. High-Humidity and Treated Wood Locations: ASTM A153, hot-dip galvanized or stainless steel.
      b. Elsewhere: Unfinished steel.

   2. Nails and Staples: Comply with ASTM F1667.

   3. Anchors: Toggle bolt type for anchorage to hollow masonry. Expansion shield and lag bolt type for anchorage to solid masonry or concrete. Bolt or ballistic fastener for anchorages to steel.

B. Building Paper:
   1. Description: Unperforated asphalt felt.
   2. Comply with ASTM D226, Type II, No. 30.

PART 3 - EXECUTION

3.1 APPLICATION

A. Framing:
1. Select individual pieces such that knots and defects will not interfere with placement of bolts when nailing or making connections.
2. Discard defective pieces.
3. Set structural members level, plumb, and in correct position.
4. Fasten framing according to Kentucky Building code.
5. Make provisions for erection loads and for sufficient temporary bracing to maintain that structure is safe, plumb, and in alignment until completion of erection and installation of permanent bracing.
6. Place horizontal members crown side up.
7. Construct load-bearing framing and curb members full length without splices.
8. Openings:
   a. Double members at openings over 30 inches wide.
   b. Space short studs over and under opening to stud spacing.
9. Headers:
   a. Construct double-joist headers at floor openings, ceiling openings, and under-wall stud partitions parallel to floor joists.
   b. Frame rigidly into joists.
10. Roof Curbs:
   a. Curb roof openings except where prefabricated curbs are provided.
   b. Form corners by alternating lapping side members.

3.2 TOLERANCES - GENERAL

A. Section 014000 - Quality Requirements: Requirements for tolerances.

B. Framing and Furring Members to Receive a Finished Wall or Ceiling: Align finish surface to vary not more than 1/8 inch from a theoretical plane or surface of the room or space.

C. Other Framing Members: Maximum 1/4 inch from indicated position.

3.3 SCHEDULE

A. The following schedule is a list of principal items only. Refer to the drawings for a detailed description of carpentry requirements.
1. Roof Nailers, Curbs and Blocking: Pressure preservative treatment, 19 percent maximum moisture content; refer to drawings for locations.
2. Wall Blocking: Provide wall blocking in masonry cavity walls for new windows.

END OF SECTION 061000

SECTION 072600 -UNDER-SLAB VAPOR BARRIER

PART 1 – GENERAL

1.1 SUMMARY

A. Products supplied under this section:
   1. Vapor Barrier, seam tape, and mastic for installation under concrete slabs.

B. Related sections:
   1. Section 03 Cast-in-Place Concrete

1.2 REFERENCES

A. American Society for Testing and Materials (ASTM):
   1. ASTM E 1745-09 Standard Specification for Plastic Water Vapor Barriers Used in Contact with Soil or Granular Fill Under Concrete Slabs.
   2. ASTM E 154-99 (2005) Standard Test Methods for Water Vapor Barriers Used in Contact with Earth Under Concrete Slabs, on Walls, or as Ground Cover.
   3. ASTM E 96-05 Standard Test Methods for Water Vapor Transmission of Materials.
   4. ASTM F 1249-06 Standard Test Method for Water Vapor Transmission Rate Through Plastic Film and Sheeting Using a Modulated Infrared Sensor.
   5. ASTM E 1643-09 Selection, Design, Installation, and Inspection of Water Vapor Barriers Used in Contact with Earth or Granular Fill Under Concrete Slabs.

B. American Concrete Institute (ACI):
   1. ACI 302.2R-06 Guide for Concrete Slabs that Receive Moisture-Sensitive Flooring Materials.

1.3 SUBMITTALS

A. Quality control/assurance:
   1. Summary of test results as per paragraph 8.3 of ASTM E 1745.
   2. Manufacturer's samples, literature.
   3. Manufacturer's installation instructions for placement, seaming and penetration repair instructions.

PART 2 – PRODUCTS

2.1 MATERIALS

A. Vapor barrier must have all of the following qualities:
   1. Permeance as tested before and after mandatory conditioning (ASTM E 1745 Section 7.1 and sub-paragraphs 7.1.1 - 7.1.5): less than 0.01 Perms [grains/(ft^2 · hr · inHg)].
   2. Other performance criteria:
      a. Strength: ASTM E 1745 Class A.

B. Provide one of the following Vapor barrier products:

1. Stego Industries, LLC; Stego Wrap, 15 mil Class A
2. Insulation Solutions, Inc; Viper Vaporcheck 2
3. Raven Industries, Inc.; Vapor Block 15
4. W. R. Meadows, Inc. ; Perminator 15 mil

2.2 ACCESSORIES

A. Vapor Retarding Seam tape must have the following qualities:
   1. Water Vapor Transmission Rate less than or equal to 0.3 perms as tested by ASTM E96

B. Vapor Proofing Mastic must have the following qualities:
   1. Water Vapor Transmission Rate less than or equal to 0.3 perms as tested by ASTM E96.

C. Pipe Boots must be constructed from vapor barrier material, pressure sensitive tape and/or mastic per vapor barrier system manufacture's instructions.

PART 3 – EXECUTION

3.1 PREPARATION

A. Ensure that subsoil is approved by Engineer or Special Inspector.
   1. Level and compact base material.

3.2 INSTALLATION

A. Install vapor barrier in accordance with manufacturer's instructions and ASTM E 1643.
   1. Unroll vapor barrier with the longest dimension parallel with the direction of the concrete placement.
   2. Lap vapor barrier over footings and/or seal to foundation walls.
   3. Overlap joints 6 inches and seal with manufacturer's tape.
   4. Seal all penetrations (including pipes) per manufacturer's instructions.
   5. No penetration of the vapor barrier is allowed except for reinforcing steel and permanent utilities.
   6. Repair damaged areas by cutting patches of vapor barrier, overlapping damaged area 6 inches and taping all sides with tape.